

Michigan Department of Natural Resources, Forest, Mineral & Fire Management Division

## HIGH CONSERVATION VALUE AREA (HCVA) AND ECOLOGICAL REFERENCE AREA (ERA) MANAGEMENT AND MONITORING FORMS PACKET

Portions of this information are exempt from Michigan's Freedom of Information Act, 1976 PA 442, MCL 15.243



### BACKGROUND AND INSTRUCTIONS

Prior to using this packet material and forms please refer to Work Instruction 1.4 Biodiversity Management on State Forestlands and the Conservation Area Management Guidelines available on line at:

[http://www.michigan.gov/dnr/0,1607,7-153-30301\\_33360-144865--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-30301_33360-144865--,00.html).

Identified HCVA's and ERAs will be managed to conserve, protect, maintain, and/or enhance their defined conservation objectives or values. The management methods used will vary depending on the objective and type of designation. On DNR-managed lands, Ecological Reference Areas may be protected through a variety of mechanisms (refer to Conservation Area Management Guidance). Management activities or prescriptions in Ecological Reference Areas are highly restricted to those that maintain or enhance the defined attributes and values and protect the immediate natural resource values or human health and safety.

This packet is for each High Conservation Value Area (HCVA) without an existing management plan and all Legally Dedicated State Natural Areas, Ecological Reference Areas (ERA), Critical Dunes and Coastal Environmental Areas on state forest land. Its purpose is to: 1.) document baseline information on each area and its conservation values, threats, management goals and objectives, and 2.) to track changes in threats, when management activities are carried out, monitor if they are effective, and capture needed changes in management determined not to be effective.

Keep the original copies of these forms in the Compartment/Stand File within each FMU and send copies to respective DEQ and DNR program managers and the DNR, FMFM Forest Resource Management Section, Monitoring Specialist.

### SUMMARY: LOCATION MAP, MANAGEMENT RECOMMENDATIONS PART I: HCVA BASELINE INFORMATION, GOALS AND OBJECTIVES

COMPLETE FOR EACH HCVA WITHOUT AN EXISTING MANAGEMENT PLAN

PART I TO ACCOMPANY PART II

#### SECTION 1: SITE INFORMATION

- A. HCVA TYPE
- B. SITE, CONTACT AND ADMINISTRATIVE INFORMATION
- C. OWNERSHIP INFORMATION
- D. CONSERVATION PARTNERS
- E. OTHER DOCUMENTS RELATED TO THIS HCVA

#### SECTION 2: CONSERVATION VALUES (TARGETS)

- A. BIODIVERSITY VALUES
- B. SOCIAL/ECONOMIC VALUES
- C. INFRASTRUCTURE/FACILITIES VALUES

#### SECTION 3: CURRENT CONDITIONS (THREATS)

- A. VALUE OR TARGET VIABILITY (POOR, FAIR, GOOD, VERY GOOD)
- B. CURRENT PRIMARY THREATS

#### SECTION 4: MANAGEMENT GOALS AND OBJECTIVES

### PART II: HCVA MONITORING

SECTION 5: COMPLIANCE MONITORING (WERE TASKS COMPLETED?)

SECTION 6: EFFECTIVENESS MONITORING AND RECOMMENDATIONS (HOW WELL DID MANAGEMENT WORK OR WERE OBJECTIVES ACHIEVED? WHAT ARE NEXT THE STEPS?)

SECTION 7: THREATS MONITORING FIELD FORM – STAND ALONE FORM (WHAT IS THE STATUS OF VALUES OR TARGETS?)

MAY BE COMPLETED BY ANYONE FOR ANY HCVA

OR PART OF MONITORING PACKET TO ACCOMPANY PART I AND PARTS II, SECTIONS 6, 7 AND PART III.

Helpful References:

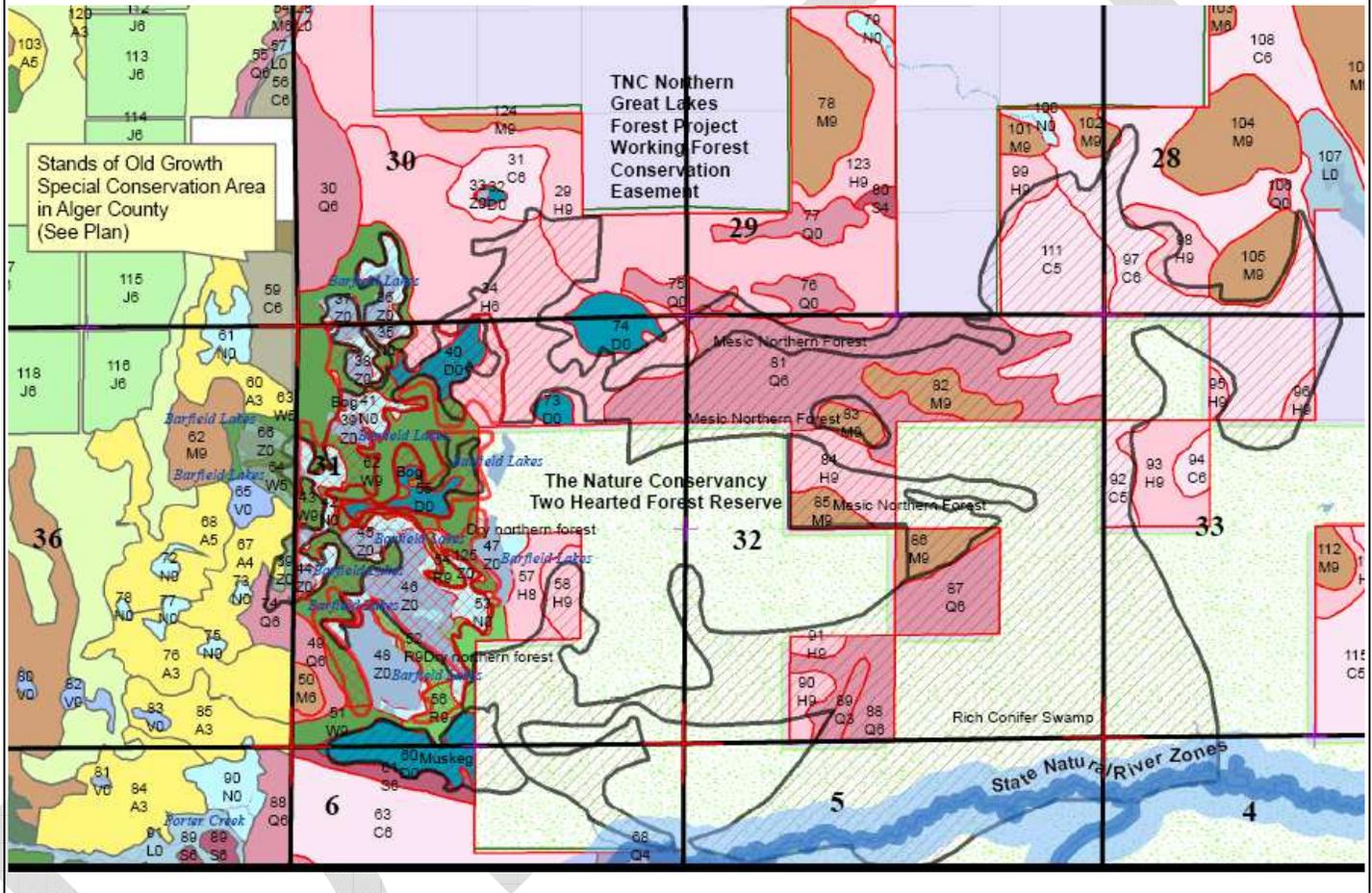
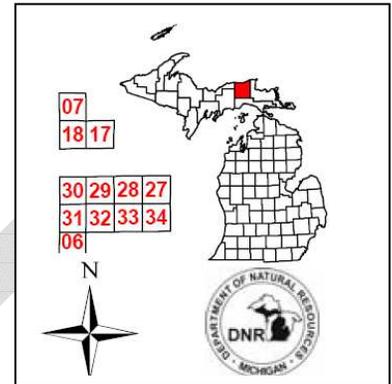
Marqoluis, R. and N. Salafsky. 1998. Measures of Success. Island Press, Washington, DC. 362 pp.

