# Forest Stewardship Plan for Herman Park


## Prepared for Suttons Bay Township by:

Linda Thomasma, Ph.D.
Two by Two Wildlife Consulting, LLC
(twobytwowildlife@gmail.com)

Plan Start Date: July 2017
Plan Duration: 20 years (July, 2037)

| Landowner Contact Information | Plan Writer Contact Information |
|---|---|
| Name: Suttons Bay Township<br>Parks and Recreation<br>William Drozdalski (contact) | Name: Linda Thomasma, Ph.D.<br>Two by Two Wildlife Consulting LLC |
| Address: 95 W. Fourth St.<br>P.O. Box 457<br>Suttons Bay, MI 49682 | Address: P.O. Box 155<br>Honor, MI 49640 |
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**Property Information**

| | | | | |
|---|---|---|---|---|
| Total Acres: Approximately 126 | Forested Acres: Approximately 103 | | Acres in Plan: Approximately 103 | Tax ID: |
| Town: 30N | Range: 11W | Sections: 32, 33 | Township: Suttons Bay | County: Leelanau |

Property Legal Description:
NE1/4 of the SE1/4 , E1/2 of the NE1/4 of Section 32 and the NW1/4 of the SW1/4, SW1/4 of the NW1/4 of Section 33, T30N R11W; Suttons Bay Township; Leelanau County

How to Find Property from Nearest Town:
Herman Park is located on the southside of Suttons Bay, MI. The main entrance to the park is located on South Herman Road near the intersection of South Herman and South Elm St.

**Participation in Related Forestry Programs**

__ I intend to enroll this parcel in the Qualified Forest Program (QF). [www.Michigan.gov/QFP]
__ I intend to enroll this parcel in the Commercial Forest Program (CF). [www.Michigan.gov/Commercial Forest]
__ I intend to enroll this parcel in the American Tree Farm System. [www.TreeFarmSystem.org]
__ I intend to apply to the NRCS for financial assistance. [www.nrcs.usda.gov]

**Michigan's Stewardship Ethic**

Stewardship is an ethic recognizing that the land and its natural inhabitants have an inherent worth and that we have a responsibility to consider the land as we protect, manage, utilize, and enjoy the forest. Stewardship guides us to conduct our activities to the utmost of our abilities, to insure the future health, productivity, diversity, and well-being of the land, its natural communities and species, and to provide opportunities to our successors that are at least equal to ours to use and enjoy the land and its resources.

**Signatures of Approval from the Landowner, Plan Writer, and DNR Service Forester**

| | |
|---|---|
| Landowner:<br>William Drozdalski<br>Suttons Bay Township Parks and Recreation | Date: 6/21/2017 |
| Plan Writer: Linda Thomasma | Date: 6/21/2017 |
| DNR Service Forester:<br>Mike Smallegan | Date: 6/21/2017 |

After review and approval by the Landowner, the Plan Writer will submit the entire Plan to the nearest DNR Service Forester for their review. Electronic submission of the Plan is encouraged by emailing a Word document or pdf file to the Service Forester. The DNR Service Forester will return a hard copy or pdf of the final signature page to the Plan Writer after approval.

## Table of Contents

**Introduction**

*Goals for Herman Park*

The Township has four primary goals for Herman Park; 1) determine if revenue could be generated through active timber management, 2) increase recreational opportunities, 3) evaluate potential threats associated with hazard trees, and 4) retain/enhance local biodiversity, including the promotion of wildlife corridors within the landscape.

Specifically, the township would like to determine if logging is a viable financial option and would it conflict with recreational objectives. The Leelanau Trail is a popular part of the TART Trail System. It is a 17 mile paved, off-road trail between Suttons Bay and Traverse City. The township would like to provide a link between the Leelanau Trail and the developed portion of Herman Park. Emerald Ash Borer, Beech-Bark Disease, and Oak Wilt have left dead and dying trees throughout the region. Standing dead trees pose potential safety threats to park visitors. This threat will need to be addressed as recreational opportunities increase within the Park. The land use/land cover of the neighborhood encompassing the park is diverse and fragmented. Do the habitats that comprise Herman Park contribute to the local diversity and are these habitats well connected? This report will address the Township's objectives and the management recommendations required to meet those objectives.

*General Property Description*

Herman Park is 126 acres in size with approximately 103 acres of diverse, predominantly mixed forested/Scrub-Shrub wetland and 23 acres of developed parkland including; tennis and pickle-ball courts, an accessible paved walking trail, soccer field, a disk golf-course, and two children's fishing ponds. The Park is located in Leelanau County just south of the village of Suttons Bay (Figure 1). The watershed that incorporates the Park drains into Suttons Bay via Leo Creek (Lake Michigan Watershed, 04060200) (Figure 2).

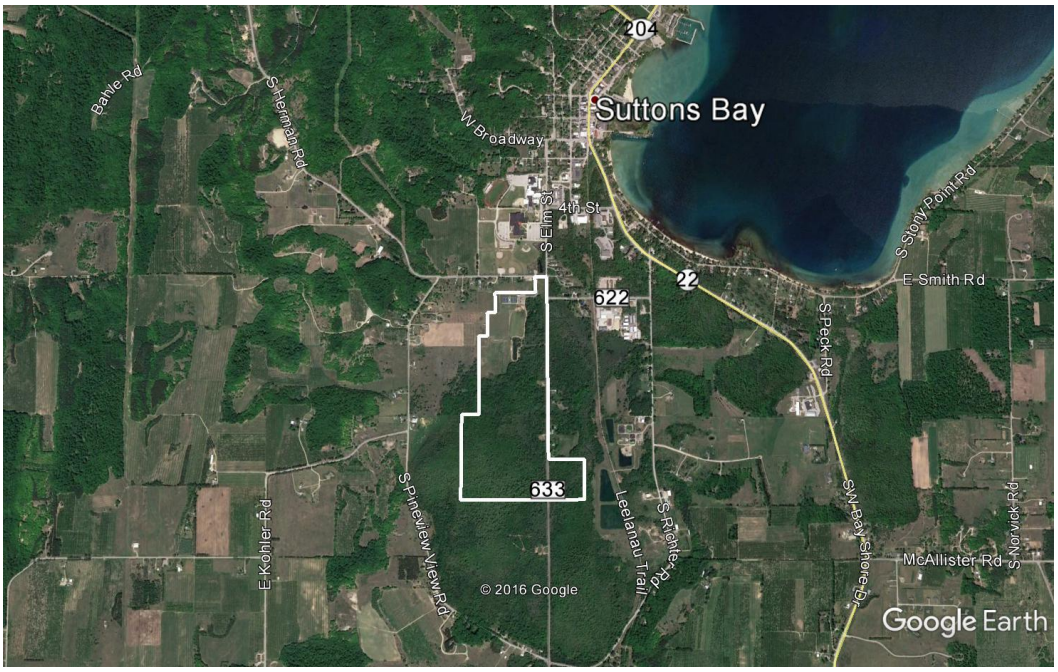

Figure 1. Herman Park is located just south of Suttons Bay, MI.

