

Keweenaw Lakeshore Forest: A Conservation Easement in the Upper Peninsula of Michigan

Introduction

A conservation easement (CE) is a voluntary legal agreement between a landowner and a land trust or government agency that replaces permanent legal limits on uses of land to protect its conservation values. Conservation easements provide an alternative to government reservation or acquisition, historically the primary approach to land conservation in the United States³. Private land conservation is becoming extremely important because habitat for 95% of all federally threatened and endangered flora and fauna is found on private land³. In addition to benefitting habitats and species, forest and wetland conservation through CEs can sequester carbon, providing an important ecosystem service⁴.

This project will analyze development suitability, assign vegetation type, and provide baseline maps for the Keweenaw Lakeshore Forest (KLF) CE, currently being written. KLF is located in Keweenaw County, Michigan. It consists of 1,800 acres, including 1.1 miles of Lake Superior shoreline, several interior lakes and ponds, miles of creeks, and a diverse range of habitats and animal and plant assemblages. The Michigan Natural Features Inventory recommended the KLF shoreline for “high priority protection” due to the “scenic and biological value”¹. By contributing to a CE proposal, this analysis will help increase the diversity and abundance of native species and mitigate climate change through carbon sequestration^{2,5}.



Table 1. Listed Species Observed or Expected

Species	Status
Canada Lynx (<i>Lynx canadensis</i>)	FT
Gray Wolf (<i>Canis lupus</i>)	FE
Northern long-eared bat (<i>Myotis septentrionalis</i>)	FT
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	BCC
Horned Grebe (<i>Podiceps auritus</i>)	BCC
American Bittern (<i>Botaurus lentiginosus</i>)	BCC
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	FP, BCC
Peregrine Falcon (<i>Falco peregrinus</i>)	SE, BCC
Yellow Rail (<i>Coturnicops noveboracensis</i>)	BCC
Solitary Sandpiper (<i>Tringa solitaria</i>)	BCC
Common Tern (<i>Sterna hirundo</i>)	ST, BCC
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	BCC
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	BCC
Wood Thrush (<i>Hylocichla mustelina</i>)	BCC
Golden-winged Warbler (<i>Vermivora chrysoptera</i>)	BCC
Canada Warbler (<i>Cardellina canadensis</i>)	BCC
Rusty Blackbird (<i>Euphagus carolinus</i>)	BCC
Trumpeter swan (<i>Cygnus buccinator</i>)	ST
Merlin (<i>Falco columbarius</i>)	ST
Least Bittern (<i>Ixobrychus exilis</i>)	ST
Caspian tern (<i>Sterna caspia Pallas</i>)	ST