The Nature Conservancy. 2005. CAP (Conservation Action Planning) Toolkit - version 08-23-05.

See 2007 overview at <http://sites-conserveonline.org/dcs/projects/art10152.html> and the workbook at [http://www.conserveonline.org/2003/07/s/ConPrjMgmt\\_v4](http://www.conserveonline.org/2003/07/s/ConPrjMgmt_v4)

# SUMMARY

**Barfield Lakes Complex  
 Ecological Reference Areas**  
 Newberry Forest Management Unit  
 Luce County, Michigan  
 T49N,R12W  
 Sections 28, 29, 30, 31, 32, 33  
 T48NR12W  
 Sections 4, 5, 6  
 1,262 Acres  
 Photo of Barfield Lakes Bog  
 By Joshua G. Cohen



**RECOMMENDED MANAGEMENT GOALS AND ACTIVITIES (REPEATED HERE FROM SECTION 4 IN BACK)**

**CHECK ALL GOAL CATEGORIES THAT APPLY**

- NATURAL COMMUNITY MAINTENANCE OR ENHANCEMENT GOALS
- ECOLOGICAL SYSTEMS MAINTENANCE OR ENHANCEMENT GOALS
- SPECIES MAINTENANCE OR ENHANCEMENT GOALS
- SPECIES RESTORATION GOALS
- SOCIAL ECONOMIC GOALS
- INFRASTRUCTURE/FACILITIES GOALS
- ADMINISTRATIVE GOALS– PROTECTION STATUS; CAPACITY BUILDING; FUNDING, VOLUNTEERS

**GOAL# AND DESCRIPTION FROM SECTIONS 2 AND 3**

**Goal 1: Manage Barfield Lakes Bog Complex, Rich Conifer Swamp, Muskeg, Mesic Northern Forest and Associated Nature Conservancy lands, and Two Hearted River intersection as one large Special Conservation Area.**

**Objective 1:** Support additional MNFI surveys in Barfield Lakes Bog, Rich Conifer Swamp ERA's and potential high quality Dry Northern Forest (2010 YOE Stand 62) to clarify natural community boundaries and determine if rare species are present.

**Task 1:** The MNFI 2007 survey focused on southern central portion of rich conifer swamp. Further surveys of the remainder are needed to gain a full understanding of the site. Therefore, in Section 30 reserve stand 31, 32, 33, 34 and MNFI mapped boundary in stand 29 in SCA until additional MNFI survey can clarify northern boundaries of this rich conifer swamp era.

**Task 2:** Keith to consult with Josh Cohen and/or Brad Slaughter in MNFI particularly about ERA south boundary in stand 29 and stand 97 in Section 28 to refine ERA boundaries, potentially Winter 2009.

**Objective 2:** Maintain ERA and Candidate ERA's within the Barfield Lake Complex by letting natural processes occur where possible, with no logging unless for restoration purposes and no salvage logging unless for safety purposes.

**Task 1:** Unit to work with resource protection staff specialists to develop wildfire response plan to allow fire to burn where safe and feasible and to use Minimum Impact Suppression Techniques (MIST) where possible.

**Task 2:** All proposed management must be in accordance with the Two Hearted River Natural River Plan.

**Objective 3:** Develop a monitoring plan for invasive species and work with conservation groups to implement.

**Objective 4:** Minimize roads and control illegal ATV access – develop strategy with ATV coordinator and repost signs.

**Goal 2: Evaluate protection needs for the Barfield Lakes Bog Complex within the upcoming Biological Stewardship Area and Ecoregional Planning Process.**

**Objective 1:** Support securing mineral rights for conservation purposes as opportunities arise on private lands adjoining and within the ERA complex.

**Objective 2:** To maintain landscape context and provide buffer, support long term protection through continued conservation easements on private land.

**Task 1:** *Work with MNFI to identify additional survey needs in adjacent state forests, in particular mesic northern forest and consider alternative management techniques such as big tree silvicultural to provide a functional buffer to the existing ERA's complex.*

**Task 2:** Work with The Nature Conservancy to apply sustainable forest practices to manage for old growth characteristics on property they manage.

**PART I: HCVA BASELINE INFORMATION , GOALS AND OBJECTIVES**

**SECTION 1: SITE INFORMATION**

**A: HCVA TYPE – CHECK ALL THAT APPLY**

- |  |   |
|--|---|
| <input type="checkbox"/> Critical Dune as defined by DEQ<br><input type="checkbox"/> Legally Dedicated State Natural Area<br><input checked="" type="checkbox"/> Ecological Reference Area (ERA):<br><b>Barfield Lakes Bog Complex</b><br>ERA Bog (@ 139 acres)<br>ERA Dry Northern Forest (@ 36 acres)<br>Candidate ERA Rich Conifer Swamp (@ 990 acres)<br>Candidate ERA Mesic Northern Forest (@ 100 acres)<br>Candidate ERA Muskeg (@ 33 acres)<br><input type="checkbox"/> Endangered Species Management Area<br><input type="checkbox"/> Kirtland Warbler<br><input type="checkbox"/> Piping Plover<br><input type="checkbox"/> Other: | <input type="checkbox"/> Environmental Area as defined by DEQ<br><input checked="" type="checkbox"/> State Natural River or Scenic River: <b>The Two Hearted River is a State Wilderness River and occurs partly along the southern boundary of the Barfield Lakes Bog complex</b><br><input type="checkbox"/> Quiet Area:<br><input type="checkbox"/> Other: |
|--|---|

**SPECIAL CONSERVATION AREA (SCA) - LIST OTHER CATEGORIES BELOW**

The Barfield Lakes ERA Complex is a portion of a possible DNR Biodiversity Stewardship Area (BSA) called the Two Hearted Forested Wetland Landscape Unit

SCA Old Growth Cedar Stands 30 and 56, and 59 in Newberry and Shingleton Units.

SCA Stands 74, 75 and 76 for buffering and hydrology purposes to ERA

SCA Stands 93, 94, 95, 96 for buffering the rich conifer swamp ERA

**Private Land**

Surrounds part of The Nature Conservancy's (TNC) Two Hearted River Forest Reserve @ 23,338 Acres in the Two Hearted River Watershed (see map) – enrolled in CFR

Embedded within the larger TNC Northern Great Lakes Forest Project – Enrolled in CFR

**B: SITE, CONTACT AND ADMINISTRATIVE INFORMATION**

Site Name : <b>Barfield Lakes Complex</b>		Other Names:	
Report Date <b>November 10, 2008</b>	Forest Mgt Unit <b>Newberry Forest Management Unit</b>  <b>Shingleton Management Unit (Alger Co.)</b>	Compartment Number(s) Stand Number(s) <b>REFER TO MAP BOUNDARIES</b> <b>YOE 2010 Compt. 3</b> Include all of stands, 30, 36, 37, 60, 61, 62, 74, portions of stands 29 & 34 within All of Section 31, Excluding Stand 49, 50 In Section 29, recognize mapping differences between stand lines and MNFI Boundary – Exclude stands 99, 98, 108, 95, 65, 105 – see map <b>YOE 2008 Compt 103</b> Stand 56, 58, 59, 66, 64, 69, part of 74, 67, to follow Candidate ERA Boundary on map.	<input checked="" type="checkbox"/> Map Attached <input type="checkbox"/> Shape File in OI/IFMAP GDSE File Location/Name
County(ies) <b>Luce</b>  <b>Alger</b>	Township(s) Range(s) Section(s) ¼ Sec. Optional if mapped <b>T48NR12W Sections 4, 5, 6</b> <b>T49N R12W Sections 28, 29, 30, 31, 32, 33, 36</b> <b>T49N R13W Sections 25, 36</b>		
Name of individual completing this form (first and last) <input checked="" type="checkbox"/> Check if DNR Employee <b>Kim Herman, Monitoring Specialist, Forest, Mineral, Fire Management Division (FMFMD)</b> <b>Keith Magnusson, Forester, FMFMD, Newberry FMU</b> <b>Kristie Sitar, Wildlife Biologist, Wildlife Division,</b> <b>Kristen Matson, Forester, FMFMD, Shingleton FMU</b> <b>James Waybrant, Fisheries Biologist, Fisheries Division</b>		Telephone  <b>(906) 786-2351 Escanaba</b>  <b>(906) 293-3293 x 4745 Newberry</b> <b>(906) 293-3293 x 4730 Newberry</b> <b>(906) 452-6227 Shingleton</b> <b>(906) 293-5131 Newberry OSC</b>	Email Address  <b>hermank@michigan.gov</b>  <b>magnussk@michigan.gov</b> <b>sitarkl@michigan.gov</b> <b>Matsonk1@michigan.gov</b> <b>waybranj@michigan.gov</b>