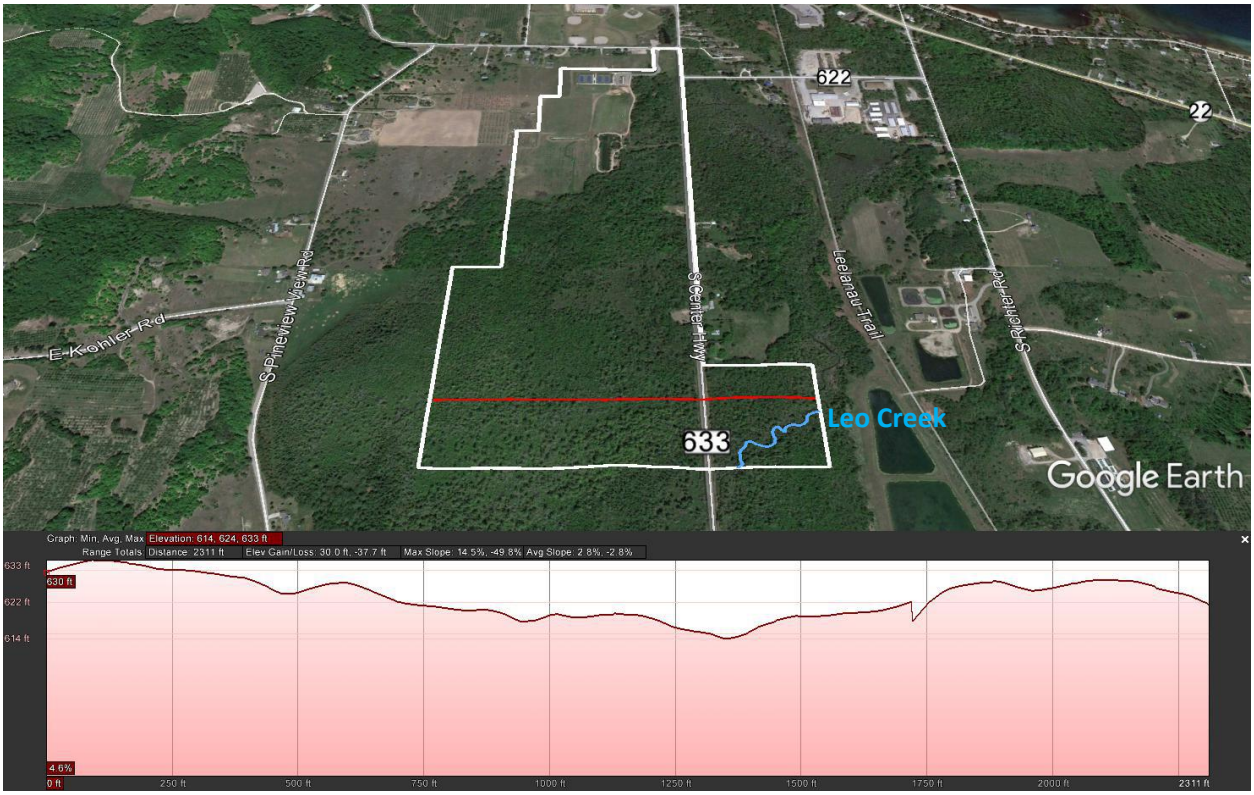

Figure 2. Elevation change on a west to east transect through Herman Park.

*Planning Process*

Representatives of the Township met with the Plan Writer during the winter of 2016-2017. A proposal, including a schedule, was submitted and accepted in late winter 2017. Multiple field visits in late winter and spring were conducted by the Plan Writer. A draft plan was submitted to the Township for their review prior to submission to the MDNR. Upon the Township's approval, the plan was then submitted to the MDNR for their review and approval.

*Stand Assessment Method*

The Plan Writer first compiled information on property boundaries, soil types, and vegetative cover types. Basic field assessment data was collected by visual and quantitative surveys on multiple occasions in the winter and spring. Winter sampling was necessary to address the presence or absence of winter deer yards. Winter sampling had the additional advantage of allowing the Plan Writer to determine if other wildlife species were present based upon tracks left in the snow. Vegetative sampling was conducted during the spring to sample both over and understory species. In addition, other wildlife such as songbirds were identified in the spring. Point and fixed area plots were used to gain a rough estimate of forest density, vegetative species composition, diameter distribution, and dead down woody debris. Other observational data included: insect and disease issues, presence or absence of invasive species, and occurrence of wildlife trees. These sampling efforts were not a formal forest inventory as this entails more expensive data collection and analysis and should be completed in preparation for a timber sale.

**Resource Descriptions**

*Geology*

Herman Park is located on a glaciolacustrine plain. The topography is relatively flat consisting of outwash plain, lake plain, and depressions in the outwash and lake plains.

*Soils*

The two primary soil types found within the more forested portions of Herman Park are the Lupton-Markey mucks and the Roscommon sand-Markey muck (Table 1, Figure 3). For a complete description of each Soil Type see Appendix 1. The Roscommon sand-Markey muck and Lupton-Markey muck are hydric soils that are associated with depressions in lake plains and outwash plains. Ponding is prevalent and productivity is low for both these soil types.

Table 1. Soil types found in the Area of Interest (AOI) which includes Herman Park, Suttons Bay Township (Soil Survey Staff, Natural Resources Conservation Service, and United States Department of Agriculture. Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/).

| Map Unit Symbol | Map Unit Name | Percent Slope | Acres in AOI* | Percent of AOI* |
|---|---|---|---|---|
| AuA | Au Gres-Kalkaska sands | 0-4% | 23.8 | 15.5% |
| Lm | Lupton-Markey mucks | ----- | 60.8 | 39.6% |
| MrB | Mancelona-Richter gravelly sandy loams | 0-6% | 0.7 | 0.4% |
| Rm | Roscommon sand-Markey muck | ----- | 68.1 | 44.4% |
| **Totals for Area of Interest** | | | **153.3** | **100.0%** |

*AOI = Area of Interest

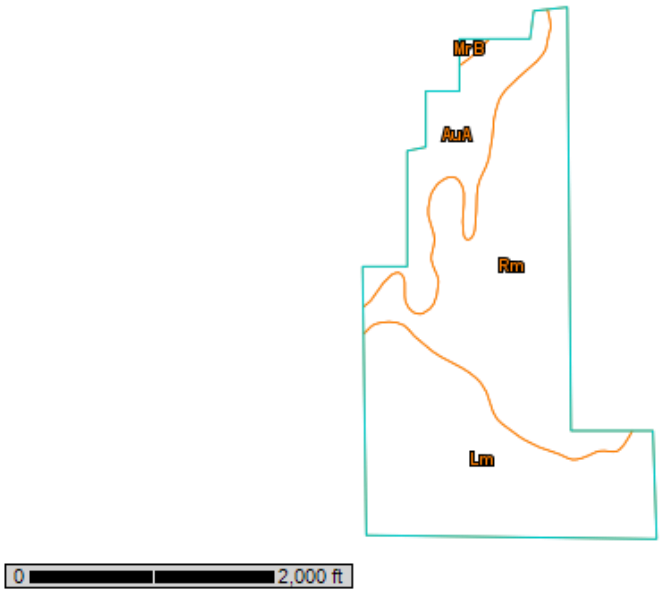


Figure 3. Soils map of the Area of Interest which encompasses Herman Park, Suttons Bay Township (Soil Survey Staff, Natural Resources Conservation Service, and United States Department of Agriculture. Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/).

*Forest Cover Types*

Herman Park incorporates a variety of land use/land cover types (Figure 4).