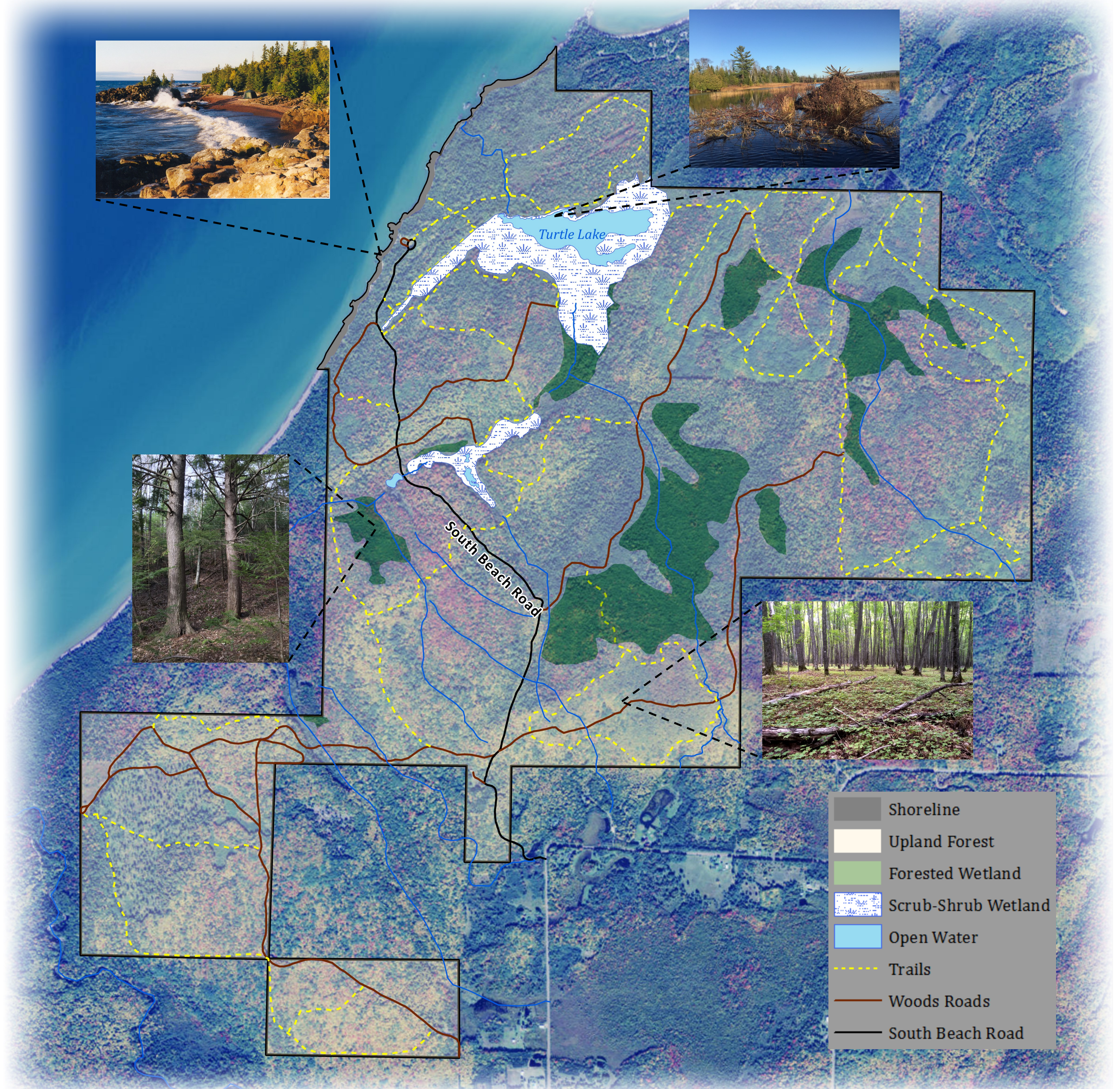
Federally Endangered (FE), Federally Threatened (FT), Federally Protected (FP), State Endangered (SE), State Threatened (ST), Birds of Conservation Concern (BCC). Sources: US Department of Interior (2008), Birds of Conservation Concern (2008).



