DESIGNATION ORDER

USDA Forest Service, Eastern Region
Chequamegon-Nicolet National Forest
Lakewood-Laona Ranger District
Oconto County, Wisconsin

Battle Creek

Research Natural Area

Designation Order

By virtue of the authority vested in me by the Secretary of Agriculture in accordance with 7 CFR 2.42, 36 CFR 251.23, and 36 CFR Part 219, I hereby establish the Battle Creek Research Natural Area. It shall be comprised of 99 acres (40 hectares) of land in Oconto County, in the state of Wisconsin, on the Lakewood-Laona District of the Chequamegon-Nicolet National Forest, as described in the section of the Establishment Record entitled "Location" [and in the Land and Resource Management Plan for the Chequamegon-Nicolet National Forest map]

Approved by:

Kathleen Atkinson
Regional Forester

5/11/15
Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Battle Creek Research Natural Area

Chequamegon-Nicolet National Forest

Oconto County, Wisconsin

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation, and FSM 4063.41, Establishment Record Content, in arriving at this recommendation.

Prepared by: Marjory E. Brzeskiewicz Date 09/29/2014
Marjory E. Brzeskiewicz, Botanist, Chequamegon-Nicolet National Forest

Draft by: /s/ Dawn Hinebaugh Date: 2005
Dawn Hinebaugh, WI DNR

Recommended by: Jeff Seefeldt Date 2/11/15
Jeff Seefeldt, District Ranger, Lakewood-Laona District

Recommended by: Date 2/18/15
Paul I.V. Strong, Forest Supervisor, Chequamegon-Nicolet National Forest

Concurrence of: Michael T. Rains Date 3.23.2015
Michael T. Rains, Station Director, Northern Research Station

TITLE PAGE

United States Department of Agriculture

Forest Service

February 2014

Establishment Record for Battle Creek Research Natural Area

Chequamegon-Nicolet National Forest, Lakewood-Laona District, Oconto County, Wisconsin

Cover photo: A view of the North Branch Oconto River from the Battle Creek RNA [Steve Janke 2012]