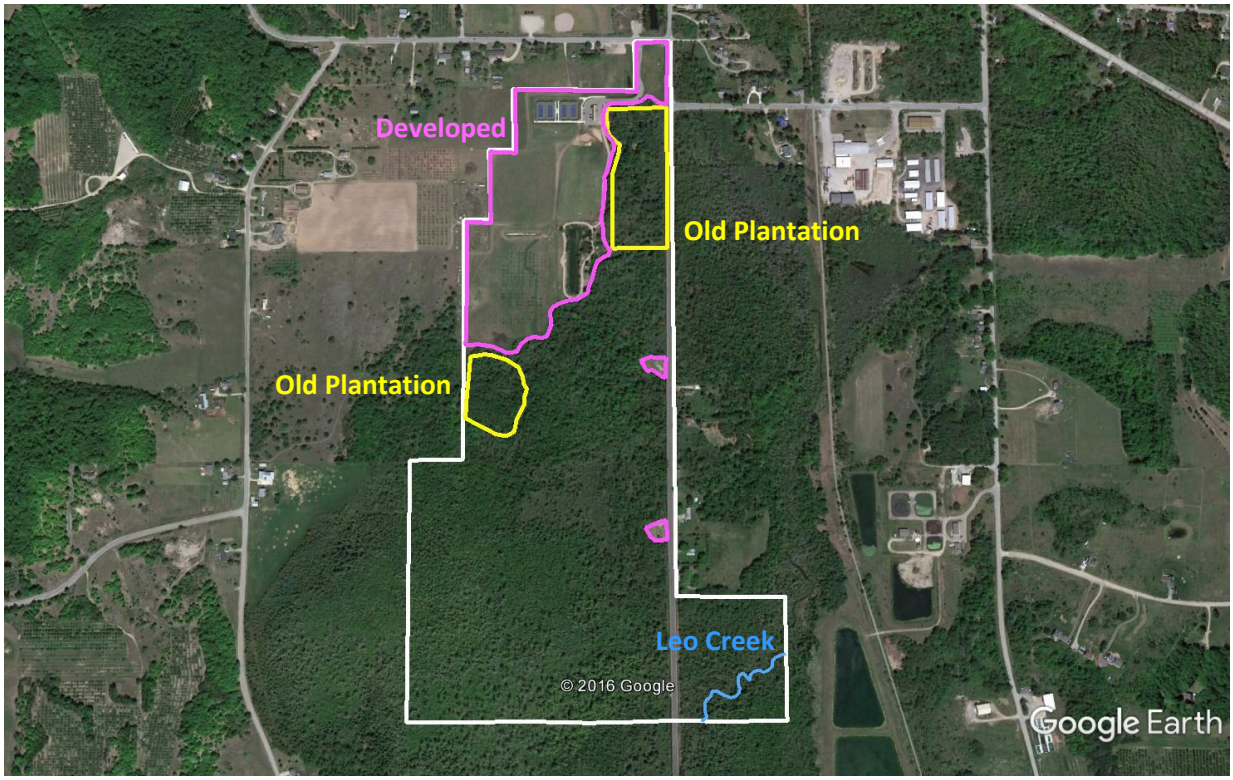


Figure 4. The land use/land cover types of Herman Park, Suttons Bay Township.

The developed portion of the Park is in the northwest corner. The remainder of the Park is a mix of forested and nonforested wetlands. This includes at least two attempts at establishing plantations of mostly non-native Norway Spruce, Scotch Pine, and native Eastern White Pine (Figure 5). The majority of the Park is in a mixed condition of forested and scrub wetlands.

Figure 5. Plantation species found in the Park include Norway Spruce, Scotch Pine, and Eastern White Pine.

Much of the Park is a complex mosaic of Scrub-Shrub Wetland, Bottomland Conifer, and Bottomland Mixed Forests. The Scrub-Shrub Wetland is comprised of various shrubs and small trees including Tag Alder, Willow, Dogwood, Northern White Cedar, and Balsam Fir (Figure 6). The Bottomland Conifer is mostly Northern White Cedar, Tamarack, and Balsam Fir, (Figure 7). The Bottomland Mixed is Northern White Cedar, Balsam Fir, Maple, Aspen, dead and dying Ash, and scattered Eastern White Pine (Figure 8). Aspen can be found extending out from the forest into the more open, developed portions of the Park. There are also small pockets of emergent wetland vegetation throughout the stand (Figure 10).

Figure 6. Scrub-Shrub Wetland.

Figure 7. Bottomland Conifer.

Figure 8. Bottomland Mixed.

Figure 9. Aspen extending into the open area.

Figure 10. Emergent vegetation.

The variety in plant species composition and structure is due to site factors and natural disturbance. The soils are predominantly hydric and stay saturated through much of the growing season. This results in low site productivity and high likelihood of wind-throw, the natural disturbance regime on these sites (Figure 11). The severity of the event and the time since it occurred determines in part the vegetative species composition.

Figure 11. A wind-throw event at Herman Park. These events create a mosaic of various vegetation conditions across the Park.

*Water*

Leo Creek runs through the eastern portion of the Park (Figure 4). Standing water is present in the Park year around (Figure 12).

Figure 12. Open water in the winter.

*Wetlands*

The Michigan Department of Environmental Quality (DEQ) Wetlands Map Viewer (www.mcgi.stte.mi.us/wetlands), indicates that the forested stands of Herman Park are designated wetland according to state and federal definitions (Figure 13). A permit is not required for typical forest management activities in a wetland, but a permit is required for filling, dredging, draining or

development. A DEQ permit is also required for a stream crossing (culvert or bridge). See www.Michigan.gov/DEQWetlands for more information about wetlands. Any management activity in the park should follow the "Sustainable Soil and Water Quality Practices on Forest Land" (Best Management Practices – www.michgan.gov/dnr).

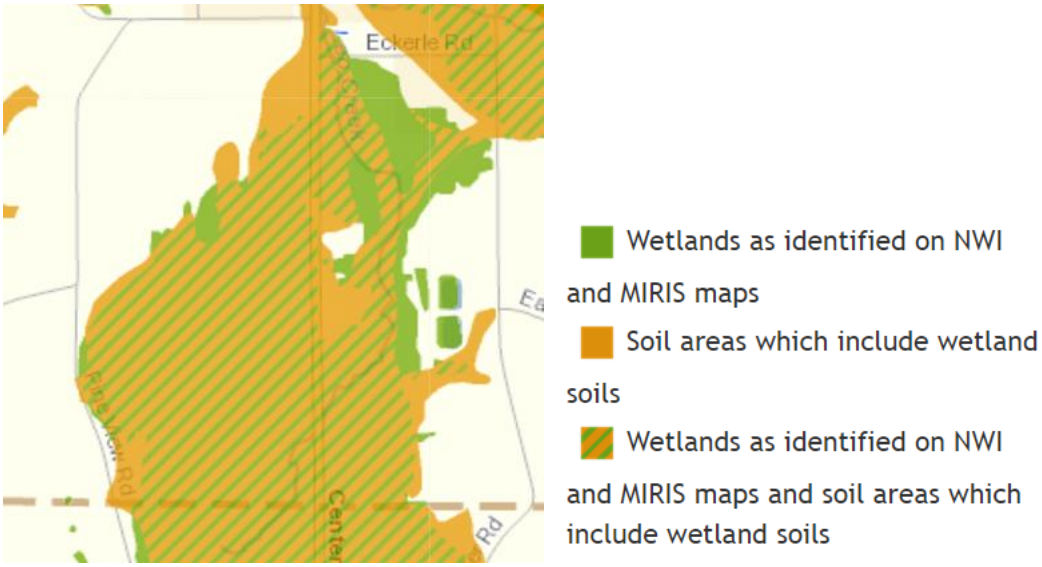


Figure 13. Wetland designation for Herman Park as determined from Michigan DEQ Wetlands Map Viewer (www.mcgi.stte.mi.us/wetlands).

*Threatened and Endangered Species*

The Michigan Department of Natural Resources (MDNR) and the Michigan Natural Features Inventory (MNFI) report that the little brown bat (*Myotis lucifugus*) (Species of Special Concern; Rare or status uncertain; not legally protected; last observed in 1921) was found in the general vicinity of the Park. The little brown bat is associated with forests near water where they forage for insects. Roosts commonly used by active bats include buildings, tree hollows, and log and rock piles. Suitable roost trees are found within the park. Unless they pose a significant threat, trees with hollows will be retained during active management.