Additional contact information Name of individual providing information (first and last), if applicable <b>Leslie Homan, FMU Manager, FMFM</b>	Telephone <b>(906) 293-3298</b>	Email Address <b>homanl@michigan.gov</b>
Name of DNR/DEQ Program Contact if Applicable	Telephone	Email Address
<input checked="" type="checkbox"/> Volunteer (s) Number of Volunteers: Name of Group: <b>The Nature Conservancy</b> Contact Name: <b>Christine (Tina) Hall</b>	Telephone <b>(906) 225-0399 ext 12</b>	Email Address <b>chall@tnc.org</b>

**C: OWNERSHIP INFORMATION – CHECK ALL THAT APPLY AND INCLUDE NAME OF THE UNIT:**

<input checked="" type="checkbox"/> State Forest Land: <b>Newberry &amp; Shingleton Management Unit</b>	<input type="checkbox"/> State Game Area: <input checked="" type="checkbox"/> Other or Private Land (describe): <b>Section 25 – Two Camps owned by J. Becker &amp; D. Becker</b> <b>Remainder of Sections 31, 32 Owned and managed by The Nature Conservancy</b>
<input type="checkbox"/> State Park/Recreation Area:	

**D: CONSERVATION PARTNERS – FILL IN ALL KNOWN PARTNERS**

Name of Organization: <b>The Nature Conservancy</b> Contact Name: <b>Christine (Tina) Hall, Conservation Director</b> Email Address: <b>chall@tnc.org</b> Telephone <b>(906) 225-0399 ext 12</b>	Name of Organization: <b>Michigan Natural Areas Council</b> Contact Name: <b>Phyllis Higman</b> Email Address: <b>mnac@cyberspace.org</b> Telephone <b>(517) 373-6983</b>
Name of Organization: _____ Contact Name: _____ Email Address _____ Telephone ( ) _____	Name of Organization: _____ Contact Name: _____ Email Address _____ Telephone ( ) _____

**E: OTHER DOCUMENTS RELATED TO THIS HCVA – CITATION AND LOCATION WHERE STORED**

Albert, D. 1986. Historical letter to The Nature Conservancy regarding the uniqueness of the area. Michigan Natural Features Inventory. Copy in FMFM and TNC files.

Cohen, J.G. 2000. Natural community abstract for mesic northern forest. Michigan Natural Features Inventory, Lansing, MI. 7 pp.  
[http://web4.msue.msu.edu/mnfi/abstracts/ecology/Mesic\\_northern\\_forest.pdf](http://web4.msue.msu.edu/mnfi/abstracts/ecology/Mesic_northern_forest.pdf)

Cohen, J.G., B.S. Slaughter, and M.A. Kost. 2008. Natural Community Surveys of Potential Ecological Reference Areas on State Forest Lands. Michigan Natural Features Inventory, Report Number 2008-04, Lansing, MI. 272 pp.

Cohen, J. G., and M. A. Kost. 2008. Natural community abstract for bog. Michigan Natural Features Inventory, Lansing, MI. 20 pp. <http://web4.msue.msu.edu/mnfi/abstracts/ecology/Bog.pdf>

Crispin, S. 1987. Historical letter to The Nature Conservancy regarding the uniqueness of the area. Michigan Natural Features Inventory. Copy in FMFM and TNC files.

Kost, M. A. 2002. Natural community abstract for rich conifer swamp. Michigan Natural Features Inventory, Lansing, MI. 9 pp. [http://web4.msue.msu.edu/mnfi/abstracts/ecology/Rich\\_conifer\\_swamp.pdf](http://web4.msue.msu.edu/mnfi/abstracts/ecology/Rich_conifer_swamp.pdf)

Kost, M. A., D. A. Albert, J. G. Cohen, B. S. Slaughter, R. K. Schillo, C. R. Weber, and K. A. Chapman. 2007. Natural Communities of Michigan: Classification and Description. Michigan Natural Features Inventory, Report No. 2007-21, Lansing, MI. [Bog](#) ; [Rich Conifer Swamp](#) ; [Mesic Northern Forest](#)

Michigan Department of Natural Resources. 2002. Revised Two Hearted River Natural River Plan, Luce County. Fisheries Division, Michigan Department of Natural Resources, Lansing, MI 37 pp with Appendices [http://www.michigan.gov/documents/Two\\_Hearted\\_River\\_Plan\\_22961\\_7.pdf](http://www.michigan.gov/documents/Two_Hearted_River_Plan_22961_7.pdf)

The Nature Conservancy – Michigan Chapter. Website Accessed 2008. Two Hearted River Forest Reserve Summary [The Nature Conservancy - Two Hearted River Forest Reserve](#)

The Nature Conservancy-Michigan Chapter. Website Accessed 2008. Northern Great Lakes Forest Project Summary. [The Nature Conservancy - Northern Great Lakes Forest Project](#)

**SECTION 2: CONSERVATION VALUES/TARGETS – CHECK ALL THAT APPLY**

**A: BIODIVERSITY VALUES**

There are a number of ways to describe biodiversity values - check all that apply.

1. **Natural Communities** – Based on Michigan Natural Features Inventory Community Classification.

GO to: [http://web4.msue.msu.edu/mnfi/data/MNFI\\_Natural\\_Communities.pdf](http://web4.msue.msu.edu/mnfi/data/MNFI_Natural_Communities.pdf); <http://web4.msue.msu.edu/mnfi/pub/abstracts.cfm>

Quality Rank comes from specific MNFI Element Occurrence Records (EOR) in the FMFM IFMAP Biodiversity Data Layer.

Community Name	State Rank	Global Rank	Quality Rank A,B,C,D
Bog	S4	G3G5	AB
Rich Conifer Swamp	S3	G4	A
Mesic Northern Forest	S3	G4	AB
Muskeg	S3	G4G5	BC
Dry Northern Forest	S3?	G3?	C

2. **Other information if known.**

**Ecological Systems** .Check Applicable Regional Landscape Ecosystem (Section), Subsection, and Sub-subsection from Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 250 pp

Check all that apply	Name	Section Number	Subsection Number	Sub-subsection Number
<input checked="" type="checkbox"/>	Section VIII. Northern Lacustrine-Influenced Upper Michigan and Wisconsin	8		
<input checked="" type="checkbox"/>	Subsection VIII.2. Luce	8	2	

3. **Ecological Systems**

**List name(s) of Ecosystems/Natural Communities (based on MNFI Community Classification):**

Overviews and Site Descriptions from Michigan Natural Features Inventory Site Summaries-Cohen et al 2008

**BOG**

**Overview:** Bog is a nutrient-poor peatland characterized by acidic, saturated peat and the prevalence of sphagnum mosses and ericaceous shrubs. Bogs occur in depressions in glacial outwash and sandy glacial lakeplains and in kettles on pitted outwash and moraines. Bogs frequently occur as a floating mat on the margins of lakes and ponds. Fire and flooding are the main natural disturbance factors.