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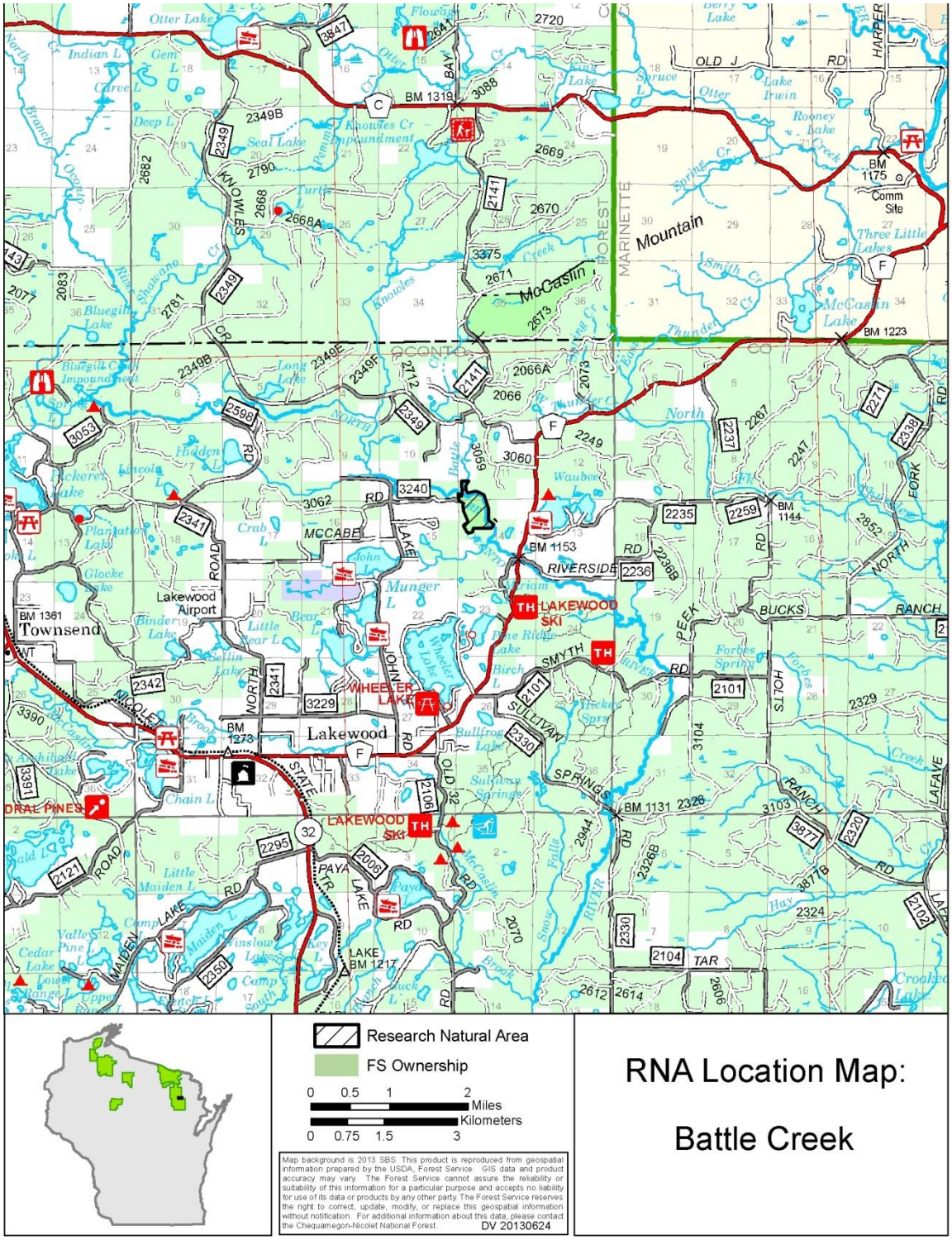
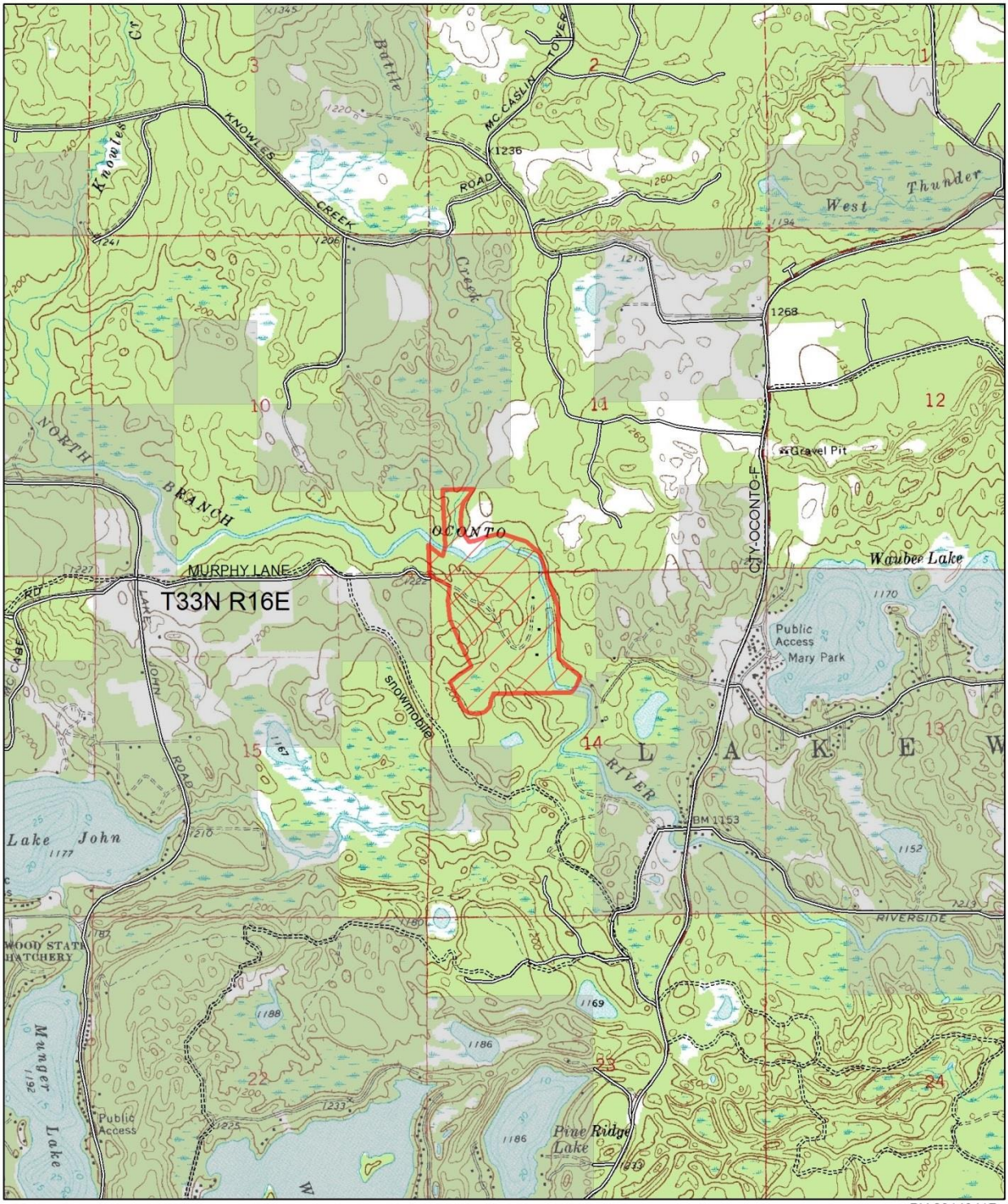
Note: The Alpha/Numeric ordering in this document follows that within 2005 Forest Service Manual direction (FSM 4063) for Establishment Records.

1. IDENTIFICATION SECTION

Location Map



RNA Boundary Map: Battle Creek



Landscape Overview Battle Creek RNA

Legal Description

The RNA's Mercator coordinates are 45º 20' N latitude and 88º 27' W longitude. The Battle Creek Research Natural Area contains approximately 100 acres (40 hectares). USGS Quad is Wheeler Lake. T 33North, R16 East, Town of Lakewood, Oconto County Wisconsin. The boundary is delineated as follows:

Commencing at the North quarter corner of Section 14, thence S 01º 37' 58" W along the North-South ¼ line of Section 14, a distance of 1665.22 feet to an iron pipe on the North line of Lot #1 of Oconto County Certified Survey Map #2240, thence N 62º 52' 15" W, along the North line of Lot #1 of Oconto County CSM #2240, a distance of 173.40 feet to the Northwest corner of CSM #2240 which is the **Point of Beginning**.