*Wildlife Habitat*

Of the 399 vertebrate wildlife species found in Michigan, 300 are found in Leelanau County. Of this, Herman Park provides forested habitat for 138 species (MIWILD analysis, Appendix 2). This large Park, with both open and forested conditions as well as the edge habitat that exists between the two is of great value to wildlife. In addition, the Park contains a variety of structural habitat features which contribute to the overall quality of the habitat for wildlife. These include; vernal pools, intermittent and permanent watercourses, significant dead down woody debris, snags, living cavity trees, canopy gap openings, and mast producing species (e.g. Maple Leaf Viburnum, Figure 14). Winter track surveys recorded the following species within the Park: Snowshoe Hare, Eastern Cottontail, Gray Squirrel, Deer Mice, Porcupine, White-tailed Deer, Ermine, and Bobcat (Figure 15). White-tailed deer winter within the Park (Figure 16). Black Bear, American Woodcock, and Ruffed Grouse have also been observed within the Park.

Figure 14. Maple Leaf Viburnum.

Figure 15. Bobcat tracks.

Figure 16. Deer bed.

*Archeological, Cultural, or Unique Natural Sites*

The MDNR reports that the archeological database does not show any concerns for historical sites in this section of the Township. Standard Seven of the American Tree Farm System is Protect Special Sites – "Special sites are managed in ways that recognized their unique historical, archeological, cultural, geological, biological or ecological characteristics." The size of the Park and its habitat complexity makes it ecologically unique. In addition, the Park is located within a Forest of Recognized Importance (FORI). The FORI in Michigan include Great Lakes coastline, riparian corridors along Wild and Scenic or Natural Rivers, rare forest types, or forests that provide required habitat for threatened or endangered species. Forests within a mile of the Great Lakes are globally rare and should be managed to maintain forest cover near Great Lakes shorelines.

The Michigan Natural Feature Inventory definitions of Rich Conifer Swamp and Hardwood Conifer Swamp apply to portions of the plant communities found at Herman Park. The state element ranking for Rich Conifer Swamp and Hardwood Conifer Swamp is S3. The S3 ranking is defined as "Vulnerable in the state due to a restricted range, relatively few occurrences (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation."

*Landscape Considerations*

In general, the remaining forested habitats in much of landscape containing Herman Park are fragmented (Figure 17). Even of greater concern is the loss of coniferous habitats. Herman Park resides in one of a very few large patches of coniferous habitats in the neighborhood (Figure 18). The Park plays an important role in sustaining the biodiversity of the neighborhood.

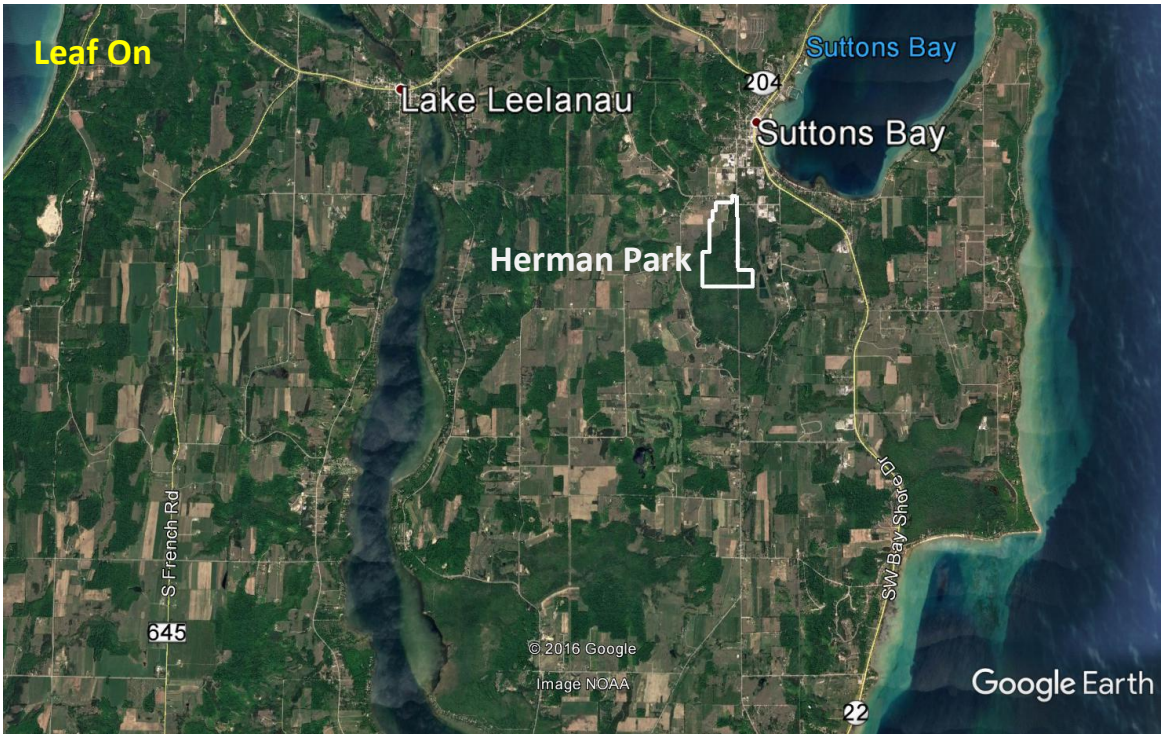

Figure 17. Forested cover is fragmented in the landscape containing Herman Park.

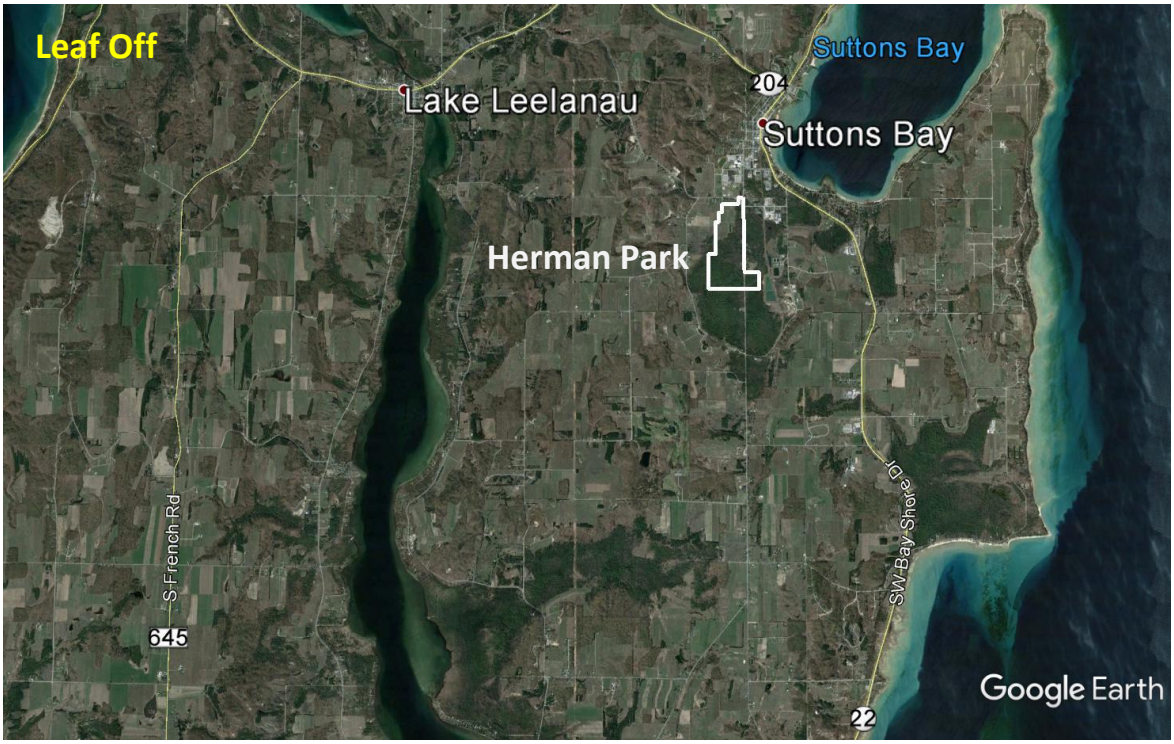

Figure 18. Herman Park represents one of the largest patches of coniferous forests in the neighborhood.