 <p>State Distribution</p>		
<p>Michigan Bog Distribution Kost et al. 2007</p>	<p>Barfield Lakes consists of numerous lake-filled bogs and peatlands of varying age and development that are surrounded by pine-dominated dry-mesic northern forest. (Cohen et al, 2008) Photos by Joshua G. Cohen.</p>	

**Barfield Lakes (Bog)**

Natural Community Type: Bog

Rank: G3G5 S4, very rare to secure globally and apparently secure within the state

Element Occurrence Rank: AB

Floristic Quality Index FQI (native) = 39.5 with 36 native species

Location: Newberry Forest Management Unit, Compartment 3

Element Occurrence Identification Number: 8926

**Site Description:** This large bog complex occurs on poorly drained lakeplain with sandy dune ridges surrounding the wetlands. This site consists of numerous lake-filled bogs and peatlands of varying age and development. The oldest areas support treed bog or muskeg while the youngest areas support intermittent wetland. Bogs predominant and are characterized by deep (> 1 meter), acidic (pH 4.5-5.0), saturated sphagnum peats and well-developed sphagnum hummock and hollow microtopography, which generates fine-scale gradients of soil moisture and soil chemistry. Beaver channels and deer trails also create unique microsites that increase the structural diversity of the site.

Both graminoid- and ericaceous-dominated bogs occur with a scattered and stunted conifer canopy composed of black spruce (*Picea mariana*), tamarack (*Larix laricina*), and white pine (*Pinus strobus*). Canopy coverage is < 5% with trees 5 to 20 cm in dbh and 5 to 20 ft tall. The sparse tall shrub layer is dominated by black spruce, tamarack, and white pine with mountain holly (*Nemopanthus mucronata*) and wild-raisin (*Viburnum cassinoides*) occurring along the upland margin where the canopy and understory become denser. The low shrub layer is dominated by leatherleaf (*Chamaedaphne calyculata*) and sweet gale (*Myrica gale*) with sweet gale most prevalent along the pond/lake margins. Additional characteristic low shrubs include bog laurel (*Kalmia polifolia*), bog rosemary (*Andromeda glaucophylla*), low sweet blueberry (*Vaccinium angustifolium*), and Labrador tea (*Ledum groenlandicum*). Labrador tea is concentrated along the upland margin. The ground cover is overwhelmingly dominated by few-seed sedge (*Carex oligosperma*) with small cranberry (*Vaccinium oxycoccos*) and large cranberry (*V. macrocarpon*) being abundant. Additional characteristic species include pitcher-plant (*Sarracenia purpurea*), white beak-rush (*Rhynchospora alba*), round-leaved sundew (*Drosera rotundifolia*), spoon-leaf sundew (*D. intermedia*), three-way sedge (*Dulichium arundinaceum*), and arrow-grass (*Scheuchzeria palustris*). Floating mats along the margins of the ponds/lakes are diverse with sundews, white beak-rush, bog buckbean (*Menyanthes trifoliata*), twig-rush (*Cladium mariscoides*), and arrow-grass. Areas of muskeg or treed bog (where lake-filling has occurred for the longest period of time) are characterized by a greater canopy coverage (10-25%) of scattered stunted conifers (black spruce, tamarack, and white pine) with ericaceous low shrub cover (leatherleaf, bog rosemary, bog laurel, and blueberries) and few-seed sedge and small cranberry. Areas of intermittent wetland are characterized by a greater prevalence of graminoids, namely twig-rush, threeway sedge, and bluejoint grass (*Calamagrostis canadensis*).

**RICH CONIFER SWAMP**

**Overview:** Rich conifer swamp is a groundwater-influenced, minerotrophic, forested wetland dominated by northern white-cedar (*Thuja occidentalis*) that occurs on organic soils (i.e., peat) primarily north of the climatic tension zone in the northern Lower and Upper Peninsulas. Rich conifer swamp occurs in outwash channels, outwash plains, glacial lakeplains, and in depressions on coarse- to medium-textured ground moraines. It is common in outwash channels of drumlin fields and where groundwater seeps occur at the bases of moraines. Rich conifer swamp typically occurs in association with lakes and cold, groundwater-fed streams. It also occurs along the Great Lakes shoreline in old abandoned embayments and in swales between former beach ridges where it may be part of a wooded dune and swale complex. Windthrow is common, especially on broad, poorly drained sites. Fire was historically infrequent. Rich conifer swamp is characterized by diverse microtopography and ground cover. The community is also referred to as cedar swamp.

 <p style="text-align: center;">State Distribution</p>		
<p>Michigan Rich Conifer Swamp Distribution                  Kost et al. 2002</p>	<p>Barfield Lakes Rich Conifer Swamp - Cedars                  Photos by Bradford Slaughter, MNFI Ecologist</p>	

**Barfield Lakes (Rich Conifer Swamp)**

Natural Community Type: Rich Conifer Swamp

Rank: G4 S3, apparently secure globally and very rare and local throughout state

Element Occurrence Rank: A

Native Floristic Quality Index = 44.2 with 80 native species

Location: Newberry Forest Management Unit, Compartment 3, and Private Lands

Element Occurrence Identification Number: 5676

**Site Description:** This extensive rich conifer swamp occurs on a poorly drained sand lakeplain. The soils are characterized by over a meter of circumneutral (pH 6.5-7.0), sapric to fibric peats over sands. Along the base of the beach ridges (on the glacial lake bed) and in narrow drainages on the ground moraine, are some of the largest northern white-cedar (*Thuja occidentalis*) in the state (70-100 cm dbh). More poorly drained areas of lakeplain are dominated by much smaller cedar due to frequent windthrow. The canopy is dominated by northern white-cedar (40-100 cm dbh) with black spruce (*Picea mariana*) and occasional white pine (*Pinus strobus*). The relatively open subcanopy and tall shrub layers include northern white-cedar, black spruce, mountain maple (*Acer spicatum*), striped maple (*Acer pennsylvanicum*), and balsam fir (*Abies balsamea*). The diverse ground cover is dense and characterized by sphagnum mosses, clubmosses (*Lycopodium* spp.), sedges (*Carex* spp.), naked miterwort (*Mitella nuda*), violets (*Viola* spp.), sensitive fern (*Onoclea sensibilis*), northern wood sorrel (*Oxalis acetosella*), and rattlesnake plantains (*Goodyera* spp.). Areas of intense blowdown are characterized by a dense shrub layer of balsam fir (*Abies balsamea*) and northern white-cedar regeneration with occasional canopy black ash (*Fraxinus nigra*), black spruce, and yellow birch (*Betula alleghaniensis*). Coarse woody debris of various sizes and decay classes was noted. Over 80 native species were noted during the 2006 surveys.

**MESIC NORTHERN FOREST**

**Overview:** Mesic northern forest is a forest type of moist to dry-mesic sites lying mostly north of the climatic tension zone, characterized by the dominance of northern hardwoods, particularly sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*). Conifers such as hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) are frequently important canopy associates. This community type breaks into two broad classes: northern hardwood forest and hemlock-hardwood forest. It is primarily found on coarsetextured ground and end moraines, and soils are typically loamy sand to sandy loam. The natural disturbance regime is characterized by gap-phase dynamics; frequent, small windthrow gaps allow for the regeneration of the shade-tolerant canopy species. Catastrophic windthrow occurred infrequently with several generations of trees passing between large-scale, severe disturbance events. Historically, mesic northern forest occurred as a matrix system, dominating vast areas of mesic uplands in the Great Lakes region. These forests were multi-generational, with old-growth conditions lasting many centuries.

 <p>State Distribution</p>		
<p>Mesic Northern Forest Map From Cohen 2000</p>	<p>Barfield Lakes Mesic Northern Forest Photos by Joshua G. Cohen, MNFI Ecologist</p>	

**Barfield Lakes (Mesic Northern Forest)**

Natural Community Type: Mesic Northern Forest

Rank: G4 S3, apparently secure globally and very rare and local throughout the state

Element Occurrence Rank: AB

Location: Newberry Forest Management Unit, Compartment 3

Element Occurrence Identification Number: 10486

**Site Description Excerpted from Cohen et al 2008:** Three variants of old-growth mesic forest characterize this site. Areas of well-drained, low ground moraine support mesic forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Level, moderately drained lakeplain is dominated by mixed hardwood-conifer forest with hemlock (*Tsuga canadensis*) being prevalent. The site also includes an east-west running, steep-sloped dune ridge that is hemlock dominated. The soils are primarily sandy loams of variable moisture retaining capacity depending on the landform. The moraine has well-drained soils, the lakeplain has moderately well-drained soils, and the dune ridge has very well-drained soils. Gap-phase dynamics has generated an uneven-aged forest with numerous canopy gaps and high volume of coarse woody debris and snags of varying species composition, diameter range, and decay classes. Well-developed pit and mound topography is found throughout indicating multiple generations of old-growth conditions. These pockets of mesic northern forest are embedded within a high-quality rich conifer swamp.