Thence along the west line of Lot #1 of CSM #2240, S 34º 15' 28" E, a distance of 174.50 feet,

Thence S 40º W, 122.08 feet,

Thence S 89º W, 1206.68 feet,

Thence S 22º W, 110.35 feet, Thence S 05º W, 107.02 feet, Thence S 48º W, 118.35 feet, Thence S 77º W, 123.96 feet, Thence N 82º W, 135.80 feet, Thence N 52º W, 82.66 feet, Thence N 28º W, 481.51 feet, Thence N 53º E, 175.50 feet, Thence N 56º E, 240.62 feet, Thence N 26º W, 406.84 feet, Thence N 23º E, 407.67 feet, Thence N 06º W, 294.20 feet, Thence N 09º E, 84.82 feet, Thence N 56º W approximately 360 feet to the West line of Section 14,

Thence North along the west line of Section 14, 85.00 feet to the Northwest corner of Section 14,

Thence North along the west line of Section 11, 483.97 feet,

Thence S 51º E, 220.52 feet, Thence S 66º E, 56.07 feet,

Thence N 15º E, 144.09 feet, Thence N 03º W, approximately 885 feet to a point on the South 1/16 line of Section 11,

Thence S 89º E along South 1/16 line, 431.75 feet,

Thence S 38º W, 215.15 feet, Thence S 16º W, 164.55 feet, Thence S 01º W, 185.63 feet,

Thence S 16º E, 164.55 feet, Thence S 35º E, 136.37 feet,

Thence N 87º E, 93.02 feet, Thence N 70º E, 133.59 feet, Thence N 76º E, 234.14 feet, Thence East, 111.35 feet,

Thence S 71º 30' E, 356.85 feet, Thence S 50º E, 260.13 feet, S 22º E, 100.03 feet, Thence S 19º E, 440.00 feet, Thence South , 1000.00 feet,

Thence S 45º E approximately 490 feet to the Northwest corner of CSM #2240, which is the Point of Beginning.

/s/ Randy Erickson March 18, 2013
Randy Erickson Date

Land Surveyor, Chequamegon-Nicolet National Forest

2. ADMINISTRATIVE SECTION

This Establishment Record has been prepared pursuant to Forest Service Manual direction (FSM 4063). Establishment of the Battle Creek RNA is documented with a signature page to follow and a Designation Order which is a separate document accompanying this document (FSM 4063.41.2) (USDA Forest Service 2005c).

The Station Director of the Northern Research Station (NRS) in consultation with the Chequamegon-Nicolet Forest (CNNF) Supervisor, Lakewood-Laona District Ranger, and NRS RNA Coordinator(s) will approve and coordinate research conducted in the RNA.

Requests to conduct research are referred to the Station Director, Northern Research Station, who will coordinate a review of the application. The Director or NRS RNA Designate will approve research proposals, and prior to the initiation of any projects, will coordinate the project or activity with the District Ranger. Any plant, animal, vegetation, or soil specimen(s) collected in the course of research conducted in the RNA are to be housed at a location designated by the Forest or approved by the Station Director.

Hard copies of research data files will be maintained in the following offices:

Chequamegon-Nicolet National Forest
1170 4th St. South
Park Falls, WI 54552

Station Director
c/o Station RNA Field Representative
Northern Research Station
5985 Highway K
Rhinelander, WI 54501

3. BODY OF ESTABLISHMENT RECORD

a. Introduction

Battle Creek Research Natural Area (RNA) is located approximately five miles northeast of Lakewood, Wisconsin (Identification Section: *Location Map* and *Boundary Map*). The 100-acre (40 hectare) RNA is on the Lakewood-Laona Ranger District of the Chequamegon-Nicolet National Forests (CNNF). The site is located entirely on National Forest Service land.

Battle Creek RNA contains high quality northern mesic forest with large white pine and eastern hemlock bordering a half-mile (0.8 km) stretch of the North Branch of the Oconto River. This community grades into an ecologically significant northern wet-mesic forest. The super-canopy pines provide habitat for numerous wood warblers and the state-protected bald eagle (*Haliaetus leucocephalus*), which uses the site.

Historical Background - American Indian tribes have lived on the lands that make up the CNNF for thousands of years with a long and complex history. They hunted, fished, gathered food, and obtained forest products for shelter, moved plants from other areas, and sometimes used fire to manipulate the land. Many of these practices continue today under reserved treaty rights (treaties of 1837 & 1842) with eleven Ojibwe tribes. See Section 4 d.(2) Cultural/Heritage for further discussion of Native American history on the site.

Some of the earliest history of northern Wisconsin was recorded by the land surveyors. J. McBride surveyed the township (T33N-R16E) in 1857. His description is noteworthy: "*This Township contains but few marshes or swamps. The Swamps are principally Cedar, both marsh and swamp are generally unfit for cultivations. It is well watered by streams and Lakes. One of the streams will furnish good power for milling purposes. The soil is of poor quality for farming purposes. The Timber is Hemlock, Birch, Sugar, Beech, and Pine. The surface of this Township is for the most part, broken and rocky. There are no improvements in the Township*" (BCPL 2004).

Northern Wisconsin was extensively logged in the late 1800s, virtually clear cutting much of the area. Catastrophic wildfires burned the logging slash across the region. The area of the RNA escaped this intense management (Figure 1) and appears to only have been selectively cut primarily focused on removal of large white pine (Janke *pers. comm*). Most of the Battle Creek RNA is now old-growth forest with many trees well over 100 years old. The land containing the RNA was purchased by the Forest Service in 1996 and there has been no timber harvested since. A small patch of red pine (*Pinus resinosa*) plantation is included within the RNA to simplify the boundary and buffer the river.