*Invasive Species*

Populations of non-native invasive species were found at Herman Park. They include; Autumn Olive, Leafy Spurge, Scotch Pine, and Norway Spruce (Figure 5). The Autumn Olive was found predominantly on the forest edge and in the more developed portions of the Park. The Leafy Spurge was noted along the walking trail in the northwest portion of the Park. The Scotch Pine and Norway Spruce were associated with the northern most plantation (Figure 4). These trees are reproducing and spreading. The Invasive Species Specialist from the Leelanau Conservation District should be contacted and directed to the sites. Population control of these invasive species should be conducted as soon as possible to prevent the spread and encroachment on native species.

*Hazard Trees*

**T**he two most predominant soil types in the park are rated as having "Severe" wind-throw potential. This is due in part to saturated soil conditions. Wind-throw is the natural disturbance regime in these forests and there is significant evidence of that across the Park. Complicating the matter is Emerald Ash Borer and the presence of numerous dead and dying ash trees (Figure 19).

Figure 14. Dead ash in the Park.

*Aesthetic Quality*

People respond positively to trees and other vegetation. Research indicates a direct link between visual quality and human health. Enhancing the visual quality of forested land for recreational users may result in a healthier community and local economy. People respond positively to natural versus urban landscapes. Within forested landscapes, they tend to prefer more open forest conditions with scattered large trees. Negative features include; many small trees, large amounts of dead and down woody debris, and a thick shrub understory. At times, human perceptions of visual quality may be

at odds with the ecological value of the stand. This is true for Herman Park where much of the park is in Forested and Scrub/Shrub wetlands. These areas are relatively inaccessible due to the dense and at times impenetrable shrub component, standing water, and ample dead down woody debris. Even though the visual quality is low the ecological quality is very high. Stand structure is not likely to change. Much of the Park is a wetland and will stay as such. However, the visual quality of the Park may change with the addition of a boardwalk. Research demonstrates that elevated pathways in wetlands do change people's perception of and appreciation of wetland habitats. Wetlands like those in Herman Park, have significant biological and cultural value and opportunities exist to inform the public on the value of these frequently misunderstood and unappreciated habitats.

County Road 633 lies on the eastern boundary of the Park and bisects a portion of the Park near Leo Creek (Figure 4). Due to the density of the vegetation, much of the Park is not readily visible from 633 and traffic sounds do not travel far into the stand. There are portions of Herman Park that are well removed from roads and development and are fairly quiet (e.g. southwest corner). These quiet areas allow the visitor to hear primarily natural sounds, enhancing their experience. Distant views of the Park are possible from portions of the Leelanau Trail and South Richter and South Pine View Roads. In the northwest portion of the Park, where the forest meets the field, the forest edge has good visual quality. This is due to the "feathered" nature of the edge (Figure 9). When a forest transitions into an open area, people prefer the natural appearance of a feathered edge over an abrupt edge.

**Management Recommendations**

*Site Considerations*

In general, meeting the goals and objectives of the Township for Herman Park are dependent on site factors. For instance, soil type will determine management options and potential expense associated with activities and development (Table 2).

Table 2. Potential limitations associated with the soil types found within Herman Park and the Township's goals (Soil Survey Staff, Natural Resources Conservation Service, and United States Department of Agriculture. Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/).

| Township's Goals | Lm | Rm |
|---|---|---|
| ***Timber Production*** | | |
| Erosion Hazard (Road and Trail)[a] | Slight | Slight |
| Suitability for Haul Roads[b] | Poorly Suited | Poorly Suited |
| Suitability for Log Landings[c] | Poorly Suited | Poorly Suited |
| Harvest Equipment Operability[d] | Poorly Suited | Poorly Suited |
| Potential for Wind-throw[e] | Severe | Severe |
| ***Recreation Development*** | | |
| Erosion Hazard (Off Road and Off Trail)[f] | Slight | Slight |
| Paths and Trails[g] | Very Limited | Very Limited |
| Camp and Picnic Areas[h] | Very Limited | Very Limited |

[a] "Slight" indicates that little or no erosion is likely.

[b] "Poorly suited" indicates that one or more limitations make the construction of haul roads very difficult or costly.

[c] "Poorly suited" indicates that one or more restrictions generally make using the soil as a site for a log landing very difficult or unsafe.

[d] "Poorly suited" indicates that the soil has one or more properties that are unfavorable and that overcoming them requires special design, extra maintenance, and costly alteration.

[e] Wind-throw hazard is the likelihood that trees will be uprooted (tipped over) by the wind. It can occur if the soil is not deep enough to provide adequate root anchorage. "Severe" alerts the forestland manager to the possibility of wind-throw. Special care is needed in planning cutting areas to minimize the danger of wind-throw.

[f] "Slight" indicates that erosion is unlikely under ordinary climatic conditions. "Severe" indicates that erosion is very likely and that erosion-control measures, including re-vegetation of bare areas, are advised.

[g and h] "Very limited" indicates that the soil has one or more features that are unfavorable. Limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

*Best Management Practices*

Poor land management practices can degrade surface and ground water quality by increasing sedimentation, nutrient and chemical input, heat, and debris. Forest landowners and their agents and contractors are responsible for any damage to streams, lakes, and wetlands. Any land management activity in the Park should follow "Sustainable Soil and Water Quality Practices on Forest Land" (Best Management Practices – http://www.michigan.gov/dnr/0,4570,7-153-31154_31261---,00.html). The purpose of the manual is to provide specific guidance to the forest landowner on how to protect water quality, critical habitat, and aquatic resources when conducting forest management activities. Following

these practices results in healthy forests and watersheds by preventing erosion, sedimentation, and soil compaction.

*Timber Management*

Due to the overall ecological importance of the forest, the preponderance of saturated soils with severe wind-throw potential, and low merchantable timber volume, there are no timber harvest recommendations for Herman Park. There are significant canopy gaps throughout the stand due to the loss of ash. The loss of ash may also contribute to an increase in soil saturation as there are fewer trees using the available water. In time, this may result in a decrease in forest cover with an increase in Scrub-Shrub wetland.

*Recreation Management*

Connector Trail – Due to site factors, an elevated trail would be required to cross much of the Park. A trail across the Park would expose the visitor to the complexity and richness of the site. Treatment of invasive species should be incorporated into any recreational development plan.

Hunting – Deer blinds were found around the margins of the Park. Even though the Park has deer, there is still White Cedar, Aspen, and Balsam Fir regeneration within the forest. By keeping the deer population in check, hunting may help with the perpetuation of White Cedar and Aspen in the Park.

Hazard Trees – Any dead or dying trees along trails or around facilities that pose a threat should be removed.

*Biodiversity and Wildlife Corridors*

With its mix of upland and lowland and forested and open habitats, Herman Park is inherently diverse. The variety in both plant and animal species is considerable. At a large spatial scale, the Park resides within one of the few remaining large contiguous patches of habitat. This large patch of forested habitat provides a home to many and a travel corridor to those migrating or just moving through the area. At a fine within stand scale, there is significant structural complexity due to the numerous wind-throw events. At both the large and small spatial scales Herman Park plays a significant role in sustaining the local biodiversity.

**Summary of Management Recommendations**

*Invasive Species Inventory*
Contact Rebecca S. Koteskey (Communication Specialist, NW Michigan Invasive Species Network at 231.941.0960 x17) to discuss funding sources as well as a formal inventory and evaluation of invasive species within the Park. Invasive species inventories should be conducted on an annual basis at the floristically appropriate time of the year.