Four to five vegetative layers characterize this forest: supercanopy with hemlock and white pine (*Pinus strobus*), canopy, subcanopy, shrub layer, and ground layer. Canopy closure ranges from 80-90%. Sugar maple, yellow birch, and beech are prevalent canopy trees on low ground moraine. Hemlock and white pine dominate the dune ridge with white pine stumps occurring sporadically along the ridge. Low level areas of lakeplain of moderate drainage are dominated by hemlock with a diverse array of canopy associates including yellow birch, northern white-cedar (*Thuja occidentalis*), white spruce (*Picea glauca*), sugar maple, and white pine. Some areas of lakeplain forest grade into rich conifer swamp. Diameters of canopy dominants range from 50 to 80 cm with some trees between 80 to 110 cm. Canopy dominants are 80 to 100 feet tall. Shade-tolerant species dominate the canopy, subcanopy, and understory. The low shrub layer throughout the site is dominated by American fly honeysuckle (*Lonicera canadensis*). Characteristic species of the ground cover include starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), bunchberry (*Cornus canadensis*), goldthread (*Coptis trifolia*), downy Solomon's seal (*Polygonatum pubescens*), stiff clubmoss (*Lycopodium annotinum*), and sugar maple seedlings.

**Ecological processes** – such as connectivity, hydrology, fire, wind events, flooding, pest and disease cycles;  
**Describe:**

**Bog:** (Excerpted from Kost et al 2007) Saturated and inundated conditions inhibit organic matter decomposition and allow for the accumulation of peat. Under cool, anaerobic, and acidic conditions, the rate of organic matter accumulation exceeds organic decay. Once sphagnum mosses become established on the peat mat, they maintain and enhance saturated and acidic conditions, which in turn promote continued peat development. Development and expansion of peatlands occur via two distinct processes: lake-filling and paludification. Lake-filling occurs in small lakes with minimal wave action, where gradual peat accumulation results in the development of a bog mat that can fill the basin or occur as a floating mat or grounded mat. Paludification is the blanketing of terrestrial systems (often forests) by the overgrowth of peatland vegetation. Paludified peatlands develop on flat areas (typically lakeplains) where peat develops vertically and spreads horizontally. For both lake-filling and paludification, peat accumulates above the water table and the bog becomes isolated from the influence of groundwater. Bogs are ombrotrophic to weakly minerotrophic peatlands, receiving inputs of water and nutrients primarily from ion-poor precipitation.

Natural disturbance factors influencing bogs include fire, flooding, windthrow, and insects. Surface fire can contribute to the maintenance of bogs by killing encroaching trees. Fire severity and frequency in bogs is closely related to fluctuations in water level and landscape context; sites adjacent to fire-prone uplands burn more frequently. Prolonged periods of lowered water table can allow the surface peat to dry out sufficiently to burn. Flooding contributes to the development, expansion, and maintenance of bogs. Dam-building activities of beaver can result in blocked drainage and flooding, which facilitate sphagnum peat development and expansion and can also cause grounded bog mats to become loosened from the bottom and float. Roots of peatland trees are physiologically active near the surface and are quickly killed when the water table rises following prolonged flooding. Trees growing in bogs are particularly susceptible to windthrow because sphagnum peat provides a poor substrate for anchoring trees and the anaerobic conditions associated with saturated soils limit rooting depth. Tree survival in bogs is also limited by insects and parasites. Insect outbreaks of the larch sawfly (*Pristiphora erichsonii*) cause heavy mortality of tamarack (*Larix laricina*). The plant parasite dwarf mistletoe (*Arceuthobium pusillum*) kills black spruce (*Picea mariana*). Native ericaceous shrubs can limit the establishment and growth of conifer trees within bogs through both competitive inhibition and the production of allelopathic compounds.

**Rich Conifer Swamp: (Excerpted from Kost et al 2007)**

Seasonal water level fluctuations, beaver flooding, windthrow, and fire are all important forms of natural disturbance for rich conifer swamp. Although rich conifer swamp is primarily groundwater fed, seasonal water-level fluctuations are common with water levels highest in spring and lowest in late summer and fall. In response to seasonal water level fluctuations, the roots of northern white-cedar and tamarack form extensive mats that stand elevated above adjacent inundated muck-flats or carpets of moss, creating a varied microtopography. Beaver flooding can cause extensive mortality of northern white-cedar and other woody plants, significantly altering community structure and composition. Prolonged flooding can cause conversion to shallow pond, emergent marsh, northern wet meadow, northern fen, poor fen, or northern shrub thicket depending on the depth and duration of inundation, local topography, and groundwater chemistry.

Due to anaerobic conditions associated with a high water table and organic soils, trees growing in rich conifer swamps are shallowly rooted, making them susceptible to frequent small-scale windthrow. As a result, leaning, bent, or fallen trees are common, creating tip-up mounds, abandoned root pits, and coarse woody debris that contribute to the complex structure and microtopography of rich conifer swamp. Northern white-cedar is well adapted to windthrow because of its ability to reproduce both sexually, through seed, and asexually, by growing adventitious roots when its lateral branches are in contact with the ground (i.e., layering).

Fire may spread through the community during extensive periods of drought, killing many woody plants and in some instances, removing the upper layers of organic soil. Fire can also play a role in the community's establishment. Seedlings of northern white-cedar can establish directly on burned-over organic soils or within alder thickets that originate following catastrophic fire in poor conifer swamp. Catastrophic fire and windfall in northern Lower Michigan conifer swamps are estimated to have occurred at intervals of approximately 3,000 years.

**Mesic Northern Forest (Excerpted from Kost et al 2007)**

The natural disturbance regime is characterized by frequent, small-scale wind disturbance or gap-phase dynamics and infrequent intermediate- and large-scale wind events. Severe low pressure systems are a significant source of small-scale canopy gaps. Catastrophic windthrow, from tornadoes and downbursts, occurs infrequently (estimated return intervals are >1000 years). Catastrophic fire was historically correlated with catastrophic windthrow, especially in hemlock-dominated forests. Due to the long interval between large-scale disturbance events, mesic northern forests tend to be multi-generational, with old-growth conditions lasting several centuries. Ice storms affecting hundreds to thousands of acres act to thin canopy cover and promote tree regeneration. Historically, where mesic northern forest bordered fire-dependent pine and oak-pine systems, low-intensity surface fires may have infrequently burned portions of the ground layer, exposing patches of mineral soil and thereby promoting regeneration of small-seeded conifers.

Underlying environmental features – such as soils, geology, topography, headwaters;

**Describe:** The soils are mostly complexes as well due to the upland and lowland nature of the landscape. Most of the uplands are dominated by beech-maple-hemlock, white pine-hemlock forest types where the topography is level to rolling with steep ridges mixed throughout and the major soil types are Rousseau, Wallace, Garlic, Bodi and Frohing. The lowland areas are relatively level and dominated by mixed conifer swamp and shrub/emergent marsh cover types. They mostly consist of soil complexes such as Tawas/Spot/Finch, Lupton/Tawas, and Dawson/Greenwood/ Loxely.