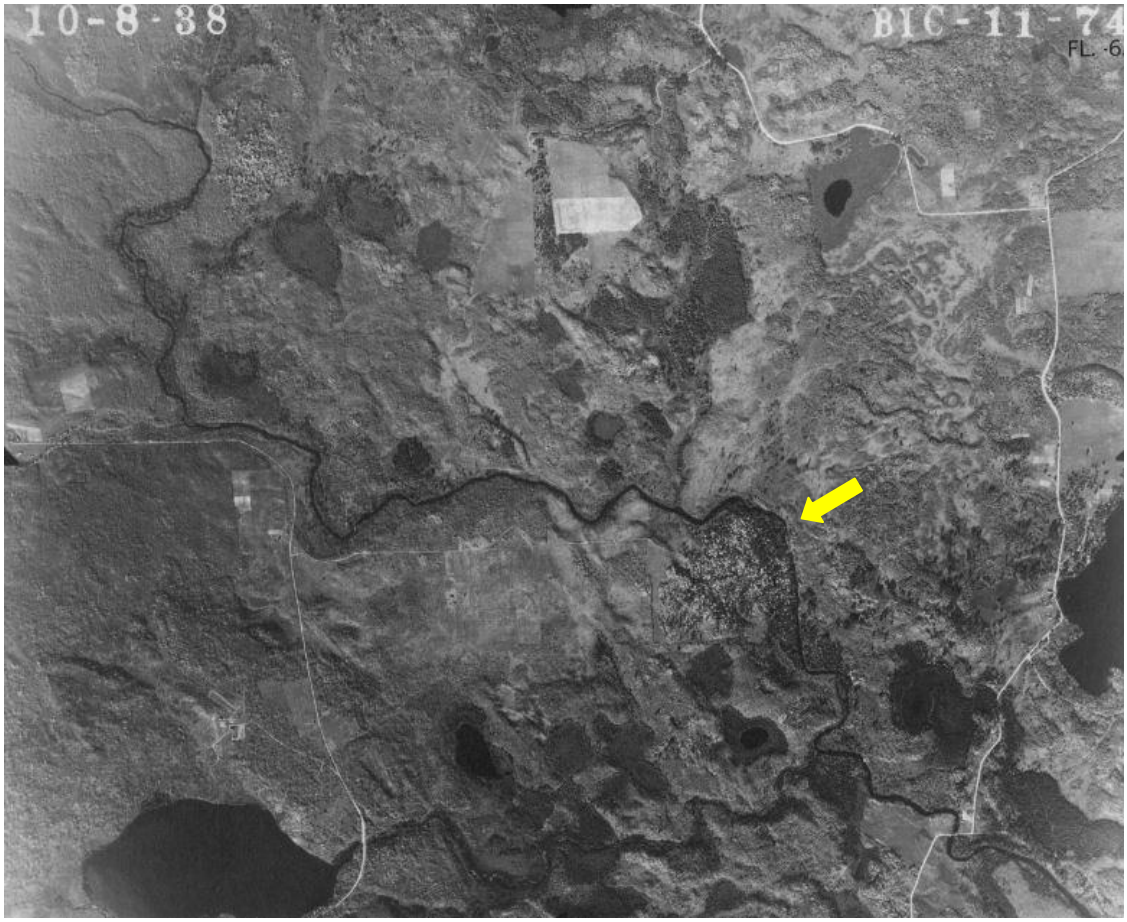


Figure 1. The large trees of Battle Creek RNA (arrow) certainly stand out in this 1938 black and white aerial photo indicating that the site survived the widespread logging of decades prior. (WHAIF 2013)

Ownership & Administration - Battle Creek RNA is owned outright by the USDA Forest Service. The land was purchased by the Forest Service in 1996. Administration and protection of the RNA is the responsibility of the Forest Supervisor of the Chequamegon-Nicolet National Forest (CNNF), or designate. The Lakewood/Laona Ranger District provides day-to-day protection and maintenance of the area.

The Northern Research Station Director, or his or her designee, will be responsible for any studies or research conducted in the RNA. The Northern Research Station Director, or his or her designee, will evaluate research proposals and coordinate all studies and research in the area with the Chequamegon-Nicolet RNA Coordinator and District Ranger.

Congressionally Designated Areas - Battle Creek RNA does not occur within any other administratively or congressionally designated areas. Refer to Appendix 1: *Ecological Evaluation* d. (1) *Research/Education use* for an explanation of co-designation as a Wisconsin State Natural Area.

b. Justification Section

(1) JUSTIFICATION STATEMENT

Battle Creek RNA features a high quality northern mesic forest dominated by large diameter white pine (*Pinus strobus*) and eastern hemlock (*Tsuga canadensis*) bordering a half-mile (0.8 km) stretch of the North Branch of the Oconto River (Spickerman 2000).

Figure 2. Old growth white pine (*Pinus strobus*), along with other large trees form a dense canopy in some areas of Battle Creek RNA that limits the shrub level cover. [Steve Janke, 2012]

Old-growth forest such as found here are but scattered remnants of the vast hemlock-hardwood forest that formerly covered much of northern Wisconsin. Such stands are rare within CNNF at present. Beech (*Fagus grandifolia*) is also present, here nearing its northern range limits in Wisconsin and its western geographical limits within the U.S. In addition, the large trees provide habitat for the protected bald eagle and likely for state-listed bat species.