*Trail Design*
Investigate potential sources of funding including, but not limited to:
Mark Mandenberg
MDNR Parks & Recreation Division
517.284.6114
mandenbergm@michigan.gov

Grand Traverse Band of Ottawa and Chippewa Indians 2% Grant http://www.grandtraverse.org/218/2-Percent-Applications---GT-Band

American Trails http://www.americantrails.org/resources/funding/

Federal Highway Administration https://www.fhwa.dot.gov/Environment/recreational_trails/

People for Bikes http://www.peopleforbikes.org/pages/community-grants

Michigan Trails and Greenway Alliance http://michigantrails.org/resources/trail-toolkit/funding/

Once funding is secured, work with the appropriate agencies to insure compliance and follow Best Management Practices in trail and picnic area development http://www.michigan.gov/dnr/0,4570,7-153-31154_31261---,00.html

*Join the American Tree Farm System*
Consider joining the American Tree Farm System. Information can be found at:
https://www.treefarmsystem.org/get-started-american-tree-farm

*Forest Health*
Forest health is an issue of concern with Emerald Ash Borer already present within the stands. The stands should be monitored annually (during different seasons) for changes that may indicate additional insect or disease problems. The "Forest Health Highlights" publication on forest insects and diseases is updated annually and available at www.Michigan.gov/ForestHealth. An additional source of information is www.Michigan.gov/ExoticPests.

**Summary Chart**

| Stand | Activity | Dates | | Cost Share | Cost/Income |
|---|---|---|---|---|---|
| | | Planned | Completed | | |
| Entire Park | Invasive Species Inventory | Annual* Beginning in 2017 | | | |
| Entire Park | Invasive Species Removal | Annual* Beginning in 2017 | | | |
| Entire Park | Trail Design and Development | Beginning in 2017 | | | |
| Entire Park | Consider Joining the American Tree Farm System | 2017 | | | |
| Entire Park | Monitor Forest Health | Annual* Beginning in 2018 | | | |

* Funding dependent

**Monitoring**

The successful implementation of this Forest Stewardship Plan is dependent upon frequent monitoring by the Township. The Township (or their agent) should walk the entire Park at least annually to inspect the forests for changes and to evaluate the success of earlier management activities. All Forest Stewardship Plans should be adaptable and flexible enough to accommodate changes in landowner goals or forest resources over the 20 year planning period. Please use the following table to record notes and make modifications to this plan as needed.

| Updates and Modifications |
|---|
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# Appendix 1. Soil Map Unit descriptions for soils found in Herman Park, Suttons Bay Township, Leelanau County.

## AuA—Au Gres-Kalkaska sands, 0 to 4 percent slopes

**Map Unit Setting**

- *National map unit symbol:* 6dj6
- *Elevation:* 600 to 1,900 feet
- *Mean annual precipitation:* 22 to 44 inches
- *Mean annual air temperature:* 39 to 46 degrees F
- *Frost-free period:* 70 to 150 days
- *Farmland classification:* Not prime farmland

**Map Unit Composition**

- *Au gres and similar soils:* 45 percent
- *Kalkaska and similar soils:* 35 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Au Gres**

**Setting**

- *Landform:* Lake plains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Sandy glaciofluvial deposits

**Typical profile**

- *H1 - 0 to 12 inches:* sand
- *H2 - 12 to 24 inches:* sand
- *H3 - 24 to 60 inches:* sand

**Properties and qualities**

- *Slope:* 0 to 4 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat poorly drained
- *Runoff class:* Negligible
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water storage in profile:* Low (about 4.2 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 4w
- *Hydrologic Soil Group:* A/D
- *Hydric soil rating:* No

**Description of Kalkaska**

**Setting**

- *Landform:* Lake plains, moraines
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Sandy glaciofluvial deposits

**Typical profile**

- *H1 - 0 to 7 inches:* sand
- *H2 - 7 to 15 inches:* sand
- *H3 - 15 to 32 inches:* sand
- *H4 - 32 to 60 inches:* sand

**Properties and qualities**

- *Slope:* 0 to 4 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat excessively drained
- *Runoff class:* Negligible
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water storage in profile:* Low (about 3.6 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 4s
- *Hydrologic Soil Group:* A
- *Hydric soil rating:* No

**Minor Components**

**Roscommon**

- *Percent of map unit:* 10 percent
- *Landform:* Depressions on lake plains, depressions on outwash plains
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

**Markey**

- *Percent of map unit:* 10 percent
- *Landform:* Depressions on outwash plains, depressions on lake plains, depressions on moraines
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

## Lm—Lupton-Markey mucks

**Map Unit Setting**

- *National map unit symbol:* 6dkv
- *Elevation:* 600 to 1,500 feet
- *Mean annual precipitation:* 19 to 44 inches
- *Mean annual air temperature:* 36 to 46 degrees F
- *Frost-free period:* 60 to 172 days
- *Farmland classification:* Not prime farmland

**Map Unit Composition**

- *Lupton and similar soils:* 60 percent
- *Markey and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Lupton**

**Setting**

- *Landform:* Depressions, depressions, depressions, lake terraces, moraines, till plains
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Greater than 51 inches of organic material

**Typical profile**

- *Oa1 - 0 to 10 inches:* muck
- *Oa2 - 10 to 60 inches:* muck

**Properties and qualities**

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Very poorly drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.20 to 5.95 in/hr)
- *Depth to water table:* About 0 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* Frequent
- *Available water storage in profile:* Very high (about 23.9 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 6w
- *Hydrologic Soil Group:* A/D
- *Hydric soil rating:* Yes

**Description of Markey**

**Setting**

- *Landform:* Depressions on moraines, depressions on outwash plains, depressions on lake plains
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Linear

- *Across-slope shape:* Linear
- *Parent material:* 16 to 51 inches of organic material over sandy glaciofluvial deposits

**Typical profile**

- *Oa - 0 to 20 inches:* muck
- *2C - 20 to 60 inches:* sand

**Properties and qualities**

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Very poorly drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.20 to 5.95 in/hr)
- *Depth to water table:* About 0 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* Frequent
- *Calcium carbonate, maximum in profile:* 5 percent
- *Available water storage in profile:* High (about 10.4 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 5w
- *Hydrologic Soil Group:* A/D
- *Hydric soil rating:* Yes

**Minor Components**

**Edwards**

- *Percent of map unit:* 5 percent
- *Landform:* Depressions on outwash plains, depressions on moraines
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

**Roscommon**

- *Percent of map unit:* 5 percent
- *Landform:* Depressions on lake plains, depressions on outwash plains
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

## MrB—Mancelona-Richter gravelly sandy loams, 0 to 6 percent slopes

**Map Unit Setting**

- *National map unit symbol:* 6dl3
- *Elevation:* 600 to 1,600 feet
- *Mean annual precipitation:* 27 to 34 inches
- *Mean annual air temperature:* 39 to 46 degrees F
- *Frost-free period:* 70 to 150 days
- *Farmland classification:* Farmland of local importance

**Map Unit Composition**

- *Mancelona and similar soils:* 70 percent
- *Richter and similar soils:* 25 percent
- *Minor components:* 5 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Mancelona**

**Setting**

- *Landform:* Lake plains, moraines, beach ridges, outwash plains, valley trains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* 18 to 40 inches of sandy and/or gravelly material over calcareous sandy and gravelly glaciofluvial deposits

**Typical profile**

- *H1 - 0 to 8 inches:* gravelly sandy loam
- *H2 - 8 to 25 inches:* loamy sand
- *H3 - 25 to 30 inches:* gravelly sandy loam
- *H4 - 30 to 60 inches:* very gravelly coarse sand