The large complex called Barfield Lakes Bog occurs on poorly drained lakeplain with sandy dune ridges surrounding the wetlands. This site consists of numerous lake-filled bogs and peatlands of varying age and development. Bogs predominant and are characterized by deep (> 1 meter), acidic (pH 4.5-5.0), saturated sphagnum peats and well-developed sphagnum hummock and hollow microtopography, which generates fine-scale gradients of soil moisture and soil chemistry. (Cohen et al 2008)

The extensive Barfield Lakes Rich Conifer Swamp occurs on a poorly drained sand lakeplain. The soils are characterized by over a meter of circumneutral (pH 6.5-7.0), sapric to fibric peats over sands. (Cohen et al 2008)

The Barfield Lakes Mesic Northern Forest soils are primarily sandy loams of variable moisture retaining capacity depending on the landform. The moraine has well-drained soils, the lakeplain has moderately well-drained soils, and the dune ridge has very well-drained soils. (Cohen et al 2008)

**Environmental gradients** – *such as elevation, precipitation, temperature;*  
**Describe:** Topography is variable throughout the compartment with a complex of uplands and lowlands. Most of the uplands topography is level to rolling with steep ridges mixed throughout. The lowland areas are relatively level and dominated by mixed conifer swamp and shrub/emergent marsh cover types.

**Species and/or community structure** – *using during migration, during different life stages, or gradual species turnover across environmental gradients.*

**Describe:**

**Nested large and small natural communities linked by functional or restorable ecosystems:**  
**Describe:** MNFI reports the C-ranked (fair quality) Barfield Lakes Dry Northern Forest adjacent or embedded within the Barfield Lakes Bog Ecological reference area.

**High quality natural communities nearby:**

**Describe:**

Two Hearted River – State Natural River (Wilderness Category) is within the southern boundary of the Barfield Lakes ERA Complex

MNFI reports high quality forests to the north and a good quality (BC Ranked), but small muskeg to the south of the Barfield Lakes Bog ERA.



**Large Block Size:**

**General Shape and Acres:** The Nature Conservancy's Two Hearted River Preserve and Barfield Lakes ERA Complex covers several square miles of essentially unfragmented landscape.

4. **Species Assemblages** – List types of species assemblage targets.

**Major groupings of species** - share common natural processes or have similar conservation requirements (e.g., freshwater mussels, forest-interior birds, essential pollinators).

**Globally significant species aggregations (e.g. migratory shorebird aggregation).**

5. **Species** - List types of species by common and scientific name.:

**Focal species** - keystone, wide-ranging (regional), providing linkages between ecosystems, and umbrella species.

**Species:** Wildlife species *potentially* using this compartment include white-tailed deer, moose, black bear, gray wolves, coyote, otter, grouse, fisher and pine marten.

**Globally imperiled or state endangered or threatened native species** - Ranked G1, G2, G3 by NatureServe, and S1, S2 by MNFI, state and/or federally listed or proposed for listing as Threatened (T) or Endangered (E) (MI and U.S.), and on the IUCN Red List (International).

**Species:** According to the Michigan Natural Features Inventory ecologist the following species have NOT been documented in the area but the natural communities could support them.

Scientific Name	Common Name	Natural Community	US Status	State Status	Global Rank	State Rank	More Information
<i>Carex wiegandii</i>	Plant - Wiegand's Sedge	Bog Muskeg		T	G3	S2	<a href="#">Summary</a>
<i>Empetrum nigrum</i>	Plant - Black Crowberry	Bog Muskeg		T	G5	S2	<a href="#">Summary</a>
<i>Lycopodiella margueriteae</i>	Plant - Northern prostrate clubmoss	Bog Muskeg		T	G2	S2	<a href="#">Summary</a>
<i>Amerorchis rotundifolia</i>	Plant - Orchid Round-leaved Orchis	Bog Muskeg Rich Conifer Swamp		E	G5	S1	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Bartonia paniculata</i>	Plant - Panicked Screw-stem	Bog Muskeg		T	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Dalibarda repens</i>	Plant - False-violet	Dry Northern Forest		T	G5	S1S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Pterospora andromedea</i>	Plant - Pine-drops	Dry Northern Forest		T	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Canis lupus</i>	Gray Wolf	Landscape Wide	LT	T	G4	S3	<a href="#">DNR - Gray Wolf (Canis lupus)</a>
<i>Buteo lineatus</i>	Bird - Red-shouldered Hawk	Mesic Northern Forest		T	G5	S3S4	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Botrychium mormo</i>	Plant - Goblin Fern/Moonwort	Mesic Northern Forest		T	G3	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Panax quinquefolius</i>	Plant - Ginseng	Mesic Northern Forest		T	G3G4	S2S3	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Galearis spectabilis</i>	Plant - Orchid - Showy Orchis -	Mesic Northern Forest		T	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Haliaeetus leucocephalus</i>	Bird - Bald Eagle	Near Water Bog Dry Northern Forest Mesic Northern Forest		T	G4	S4	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Gymnocarpium robertianum</i>	Plant - Limestone Oak Fern	Rich Conifer Swamp		T	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Ranunculus lapponicus</i>	Plant - Lapland Buttercup	Rich Conifer Swamp		T	G5	S1S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Calypso bulbosa</i>	Plant - Orchid - Calypso or Fairy-slipper -	Rich Conifer Swamp		T	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>

**Species of Special Concern - Due to vulnerability, declining trends, disjunct distributions, or endemic status; Ranked S3 by MNFI**

**Species:**

Scientific Name	Common Name	Natural Community	US Status	State Status	Global Rank	State Rank	More Information
<i>Accipiter gentilis</i>	Northern Goshawk KNOWN LOCATION	Dry Northern Forest Mesic Northern Forest		SC	G5	S3	<a href="#">Summary</a> <a href="#">Abstract</a>

According to the Michigan Natural Features Inventory ecologist, the following species have not been documented in the area but habitat could support them.

Scientific Name	Common Name	Natural Community	US Status	State Status	Global Rank	State Rank	More Information
<i>Clemmys insculpta</i>	Wood Turtle	Along drainages		SC	G4	S2S3	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Falcpennis canadensis</i>	Bird - Spruce Grouse	Bog Dry Northern Forest		SC	G5	S2S3	<a href="#">Summary</a> <a href="#">Abstract</a>

Scientific Name	Common Name	Natural Community	US Status	State Status	Global Rank	State Rank	More Information
<i>Picoides arcticus</i>	Bird – Black-backed Woodpecker	Bog Dry Northern Forest Mesic Northern Forest Muskeg Rich Conifer Swamp		SC	G5	S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Boloria freija</i>	Butterfly – Freija Fritillary	Bog		SC	G5	S3S4	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Boloria frigga</i>	Butterfly – Frigga Fritillary	Bog		SC	G5	S3S4	<a href="#">Summary</a>
<i>Erebia discoidalis</i>	Butterfly – Red-disked Alpine	Bog		SC	G5	S2S3	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Somatochlora incurvata</i>	Dragonfly – Incurvate Emerald	Bog		SC	G4	S1S2	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Williamsonia fletcheri</i>	Dragonfly – Ebony Boghaunter	Bog Muskeg Rich Conifer Swamp		SC	G3G4	S1S2	<a href="#">Summary</a>
<i>Drosera anglica</i>	Plant – English Sundew	Bog Muskeg		SC	G5	S3	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Huperzia selago</i>	Plant – Fir Clubmoss	Bog Muskeg		SC	G5	S3	<a href="#">Summary</a>
<i>Adlumia fungosa</i>	Plant- Climbing Fumitory	Dry Northern Forest Mesic Northern Forest		SC	G4	S3	<a href="#">Summary</a>
<i>Alces alces</i>	Moose	Landscape Wide		SC	G5	S4	<a href="#">Summary</a>
<i>Cypripedium arietinum</i>	Plant – Orchid Ram's Head Lady's-slipper	Rich Conifer Swamp		SC	G3	S3	<a href="#">Summary</a> <a href="#">Abstract</a>
<i>Listera auriculata</i>	Plant -Orchid - Auricled Twayblade	Streamside Thickets		SC	G3	S2S3	<a href="#">Summary</a>

Other species of greatest conservation need - Identified as part of Michigan's Wildlife Action Plan due to declining populations or other characteristics that may make them vulnerable.