(2) PRINCIPAL DISTINGUISHING FEATURES

Battle Creek RNA features a northern mesic forest (Curtis 1959) of large eastern hemlock and white pine occupying hilly terrain adjacent to the North Branch of the Oconto River (Spickerman 2000). The eastern hemlock and white pine are some of the largest diameter trees on the CNNF. Canopy associates include yellow birch (*Betula alleghaniensis)*, sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), and beech. Small maples are frequent and there is a diverse representation of size-age classes among the canopy trees. This stand is a relatively rich habitat with a diverse herbaceous layer and sparse mid-story. This stretch of the Oconto River is fast-moving and clear with exposed bedrock and boulders. Combined with the large trees it is very scenic. The RNA also contains a spring-fed, closed canopy stream containing course woody debris, and it is bordered by

northern wet-mesic forest dominated by white cedar (*Thuja occidentalis*) with lesser amounts of yellow birch and black ash (*Fraxinus nigra*).

The North Branch of the Oconto River is a high quality hard-water stream having slightly alkaline water. The entire stream is classed as trout water with brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*) inhabiting the waters.

(3) OBJECTIVES

Battle Creek RNA was recommended for RNA designation in the 2004 Chequamegon and Nicolet National Forest's Land and Resource Management Plan (hereinafter referred to as "2004 CNNF Forest Plan") and is incorporated by reference per the page citations that occur in this Establishment Record (USDA Forest Service 2004a pg 3-50). Objectives in the 2004 CNNF Forest Plan state that "RNAs and candidate RNAs (MA 8E) and Special Management Areas (MA 8F) as well as Old Growth and Natural Features Complexes (MA 8G) serve in the role as minimum management requirements, because they cumulatively function as important contributors for sustainable ecosystem management including the provision of a long-term increase in security of species viability and diversity" (USDA Forest Service, 2004c p. 10). These include plant communities that are part of a larger network of ecosystems represented across the region and nation. Battle Creek RNA is one of thirty areas on the CNNF that will be managed to meet the objectives of the national RNA program (FSM 4063.02) as a site for research and educational opportunities.

c. Land Management Planning

The alternative effects on RNA establishment were analyzed and disclosed in the Final Environmental Impact Statement (USDA Forest Service 2004b pg 3-110) and Record of Decision (USDA Forest Service 2004c pg 9). Battle Creek RNA "is part of a national network of ecological areas designated in perpetuity for research and education, and to provide important components of biological diversity for the Forests.

The RNAs and candidate RNAs on the CNNF have been assigned to a management prescription (8E) that is consistent with RNA objectives (USDA Forest Service 2004c pg 9). Management Area 8E is characterized by ecologically significant natural features and representative ecosystems. It includes a broad array of community types occurring on the range of landforms and soil types that occur on the CNNF. Plant communities are generally of an older age class and contain all or most species characteristic of that community in the region (Appendix 3 - *Forest Management Area Direction* and USDA Forest Service 2004a pg 3-50).

d. Management Prescription

The management prescription for Battle Creek RNA is embodied in the management area direction and guidance presented in the 2004 CNNF Forest Plan.

Management objectives under the guidelines of management area 8E are to allow natural processes to drive the structure and function of the ecosystems. The CNNF has not developed an individual site management plan for Battle Creek RNA. When developed, such a plan will provide more specific detail of management needs and ensure that the objectives for which the RNA was created are met. Any site plans will be coordinated with the state as Battle Creek is co-designated as a

State Natural Area and as such has compatible management goals [explained in Appendix 1: *Ecological Evaluation* d. (1) *Research/Education use*]. The CNNF non-native invasive plant strategy will detect, manage and prevent invasive plants as RNAs are high priority for monitoring and controlling invasives.

Refer to Appendix 1, section f.(1) *Potential or existing conflicts* to reference unique management issues that should be addressed for this RNA.

e. Use or Control of Fire and Grazing

Fire is not generally used as a management tool in these mesic community types but the site has had natural fires in the past. Fire is allowed if needed for specific objectives (Appendix 3- *Forest Management Area Direction)* and would be designed in the Battle Creek RNA management plan. However, fire has not been identified as a management need thus far.

Occasional wildfires do occur in dry years, but they are most often small in size - usually less than one acre (0.4 ha), limited by lack of fuel, and easily suppressed. Spring fires that occasionally occur in wetlands can be as large as 100 acres. Wildfire suppression within the RNA would employ those methods that cause the least disturbance.

There is currently no grazing on the Chequamegon-Nicolet National Forest, nor is grazing allowed in RNAs per 2004 CNNF Forest Plan standard.

4. APPENDIX 1 ECOLOGICAL EVALUATION

The following ecological evaluation is included as an appendix to the establishment record and tiers to the 2004 CNNF Forest Plan (USDA Forest Service 2004a) and to the Environmental Impact Statement (USDA Forest Service 2004b). This evaluation provides the initial baseline information for the Research Natural Area, serves as a source of data for reports on the Research Natural Area program, and provides information to researchers seeking research sites or projects. More specific information on research sites can be obtained from the Forest RNA Coordinator.

a. Physical Site Description and Climatic Conditions

(1) LOCATION

Battle Creek RNA is located on the Lakewood-Laona Ranger District of the Chequamegon-Nicolet National Forest, Oconto County, in the state of Wisconsin. The legal description is T33N R16E Sections 11, 14 (USGS Wheeler Lake quadrangle 7.5 minute series map, revised 1991 by the Forest Service). The RNA's Mercator coordinates are 45º 20' N latitude and 88º 27' W longitude. See Establishment Record Identification Section for *Location Map,* and *Boundary Map*.

(2) SIZE IN ACRES/HECTARES

The RNA is comprised of 100 acres (40 hectares).

(3) ELEVATION RANGE

Elevations range from 1,180 feet (360 m) to 1,220 feet (372 m) above sea level.