**Properties and qualities**

- *Slope:* 0 to 6 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat excessively drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 25 percent
- *Available water storage in profile:* Low (about 3.8 inches)

**Description of Richter**

**Setting**

- *Landform:* Drainageways, lake plains, valley trains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear

- *Parent material:* 25 to 40 inches of sandy and/or loamy material over stratified, calcareous sandy and silty glaciofluvial deposits

**Typical profile**

- *H1 - 0 to 8 inches:* sandy loam
- *H2 - 8 to 27 inches:* fine sandy loam
- *H3 - 27 to 60 inches:* stratified loamy fine sand to sandy loam

**Properties and qualities**

- *Slope:* 0 to 6 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat poorly drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 20 percent
- *Available water storage in profile:* Moderate (about 7.4 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2e
- *Hydrologic Soil Group:* B/D
- *Hydric soil rating:* No

**Minor Components**

**Tonkey**

- *Percent of map unit:* 2 percent
- *Landform:* Depressions on depressions on lake plains, depressions on drainageways, outwash plains
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

**Epoufette**

- *Percent of map unit:* 2 percent
- *Landform:* Depressions on lake plains
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

**Wallace**

- *Percent of map unit:* 1 percent
- *Landform:* Lake plains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex

- *Hydric soil rating:* No

## Rm—Roscommon sand-Markey muck

**Map Unit Setting**

- *National map unit symbol:* 6dlf
- *Elevation:* 600 to 1,900 feet
- *Mean annual precipitation:* 22 to 44 inches
- *Mean annual air temperature:* 39 to 46 degrees F
- *Frost-free period:* 70 to 150 days
- *Farmland classification:* Not prime farmland

**Map Unit Composition**

- *Roscommon and similar soils:* 50 percent
- *Markey and similar soils:* 30 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Roscommon**

**Setting**

- *Landform:* Depressions on outwash plains, depressions on lake plains
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Sandy glaciofluvial deposits

**Typical profile**

- *H1 - 0 to 6 inches:* sand
- *H2 - 6 to 60 inches:* sand

**Properties and qualities**

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Very poorly drained
- *Runoff class:* Negligible
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* About 0 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* Frequent
- *Calcium carbonate, maximum in profile:* 10 percent
- *Available water storage in profile:* Low (about 4.5 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 6w
- *Hydrologic Soil Group:* A/D
- *Hydric soil rating:* Yes

**Description of Markey**

**Setting**

- *Landform:* Depressions on outwash plains, depressions on lake plains, depressions on moraines
- *Landform position (three-dimensional):* Dip

- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* 16 to 51 inches of organic material over sandy glaciofluvial deposits

**Typical profile**

- *Oa - 0 to 20 inches:* muck
- *2C - 20 to 60 inches:* sand

**Properties and qualities**

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Very poorly drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.20 to 5.95 in/hr)
- *Depth to water table:* About 0 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* Frequent
- *Calcium carbonate, maximum in profile:* 5 percent
- *Available water storage in profile:* High (about 10.4 inches)

**Interpretive groups**

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 5w
- *Hydrologic Soil Group:* A/D
- *Hydric soil rating:* Yes

**Minor Components**

**Au gres**

- *Percent of map unit:* 10 percent
- *Landform:* Lake plains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

**Kalkaska**

- *Percent of map unit:* 5 percent
- *Landform:* Outwash plains, lake plains
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

**East lake**

- *Percent of map unit:* 5 percent
- *Landform:* Outwash plains, moraines
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear

- *Hydric soil rating:* No

## Appendix 2. Wildlife species associated with Scrub-Shrub Wetland and the various size classes of Bottomland Conifer and Bottomland Mixed Forests in Leelanau County, MI.

| Species | Latin | Scrub-Shrub Wetland | Bottomland Conifer | Bottomland Mixed |
|---|---|---|---|---|
| Blue-Spotted Salamander | *Ambystoma laterale* | - | LX | LX |
| Spotted Salamander | *Ambystoma maculatum* | Yes | - | - |
| Tiger Salamander | *Ambystoma tigrinum* | Yes | - | SPLX |
| Four-Toed Salamander | *Hemidactylium scutatum* | Yes | - | LX |
| Eastern Redback Salamander | *Plethodon cinereus* | - | - | PLX |
| Eastern Newt | *Notophthalmus viridescens* | Yes | LX | LX |
| American Toad | *Bufo americanus* | Yes | SPLX | SPLX |
| Gray Treefrog | *Hyla versicolor* | Yes | LX | LX |
| Western Chorus Frog | *Pseudacris triseriata* | - | PLX | PLX |
| Spring Peeper | *Pseudacris crucifer* | Yes | PLX | PLX |
| Green Frog | *Rana clamitans* | Yes | SPLX | SPLX |
| Wood Frog | *Rana sylvatica* | Yes | LX | LX |
| Double-crested Cormorant | *Phalacrocorax auritus* | - | - | LX |
| American Bittern | *Botaurus lentiginosus* | Yes | - | - |
| Great Blue Heron | *Ardea herodias* | Yes | PLX | PLX |
| Green Heron | *Butorides virescens* | Yes | - | SPLX |
| Wood Duck | *Aix sponsa* | Yes | - | LX |
| American Black Duck | *Anas rubripes* | Yes | - | RSPLX |
| Mallard | *Anas platyrhynchos* | Yes | RSPLX | RSPLX |
| Ring-necked Duck | *Aythya collaris* | Yes | - | - |
| Hooded Merganser | *Lophodytes cucullatus* | Yes | LX | LX |
| Common Merganser | *Mergus merganser* | - | LX | LX |
| Osprey | *Pandion haliaetus* | - | LX | LX |
| Bald Eagle | *Haliaeetus leucocephalus* | - | LX | LX |
| Red-shouldered Hawk | *Buteo lineatus* | Yes | - | LX |
| Broad-winged Hawk | *Buteo platypterus* | Yes | - | LX |
| Ruffed Grouse | *Bonasa umbellus* | Yes | - | - |
| Solitary Sandpiper | *Tringa solitaria* | - | PLX | PLX |
| Common Snipe | *Gallinago gallinago* | Yes | - | - |
| American Woodcock | *Scolopax minor* | Yes | - | - |
| Black-billed Cuckoo | *Coccyzus erythropthalmus* | Yes | - | - |
| Yellow-billed Cuckoo | *Coccyzus americanus* | Yes | - | R |
| Great Horned Owl | *Bubo virginianus* | - | | RLX |
| Northern Hawk Owl | *Surnia ulula* | Yes | RPLX | RPLX |