**Species: B: KNOWN SOCIAL/ECONOMIC VALUES**

**C: EXISTING INFRASTRUCTURE/FACILITIES:**

- Archaeological
- Historical:
- Recreational: **Passive wilderness experience**
  - Camping: **back country**
  - Canoeing/Kayaking: **On the Two Hearted River**
  - Fishing: **The Two Hearted River**
  - Hiking/Backpacking:
  - Hunting/Trapping: **Bear hunting in NW boundary, walk in opportunities.**
  - Photography
  - Scenic: **@ the Barfield Lakes**
  - Water (lake, river, stream):  
**Barfield Lakes**  
**Two Hearted River**
  - Wildlife Viewing: **Passive**
  - Cross Country Skiing
  - Other : **Remote with pockets of large trees, roadless wild area, very few people**
- Restorative/Spiritual: **Wilderness Experience**
- Traditional Use/Gathering

- American Disability Accessibility (ADA) Considerations
- Boat Launch(es)
- Bridge(s):
- Campground(s):
- Interpretive Displays:
- Marked boundaries
- Parking lot(s):
- Posted use rules
- Scenic Overviews
- Toilet(s)
- Trails/Boardwalks:
- Other: **Barfield Lakes Road from Co Road 416 goes east - west; forest road south of Barfield Lakes used by ORV's**

**SECTION 3: CURRENT CONDITIONS**

**D. CURRENT STATUS/VIABILITY OF CONSERVATION VALUE/TARGET (FROM TNC CAP TOOL KIT)**

**STATUS DEFINITIONS – POOR - IMMINENT LOSS, FAIR – VULNERABLE, GOOD – MINIMUM INTEGRITY, VERY GOOD - OPTIMAL INTEGRITY**

LIST CONSERVATION VALUE/TARGET FROM SECTION 2 – A, B OR C	LIST CATEGORY OF SIZE, CONDITION, OR LANDSCAPE CONTEXT	LIST KEY ATTRIBUTE	LIST INDICATOR	LIST CURRENT STATUS POOR, FAIR, GOOD, OR VERY GOOD
BARFIELD LAKES BOG	CONDITION LANDSCAPE CONTEXT	INTACT ECOLOGICAL PROCESSES <ul style="list-style-type: none"> <li>• BEAVER FLOODING</li> <li>• WIND</li> <li>• FIRE</li> </ul> NUMEROUS LAKE-FILLED BOGS AND PEATLANDS OF VARYING AGE AND DEVELOPMENT.	LACK OF ATV ACTIVITY  FLORISTIC QUALITY <ul style="list-style-type: none"> <li>• NO INVASIVE PLANTS</li> <li>• 36 NATIVE SPECIES</li> <li>• NATIVE FQI = 39</li> </ul>	VERY GOOD
BARFIELD LAKES RICH CONIFER SWAMP	SIZE CONDITION LANDSCAPE CONTEXT	OLD GROWTH CHARACTERISTICS  INTACT ECOLOGICAL PROCESSES <ul style="list-style-type: none"> <li>• HYDROLOGY</li> <li>• BEAVER FLOODING</li> <li>• WIND</li> <li>• FIRE</li> </ul>	STRUCTURAL DIVERSITY <ul style="list-style-type: none"> <li>• OLD GROWTH WHITE CEDAR 40-100 CM DBH,</li> <li>• COARSE WOODY DEBRIS VARIOUS SIZE/DECAY CLASSES.</li> <li>• WINDTHROW PREVALENT, W/ CEDAR REGENERATION ESP. IN AREAS OF INTENSE BLOWDOWN</li> </ul> FLORISTIC QUALITY <ul style="list-style-type: none"> <li>• &gt;80 NATIVE SPECIES</li> <li>• NATIVE FQI = 44</li> </ul> FEW ROADS	VERY GOOD
BARFIELD LAKES NORTHERN MESIC FOREST	CONDITION LANDSCAPE CONTEXT	INTACT ECOLOGICAL PROCESSES <ul style="list-style-type: none"> <li>• SMALL SCALE WIND EVENTS</li> </ul> EXCELLENT LANDSCAPE CONTEXT: EMBEDDED WITHIN HIGH-QUALITY RICH CONIFER SWAMP IN FORESTED LANDSCAPE WITH MODERATE HUMAN DISTURBANCE.  OLD GROWTH CHARACTERISTICS PART OF ONE OF THE LARGEST UNCUT-LIGHTLY CUT FOREST BLOCKS IN THE EASTERN UP WITH THREE VARIANTS OF OLD-GROWTH MESIC NORTHERN FOREST (LAKEPLAIN, MORaine, AND DUNE RIDGES) THAT WERE EITHER MODERATELY SELECTIVELY CUT OR NEVER LOGGED	NO LOGGING OR SALVAGE LOGGING  HIGH STRUCTURAL DIVERSITY <ul style="list-style-type: none"> <li>• UNEVEN-AGED FOREST WITH NUMEROUS CANOPY GAPS</li> <li>• HIGH VOLUME OF COARSE WOODY DEBRIS AND SNAGS OF VARYING SPECIES COMPOSITION, DIAMETER RANGE, AND DECAY CLASSES.</li> <li>• WELL-DEVELOPED PIT AND MOUND TOPOGRAPHY THROUGHOUT INDICATING MULTIPLE GENERATIONS OF OLD-GROWTH CONDITIONS.</li> <li>• FOUR TO FIVE VEGETATIVE LAYERS-                             <ul style="list-style-type: none"> <li>▪ SUPERCANOPY WITH HEMLOCK AND WHITE PINE</li> <li>▪ CANOPY,</li> <li>▪ SUBCANOPY,</li> <li>▪ SHRUB LAYER,</li> <li>▪ GROUND LAYER</li> </ul> </li> </ul>	VERY GOOD - GOOD
NORTH BRANCH TWO HEARTED RIVER	CONDITION LANDSCAPE CONTEXT	FREE FLOWING COLD WATER TROUT STREAM STATE NATURAL RIVER-WILDERNESS CATEGORY	UNDEVELOPED WATERSHED COMPLETELY NATURAL PRESENCE OF BROOK TROUT	VERY GOOD

**SECTION 3: CURRENT CONDITIONS**

**D. CURRENT STATUS/VIABILITY OF CONSERVATION VALUE/TARGET (FROM TNC CAP TOOL KIT)**

**STATUS DEFINITIONS – POOR - IMMINENT LOSS, FAIR – VULNERABLE, GOOD – MINIMUM INTEGRITY, VERY GOOD - OPTIMAL INTEGRITY**

<i>LIST CONSERVATION VALUE/TARGET FROM SECTION 2 – A, B OR C</i>	<i>LIST CATEGORY OF SIZE, CONDITION, OR LANDSCAPE CONTEXT</i>	<i>LIST KEY ATTRIBUTE</i>	<i>LIST INDICATOR</i>	<i>LIST CURRENT STATUS POOR, FAIR, GOOD, OR VERY GOOD</i>
POTENTIAL HIGH QUALITY DRY NORTHERN AND DRY MESIC NORTHERN FOREST COMPLEX	CONDITION LANDSCAPE CONTEXT	ECOLOGICAL PROCESSES • FIRE	MATURE PINE FOREST WITH NATURAL REPRODUCTION	VERY GOOD TO GOOD?
MUSKEG	CONDITION LANDSCAPE CONTEXT	INTACT HYDROLOGY	INTACT FLORA	GOOD
TNC NORTHERN GREAT LAKES FOREST PROJECT TWO HEARTED RIVER RESERVE	CONDITION LANDSCAPE CONTEXT	SUSTAINABLE FORESTRY PRACTICES	RESTORATION OF OLD GROWTH CHARACTERISTICS	FAIR TO GOOD

**E. : INITIAL PRIMARY THREATS ASSESSMENT TO ESTABLISH BASELINE CONDITION**

**CHECK ALL THAT THERE IS ACTUAL EVIDENCE FOR AND DESCRIBE THE EVIDENCE BRIEFLY AND/OR ATTACH PHOTOS  
 DO THIS INITIALLY FROM AERIAL PHOTOS, LOCAL KNOWLEDGE, AND EXISTING DATA FOLLOWED BY A SITE VISIT.**