(4) ACCESS TO THE SITE

The site is located 4.5 miles (7.2 km) northeast of Lakewood, Wisconsin. From Lakewood, go east on County F about 1.5 miles (2.4 km) to Lake John Road (Forest Road 3235) on the north side of the highway. Turn left and travel north approximately 3.5 miles (5.6 km) to the intersection of McCabe Road. Turn right (east) on the gravel Forest Road 3240 and proceed 0.8 miles (1.3 km) and park at the gate. An old road (Figure 6) provides easy walking access east into the site (Identification Section: *Location Map* and *Boundary Map*.).

(5) CLIMATIC DATA

The weather station nearest to the Battle Creek RNA is Lakewood 3 NE (station no. 474523 latitude 45° 19' N, longitude 88° 30' W). The station is about 5 mi (8 km) to the southwest of the RNA and

has the same weather. This station recorded temperature and precipitation data since 1968 (Midwestern Regional Climate Center 2003). Climatic Records for Lakewood 3 NE weather station, Oconto County, Wisconsin from the years 1972 to 2001 are given in Table 1.

Table 1. Climate data for Battle Creek RNA; Temperature and precipitation from 1972 to 2001 (Midwestern Regional Climate Center 2003)

Temperature	°F	°C
Mean annual	42.0	5.6
Mean monthly - April through September	58.0	14.4
Mean monthly - October through March	25.0	-3.9
Average daily maximum	53.0	11.7
Average daily minimum	30.0	-1.1
Record high	100.0	37.8
Record low	-43.0	-41.6
Precipitation	**Inches**	**cm**
Mean annual rainfall	33.1	84.1
Mean monthly - April through September	3.6	9.1
Mean monthly - October through March	1.9	4.8
Mean annual snowfall	64.7	164.3

b. Ecological Description

(1) ECO-REGION (TO THE LOWEST LEVEL OF DETAIL CURRENTLY AVAILABLE).

Battle Creek RNA is located in the Laurentian Mixed Forest Province, 212T Northern Great Lakes Section, Subsection 212Ta Green Bay Lobe Stagnation Moraine of the Ecological Units of the Eastern United States (Cleland et al 2007). It includes Land Type Association (LTA) Ta01 Lakewood Plains and Moraines.

(2) PLANT COMMUNITY TYPES

Nomenclature for flora follows the USDA PLANTS database (USDA, NRCS. 2013); nomenclature for birds follows AOU Checklist (1983); nomenclature for vertebrates follows Watermolen & Murrell (2001). In Wisconsin, commonly used references for describing ecosystems include Forest Habitat Types (Kotar 2002) and Natural Communities (Curtis 1959).

Battle Creek RNA is predominantly a northern mesic forest dominated by large eastern hemlock, and numerous super-canopy white pine with white cedar, sugar maple, red oak (*see Table 4 for scientific names*), yellow birch, and beech (Spickerman 2000). The community has a very sparse mid-story and shrub layer but a relatively diverse herbaceous layer including downy yellow violet, large-flowered trillium, baneberry, rosy twisted stalk, and intermediate wood fern. Understory shrubs include American fly honeysuckle and hazel species. Canopy gaps, snags, den trees, and coarse woody debris are infrequent in this community despite the large diameter trees (Figure 3).

Figure 3. The forest in Battle Creek RNA is just starting to develop old growth characteristics such as large woody debris and canopy gaps. [S. Janke 2012]

At the base of a steep-sided esker is a small spring-fed trout stream (Battle Creek) bordered by a northern wet-mesic forest. Medium to large diameter white cedar [8-20" (20-50 cm)] and smaller black ash form a closed canopy over the stream. This is listed as Existing Vegetation type 11 in Figure 4.

Large amounts of coarse woody debris are both in the stream and on its banks. The herbaceous layer includes mountain wood-sorrel, small white violet, small enchanter's-nightshade, bunchberry, crested shield fern, common oak fern, northern tree club-moss, and abundant mosses.

A small patch of northern wet forest dominated by black spruce and tamarack occurs in the southwest corner of the RNA. Trees are small in stature and the understory is dominated by ericad shrubs. Vegetation type 12 on Figure 4.

Table 2. Natural vegetation community types within Battle Creek RNA using common classification systems for Wisconsin (Curtis 1959 and Kotar et al. 2002) and NGDC (2013)

Natural Communities (Curtis 1959)	**Dominant Species**	**Habitat Types** (Kotar et al. 2002)	**NVCS Associations** (NGDC 2012)*
Northern mesic forest	eastern hemlock, white pine	AFD	Tsuga canadensis - (Betula alleghaniensis) Forest CEGL002598
Northern wet-mesic forest	eastern hemlock	TMC	Tsuga canadensis - Betula alleghaniensis Saturated Forest CEGL005003
Northern wet-mesic forest	northern white cedar, black ash	TMC	Fraxinus nigra - Mixed Hardwoods - Conifers / Cornus sericea / Carex spp. Forest CEGL002105
Northern wet forest	black spruce, tamarack	not defined	Picea mariana - (Larix laricina) / Ledum groenlandicum / Sphagnum spp. Forest CEGL005271
Shrub carr (creek corridor)	alder	not defined	Alnus incana Swamp Shrubland CEGL002381
Stream: fast, hard, cold	not inventoried	N/A	Not defined

* These National Vegetation Classification System associations are preliminary.