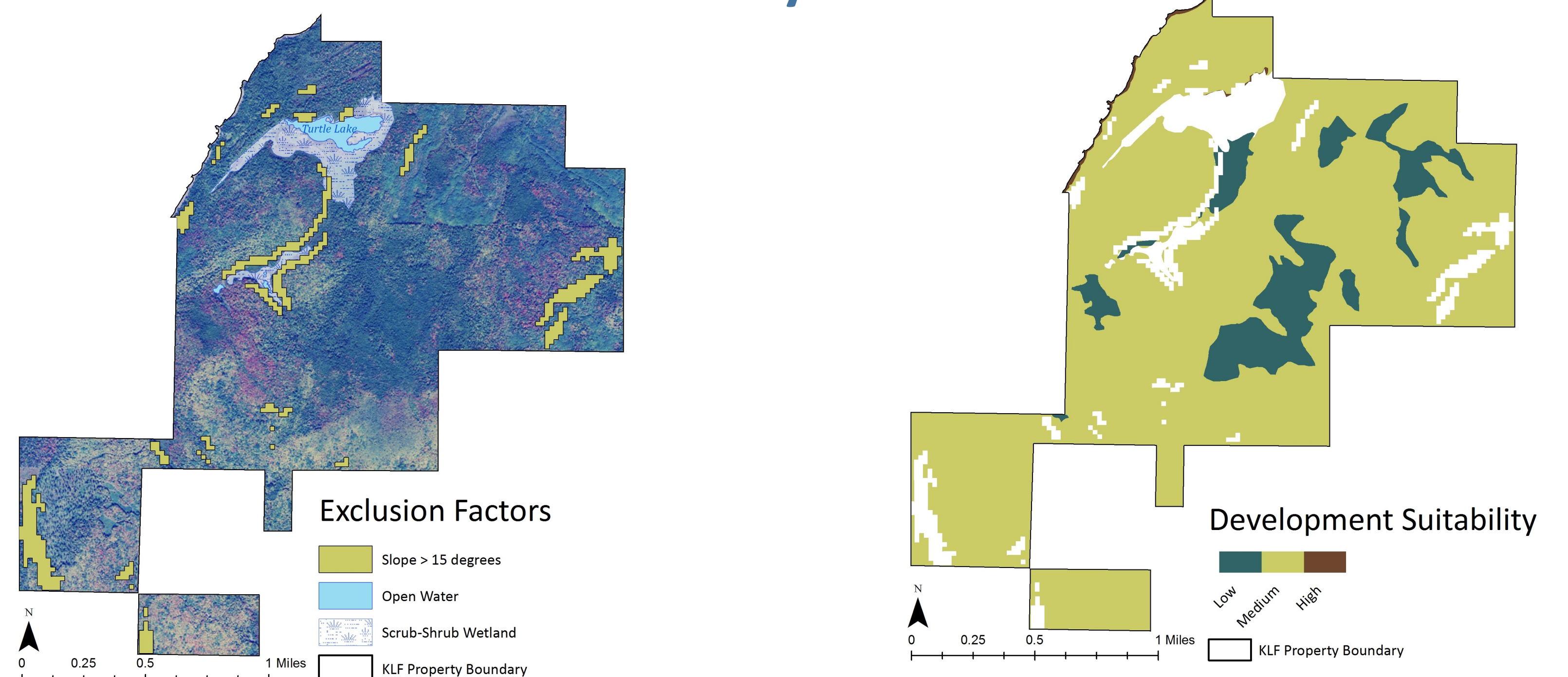
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Methods

Shapefiles were created by tracing landmarks and color gradients on the satellite image (e.g. open water, forested wetland, etc) using the editor tool and in Google Earth. Slope was calculated from the Michigan digital elevation model (DEM) data set. Slopes greater than 15 degrees were exported to a new shapefile using the select by attribute tool. Open water, scrub-shrub wetland, and areas with slope greater than 15 degrees are not developable and were excluded from the analysis using the erase tool. Development suitability factors were ranked according to market value estimates per front foot (ff) or acre, ease of access, and CE desirability. The market value of shorefront is \$600-\$1,000/ff, upland forest is \$1000/acre, and forested wetland is \$800/acre. Forested wetland is the least suitable and accessible for development. Development rights (CE value) can be estimated at 90% of market value for shorefront and 50% of market value for interior acreage. In this analysis, shorefront was assigned a ranking of 2, upland forest 1, and forested wetland -1. A classified color ramp was used to differentiate between high, medium, and low development suitability.



Analysis



Results & Conclusions

The results of this analysis indicate that KLF contains 5,895 feet (60 acres) of Lake Superior frontage, 1,800 feet (20 acres) of Turtle Lake frontage, 1,316 acres of upland forest, and 181.4 acres of forested wetland available for development. Based upon current market estimates, the development value of KLF is approximately \$8 million. However, the true value of KLF is the conservation value, including varied upland, lowland, and wetland habitats, unique species assemblages including several endangered and threatened species (Table 1), and carbon sequestration. Planned surveys will identify additional insect, plant, and freshwater mussel and clam species that occur at KLF. The primary habitat type at KLF is biologically valuable boreal hardwood transitional forest, an ecotone that blends coniferous and northern hardwood forests and associated species, nutrient-poor soils, and a variety of water bodies. Protecting KLF with a CE will provide carbon sequestration and achieve permanent protection of valuable habitats and species that are under treat a variety of sources, including development, drainage, and logging.⁶

Acknowledgments

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Data Sources

GIS Open Data: State of Michigan
 Ersi
 Natural Resources Canada
 Google Earth
 Projection: NAD_1983_2011_UTM_Zone_16N



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