- A. Habitat Conversion & Degradation** – Complete or substantial **loss of or damage** to natural habitats.
- Altered Fire Regime -*suppression or increase in fire frequency and/or intensity outside of its natural range of variation:*
  - Altered Hydrologic Regime Changing water flow patterns outside their natural range of variation (*surface water diversion, groundwater pumping, dam operations*)
  - Commercial & Industrial Development: *factories, stand-alone shopping centers, office parks, train yards, docks, ship yards, airports, landfills*)
  - Farms & Plantations Agricultural operations - *commercial farms, industrial plantations, feed lots, aquaculture*
  - Housing & Urban Development Expansion of cities, towns, settlements, non-housing development - *urban areas, suburbs, villages, homes, shopping areas, offices, schools, hospitals*
  - Military Activities Actions by formal or paramilitary forces (*military bases, defoliation, munitions testing* :
  - Natural System Modifications Actions that convert or degrade habitat to “managing” natural systems for human welfare - *dam construction, land reclamation, wetland filling, rip-rap along shoreline, levees and dikes*
  - Recreation Areas Recreation sites with a substantial footprint *ski areas, golf courses, resorts, county parks*
  - Other:
- 
- B. Transportation Infrastructure** – Long narrow corridors **altering, fragmenting, and disturbing** natural habitat and species, including soil erosion/sedimentation, and providing routes for invasive or problematic species.
- Flight Paths :
  - Railroads:
  - Roads and Trails: **Many logging roads primarily in buffer areas to the north**
  - Shipping Lanes:
  - Trails: **Illegal ORV use specific to Stand 52**
  - Utility Lines.
  - Stream Crossings - *culverts, bridges* :
  - Other:
- 
- C. Energy & Mining** – Production of non-biological resources **having negative impacts** to conservation values.
- Mining – *Exploring, developing, and producing. DNR owns 100% minerals, both surface and below on state forest land. Sub surface mineral ownership (Cleveland Cliffs) severed from surface ownership on private lands.*
  - Oil & Gas Drilling
  - Renewable Energy – *Exploring, developing, and producing.*
- 
- D. Biological Resource Harvesting** –Over or under consumption of “wild” resources **resulting in loss** of conservation values.
- Gathering – *Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, or subsistence purposes.*
  - Grazing
  - Hunting, Trapping & Fishing
  - Timber Harvesting: **Continued or more intensive timber harvesting surrounding Mesic Northern Forest ERA threaten may cause fragmentation.**

**E. : INITIAL PRIMARY THREATS ASSESSMENT TO ESTABLISH BASELINE CONDITION**  
**CHECK ALL THAT THERE IS ACTUAL EVIDENCE FOR AND DESCRIBE THE EVIDENCE BRIEFLY AND/OR ATTACH PHOTOS**  
**DO THIS INITIALLY FROM AERIAL PHOTOS, LOCAL KNOWLEDGE, AND EXISTING DATA FOLLOWED BY A SITE VISIT.**

- E. Recreation & Research** – Non-consumptive uses of biological resources **resulting in damage** to natural resources.
- Human-Powered Recreation – *mountain bikes, hikers, backpackers, cross-country skiers, rock climbers, canoeists, kayakers, hang-gliders, birdwatchers, photographers: illegal ORV use specific to Stand 52 (2010 YOE)*
  - Motor-Powered Recreation - *Traveling outside of established transport corridors: off-road vehicles, motorcycles, motorboats, jet-skis, snowmobiles, ultra-light planes.*
  - Scientific Research – *Ecosystem manipulations*
- 
- F. Pollution** – Introduction of exotic and/or excess materials from point and non-point sources with **evidence of resource damage.**
- Chemicals & Toxins
  - Greenhouse Gasses –*CO<sub>2</sub>, methane*
  - Light Pollution
  - Noise Pollution
  - Nutrient Loads
  - Radioactive Materials
  - Salt/Brine
  - Solid Waste – *garbage, litter*
  - Thermal Pollution
  - Waste & Residual Materials – *dredge spoil, water treatment residuals, slash, mine tailings, excess sediment loads.*
- 
- G. Invasive & Other Problematic Species & Genes** – Aquatic or terrestrial non-native and native species or genetic materials that have or are predicted to have harmful effects on biodiversity following their introduction, spread and/or increase in abundance.  
List species, extent of infestation and fill out Forest Health Form.
- Introduced Genetic Material
  - Invasive Species: **Essentially un-impacted by invasive species. monitoring recommended.**
  - Problematic Native Species:
  - Hybrid Species
- 
- H. Climate Change** – Evidence of impacts from long-term changes linked to global warming and other climate issues.
- Climate Variability – Intensification and/or alteration of normal weather patterns - *droughts, high wind or rain event.*
  - Habitat Shifting & Alteration
- 
- I. Other**

**SECTION 4: RECOMMENDED MANAGEMENT GOALS AND ACTIVITIES (REPEATED IN SUMMARY UP FRONT)**  
**LIST GOAL(S), FOR EACH VALUE, RELATED THREAT ABATEMENT, MAINTENANCE OR ENHANCEMENT NEED IDENTIFIED IN SECTIONS 2 AND 3**

**CHECK ALL GOAL CATEGORIES THAT APPLY**

- NATURAL COMMUNITY MAINTENANCE OR ENHANCEMENT GOALS**
- ECOLOGICAL SYSTEMS MAINTENANCE OR ENHANCEMENT GOALS**
- SPECIES MAINTENANCE OR ENHANCEMENT GOALS**
- SPECIES RESTORATION GOALS**
- SOCIAL ECONOMIC GOALS**
- INFRASTRUCTURE/FACILITIES GOALS**
- ADMINISTRATIVE GOALS– PROTECTION STATUS; CAPACITY BUILDING; FUNDING, VOLUNTEERS**

**GOAL# AND DESCRIPTION FROM SECTIONS 2 AND 3**

**Goal 1: Manage Barfield Lakes Bog Complex, Rich Conifer Swamp, Muskeg, Mesic Northern Forest and Associated Nature Conservancy lands, and Two Hearted River intersection as one large Special Conservation Area.**

**Objective 1:** Support additional MNFI surveys in Barfield Lakes Bog, Rich Conifer Swamp ERA's and potential high quality Dry Northern Forest (2010 YOE Stand 62) to clarify natural community boundaries and determine if rare species are present.

**Task 1:** The MNFI 2007 survey focused on southern central portion of rich conifer swamp. Further surveys of the remainder are needed to gain a full understanding of the site. Therefore, in Section 30 reserve stand 31, 32, 33, 34 and MNFI mapped boundary in stand 29 in SCA until additional MNFI survey can clarify northern boundaries of this rich conifer swamp era.

**Task 2:** Keith to consult with Josh Cohen and/or Brad Slaughter in MNFI particularly about ERA south boundary in stand 29 and stand 97 in Section 28 to refine ERA boundaries, potentially Winter 2009.

**Objective 2:** Maintain ERA and Candidate ERA's within the Barfield Lake Complex by letting natural processes occur where possible with no logging unless for restoration purposes and no salvage logging unless for safety purposes.

**Task 1:** Unit to work with resource protection staff specialists to develop wildfire response plan to allow fire to burn where safe and feasible and to use Minimum Impact Suppression Techniques (MIST) where possible.

**Task 2:** All proposed management must be in accordance with the Two Hearted River Natural River Plan.

**Objective 3:** Develop a monitoring plan for invasive species and work with conservation groups to implement.

**Objective 4:** Minimize roads and control illegal ATV access – develop strategy with ATV coordinator and repost signs.

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**Goal 2: Evaluate protection needs for the Barfield Lakes Bog Complex within the upcoming Biological Stewardship Area and Ecoregional Planning Process.**

**Objective 1:** Support securing mineral rights for conservation purposes as opportunities arise on private lands adjoining and within the ERA complex.

**Objective 2:** To maintain landscape context and provide buffer, support long term protection through continued conservation easements on private land.

**Task 1:** *Work with MNFI to identify additional survey needs in adjacent state forests, in particular mesic northern forest and consider alternative management techniques such as big tree silvicultural to provide a functional buffer to the existing ERA's complex.*

**Task 2:** Work with The Nature Conservancy to apply sustainable forest practices to manage for old growth characteristics on property they manage.

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