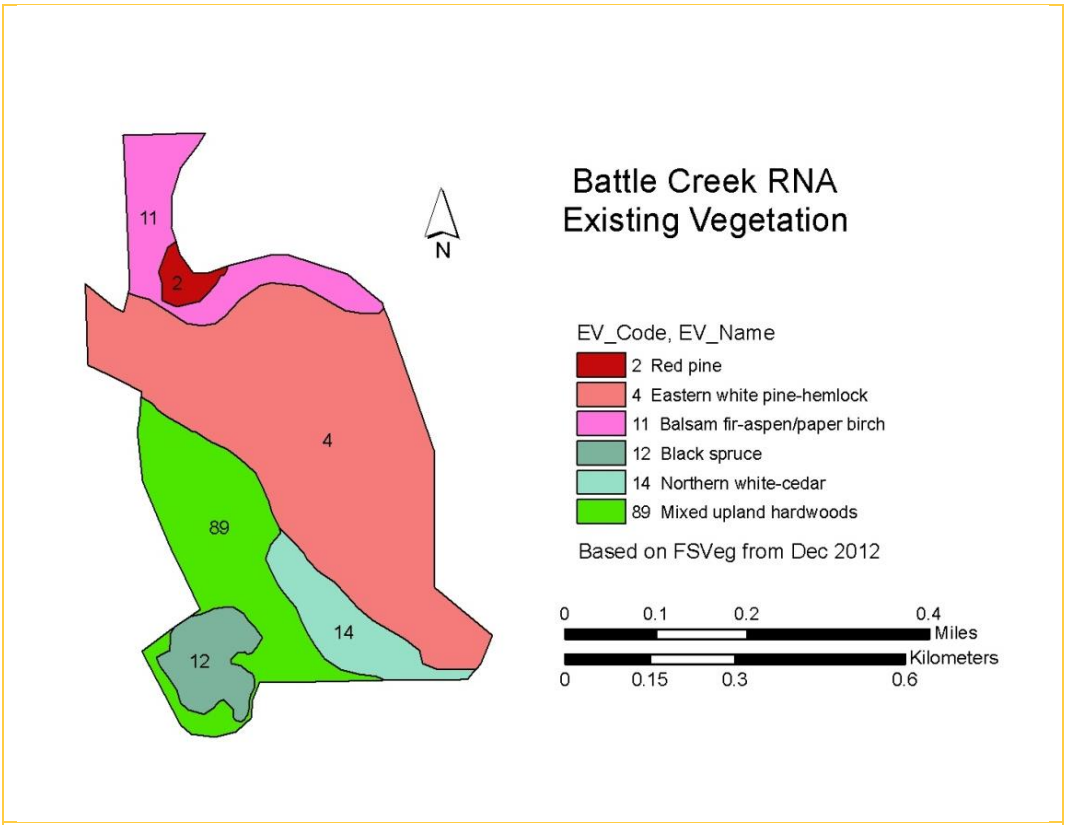


Figure 4. Existing Vegetation (formerly Forest Type) in Battle Creek RNA (CNNF data 2012)

Table 3. USDA FS cover types and acreages in Battle Creek RNA and key to Figure 4

EV Code	Existing Vegetation (EV)	Acres	Hectares
2	Red pine	1.7	0.7
4	Eastern white pine-hemlock	53.5	21.6
11	Balsam fir-aspen/paper birch*	10.9	4.4
12	Black spruce	6.0	2.4
14	Northern white-cedar	7.6	3.1
89	Mixed upland hardwoods	20.7	8.4
Grand Total		100.4	40.6

*May be mistyped; is predominately northern white cedar and black ash with balsam fir.

(3) DESCRIPTION OF THE VALUES OF THE RESEARCH NATURAL AREA.

(A) FLORA LIST

The flora in Table 4 is based on one rapid walk-through in 2000. Further inventory is needed especially in the wetland communities along Battle Creek and the North Branch Oconto River.

Table 4. Initial flora of Battle Creek RNA (Spickerman and Brzeskiewicz, 2000)

Scientific Name	Common Name
Abies balsamea	Balsam fir
Acer rubrum	Red maple
Acer saccharum	Sugar maple
Actaea pachypoda	White baneberry
Actaea rubra	Red baneberry
Adiantum pedatum	Maidenhair fern
Alnus incana	Speckled alder
Anemone quinquefolia	Wood anemone
Aralia nudicaulis	Wild sarsaparilla
Aralia racemosa	Spikenard
Arisaema triphyllum	Jack-in-the-pulpit
Aster macrophyllus	Big-leaf aster
Athyrium filix-femina	Lady fern
Betula alleghaniensis	Yellow birch
Betula papyrifera	Paper birch
Brachyelytrum erectum	Bearded shorthusk
Carex pedunculata	Long-stalk sedge
Carex pensylvanica	Pennsylvania sedge
Circaea alpina	Dwarf enchanter's night-shade
Clintonia borealis	Bluebead lily
Coptis trifolia	Goldthread
Corallorhiza trifida	Northern coral-root
Cornus canadensis	Bunchberry
Corylus americana	American hazelnut
Dryopteris cristata	Crested wood fern
Dryopteris intermedia	Fancy wood fern
Equisetum sylvaticum	Woodland horsetail
Fagus grandifolia	Beech
Fraxinus nigra	Black ash
Galium triflorum	Sweet-scented bedstraw
Gymnocarpium dryopteris	Oak fern
Larix laricina	Tamarack
Lonicera canadensis	American fly honeysuckle
Lycopodium annotinum	Stiff club-moss
Lycopodium dendroideum	Northern tree club-moss
Maianthemum canadense	Wild lily-of-the-valley
Oryzopsis asperifolia	Rough-leaf ricegrass
Oxalis montana	Mountain wood sorrel
Picea glauca	White spruce
Picea mariana	Black spruce
Pinus resinosa	Red pine