| Species | Latin | Scrub-Shrub Wetland | Bottomland Conifer | Bottomland Mixed |
|---|---|---|---|---|
| Barred Owl | *Strix varia* | - | | LX |
| Northern Saw-whet Owl | *Aegolius acadicus* | - | PLX | PLX |
| Ruby-throated Hummingbird | *Archilochus colubris* | - | | LX |
| Downy Woodpecker | *Picoides pubescens* | - | PLX | PLX |
| Hairy Woodpecker | *Picoides villosus* | - | LX | LX |
| Olive-sided Flycatcher | *Contopus cooperi* | Yes | PLX | PLX |
| Alder Flycatcher | *Empidonax alnorum* | Yes | - | - |
| Willow Flycatcher | *Empidonax traillii* | Yes | - | - |
| Eastern Kingbird | *Tyrannus tyrannus* | Yes | - | - |
| Common Raven | *Corvus corax* | Yes | RLX | RLX |
| Black-capped Chickadee | *Poecile atricapillus* | - | PLX | PLX |
| Tufted Titmouse | *Baeolophus bicolor* | - | - | PLX |
| Red-breasted Nuthatch | *Sitta canadensis* | Yes | PLX | PLX |
| Brown Creeper | *Certhia americana* | - | LX | LX |
| House Wren | *Troglodytes aedon* | - | - | SPLX |
| Winter Wren | *Troglodytes troglodytes* | Yes | LX | LX |
| Ruby-crowned Kinglet | *Regulus calendula* | Yes | PLX | PLX |
| Veery | *Catharus fuscescens* | - | - | SPLX |
| Gray-cheeked Thrush | *Catharus minimus* | Yes | PLX | LX |
| Swainson's Thrush | *Catharus ustulatus* | - | PLX | PLX |
| Hermit Thrush | *Catharus guttatus* | - | PLX | PLX |
| Wood Thrush | *Hylocichla mustelina* | - | - | LX |
| American Robin | *Turdus migratorius* | Yes | - | RSPLX |
| Gray Catbird | *Dumetella carolinensis* | Yes | - | - |
| Cedar Waxwing | *Bombycilla cedrorum* | - | RSPLX | RSPLX |
| Blue-headed Vireo | *Vireo solitarius* | - | - | LX |
| Warbling Vireo | *Vireo gilvus* | - | - | PLX |
| Golden-winged Warbler | *Vermivora chrysoptera* | Yes | - | - |
| Orange-crowned Warbler | *Vermivora celata* | Yes | - | - |
| Nashville Warbler | *Vermivora ruficapilla* | Yes | SLX | SLX |
| Northern Parula | *Parula americana* | Yes | LX | LX |
| Yellow Warbler | *Dendroica coronata* | Yes | - | - |
| Chestnut-sided Warbler | *Dendroica pensylvanica* | Yes | - | S |
| Magnolia Warbler | *Dendroica magnolia* | - | - | SLX |
| Yellow-rumped Warbler | *Dendroica coronata* | Yes | PLX | PLX |
| Black-throated Green Warbler | *Dendroica virens* | - | PLX | PLX |
| Blackburnian Warbler | *Dendroica fusca* | - | PLX | PLX |

| Species | Latin | Scrub-Shrub Wetland | Bottomland Conifer | Bottomland Mixed |
|---|---|---|---|---|
| Blackpoll Warbler | *Dendroica striata* | - | PLX | PLX |
| Black-and-white Warbler | *Mniotilta varia* | - | - | LX |
| American Redstart | *Setophaga ruticilla* | Yes | - | S |
| Northern Waterthrush | *Seiurus noveboracensis* | Yes | LX | LX |
| Mourning Warbler | *Oporornis philadelphia* | Yes | S | S |
| Common Yellowthroat | *Geothlypis trichas* | Yes | - | - |
| Canada Warbler | *Wilsonia canadensis* | Yes | - | - |
| Northern Cardinal | *Cardinalis cardinalis* | Yes | - | SPLX |
| Rose-breasted Grosbeak | *Pheucticus ludovicianus* | - | - | PLX |
| Indigo Bunting | *Passerina cyanea* | - | - | RSPLX |
| American Tree Sparrow | *Spizella arborea* | Yes | - | - |
| Song Sparrow | *Melospiza melodia* | Yes | - | - |
| Swamp Sparrow | *Melospiza georgiana* | Yes | - | - |
| White-throated Sparrow | *Zonotrichia albicollis* | Yes | S | S |
| Red-winged Blackbird | *Agelaius phoeniceus* | Yes | - | - |
| Common Grackle | *Quiscalus quiscula* | Yes | Yes | SPLX |
| Baltimore Oriole | *Icterus galbula* | - | - | LX |
| Pine Grosbeak | *Pinicola enucleator* | - | PLX | PLX |
| Purple Finch | *Carpodacus purpureus* | Yes | PLX | PLX |
| Common Redpoll | *Carduelis flammea* | Yes | - | - |
| Pine Siskin | *Carduelis pinus* | - | PLX | PLX |
| American Goldfinch | *Carduelis tristis* | Yes | - | - |
| Virginia Opossum | *Didelphis virginiana* | Yes | - | PLX |
| Masked Shrew | *Sorex cinereus* | Yes | RSPLX | RSPLX |
| Water Shrew | *Sorex palustris* | Yes | PLX | PLX |
| Northern Short-Tailed Shrew | *Blarina brevicauda* | - | RSPLX | RSPLX |
| Star-Nosed Mole | *Condylura cristata* | Yes | PLX | PLX |
| Little Brown Myotis | *Myotis lucifugus* | - | LX | LX |
| Northern Myotis | *Myotis septentrionalis* | - | LX | LX |
| Silver-Haired Bat | *Lasionycteris noctivagans* | - | - | LX |
| Big Brown Bat | *Eptesicus fuscus* | - | - | RSPLX |
| Eastern Red Bat | *Lasiurus borealis* | - | - | LX |
| Hoary Bat | *Lasiurus cinereus* | - | LX | LX |
| Snowshoe Hare | *Lepus americanus* | Yes | SPLX | SPLX |
| Red Squirrel | *Tamiasciurus hudsonicus* | - | - | PLX |
| Northern Flying Squirrel | *Glaucomys sabrinus* | - | LX | LX |
| American Beaver | *Castor canadensis* | Yes | - | - |
| Deer Mouse | *Peromyscus maniculatus* | - | SPLX | SPLX |

| Species | Latin | Scrub-Shrub Wetland | Bottomland Conifer | Bottomland Mixed |
|---|---|---|---|---|
| Southern Red-Backed Vole | *Clethrionomys gapperi* | Yes | SPLX | SPLX |
| Southern Bog Lemming | *Synaptomys cooperi* | Yes | LX | LX |
| Meadow Jumping Mouse | *Zapus hudsonius* | Yes | - | - |
| Woodland Jumping Mouse | *Napaeozapus insignis* | - | SPLX | SPLX |
| Common Porcupine | *Erethizon dorsatum* | - | - | PLX |
| Coyote | *Canis latrans* | Yes | PLX | PLX |
| Red Fox | *Vulpes vulpes* | - | PLX | PLX |
| Black Bear | *Ursus americanus* | Yes | PLX | PLX |
| Common Raccoon | *Procyon lotor* | Yes | LX | LX |
| American Marten | *Martes americana* | Yes | PLX | PLX |
| Ermine | *Mustela erminea* | Yes | SPLX | SPLX |
| Long-Tailed Weasel | *Mustela frenata* | Yes | SPLX | SPLX |
| Mink | *Mustela vison* | Yes | SPLX | SPLX |
| Striped Skunk | *Mephitis mephitis* | Yes | - | - |
| Northern River Otter | *Lutra canadensis* | Yes | SPLX | SPLX |
| Bobcat | *Lynx rufus* | Yes | SPLX | SPLX |
| White-Tailed Deer | *Odocoileus virginianus* | - | SPLX | S |
| Snapping Turtle | *Chelydra serpentina* | Yes | - | - |
| Painted Turtle | *Chrysemys picta* | Yes | - | - |
| Spotted Turtle | *Clemmys guttata* | Yes | SPLX | SPLX |
| Wood Turtle | *Clemmys insculpta* | Yes | SPLX | SPLX |
| Blanding's Turtle | *Emydoidea blandingii* | Yes | SPLX | SPLX |
| Common Box Turtle | *Terrapene carolina* | - | - | LX |
| Ringneck Snake | *Diadophis punctatus* | - | - | LX |
| Northern Water Snake | *Nerodia sipedon* | Yes | SPLX | SPLX |
| Brown Snake | *Storeria dekayi* | Yes | SPLX | SPLX |
| Eastern Ribbon Snake | *Thamnophis sauritus* | Yes | - | - |
| Common Garter Snake | *Thamnophis sirtalis* | Yes | - | SPLX |
| Eastern Massasauga | *Sistrurus catenatus* | Yes | SPLX | SPLX |