Pinus strobus	White pine
Polygala paucifolia	Fringed polygala
Polygonatum biflorum	Greater Solomon's seal
Quercus rubra	Northern red oak
Schizachne purpurascens	False melic
Streptopus lanceolatus v. longipes	Rosy twisted stalk
Thuja occidentalis	Northern white cedar
Toxicodendron radicans	Poison ivy
Trientalis borealis	Starflower
Trillium grandiflorum	Large trillium
Tsuga canadensis	Eastern hemlock
Viola macloskeyi	Smooth white violet
Viola pubescens	Downy yellow violet

(B) FAUNA LIST

No faunal inventory has been done. Numerous wood warblers (family Parulidae) are found in this general area and the state special concern, protected bald eagle (*Haliaeetus leucocephalus*) is known to use the RNA. Nesting has not been documented, however the super-canopy white pines offer suitable nesting sites for this species.

Table 5. Limited list of fauna known from Battle Creek RNA (Spickerman 2000, Carlson et al. 1977)

Fauna of Battle Creek RNA	
Common Name	Scientific Name
muskrat	*Ondatra zibethicus*
mink	*Mustela vison*
beaver	*Castor canadensis*
otter	*Lontra canadensis*
brook trout	*Salvelinus fontinalis*
brown trout	*Salmo trutta*
rainbow trout	*Oncorhynchus mykiss*
blackburnian warbler	*Dendroica fusca*
black-throated green warbler	*Dendroica virens*
black and white warbler	*Mniotilta varia*
northern parula	*Parula americana*
ovenbird	*Seiurus aurocapillus*
bald eagle	*Haliaeetus leucocephalus*

(C) GEOLOGY

The geology of northern Wisconsin was shaped by long periods of cooling climate and expansion of glaciers; the last expansion is known as the Wisconsin Glaciation. This glacial advance began about 26,000 years ago when the Laurentide Ice Sheet spread across the continent. As this glacier retreated, till deposition and glacial melt-water formed an irregular landscape of hills pocked with depressions that later became lakes and wetlands (WGNHS 2011).

Bedrock of the Lakewood Plains and Moraines LTA is igneous, metamorphic, and volcanic rock (WI DNR 2003). Bedrock is between 100 feet and 50 feet of the land surface. Geomorphologic processes of this LTA were glacial meltwater and till deposition.

(D) SOILS

Soils of Battle Creek RNA fall into the Padus, Pence, and Menahga series (USDA NRCS 2003; USDA Soil Conservation Service 1988).

The majority of the area contains very deep somewhat excessively drained soils, which are shallow to stratified sandy outwash (Pence series). The soils formed in a thin mantle of loamy alluvium or eolian deposits and in the underlying stratified sand or stratified sandy outwash on glacial lake plains, outwash terraces, outwash plains, eskers, and kames. Permeability is moderate or moderately rapid in the loamy part of the solum; moderately rapid to very rapid in the sandy part of the solum; and rapid or very rapid in the substratum. Slopes range from 0 to 45 percent. Forest vegetation is mixed coniferous and deciduous forest. Timber stands are mostly sugar maple, paper birch, red maple, basswood, northern red oak, white ash, eastern hemlock, and eastern white pine. Red pine, aspen, balsam fir, and yellow birch are also in some stands.

A small area is well-drained fine sandy loam soils (Padus series) on 6-15 percent slope. These soils formed mostly in loamy alluvium and are underlain by stratified sandy outwash on glacial lake plains, outwash plains, stream terraces, eskers, kames, and moraines. Native vegetation is mostly sugar maple, red maple, northern red oak, basswood, white ash, and eastern hemlock but big-tooth aspen (*Populus grandidentata*), red pine, and eastern white pine are in some stands.

Adjacent to the North Branch of the Oconto River is a small area of Menahga sands on slopes of 0-6 percent. The Menahga series consists of very deep, excessively drained to well drained soils that formed in sandy glacial outwash sediments on outwash plains, valley trains, and some moraines and drumlins. They primarily are on outwash plains and valley trains, but some are on moraines or sand mantled drumlins. The deposits are mostly coarse sand or sands and are late Wisconsinan glacial age.

(E) TOPOGRAPHY

Characteristic landform pattern within this Ecological Land Type is rolling pitted and un-pitted outwash plains, and hummocky moraine complex with lakes and bogs common (WI DNR 2003). The topography of the RNA is rolling with a steep-sided esker above Battle Creek. See Identification Section: *Boundary Map* showing 10-foot contour intervals.

(F) AQUATIC/RIPARIAN

The RNA protects a quarter mile segment of Battle Creek and a half-mile stretch (0.8 km) of the North Branch Oconto River (Figure 5), an *Exceptional Resource Water* (WI DNR 2011). The creek and river are

Figure 5. The RNA protects a short stretch of the North Branch Oconto River here showing boulder substrate and clear fast water. [S. Janke, 2012]

within the Lower North Branch Oconto River watershed of the Green Bay Basin. North Branch Oconto is a fast, clear, hard-water stream that supports a natural population of native brook trout as well as brown trout and rainbow trout.

(G) RARE, THREATENED, ENDANGERED, OR SENSITIVE SPECIES

The RNA safeguards habitat for the state-protected bald eagle as well as the host of birds and animals that are dependent on these plant communities. The CNNF lists three bat species as Regional Forester Sensitive due to the looming peril of white-nose syndrome. While no bat surveys have been done, the RNA does contain many of the habitat features critical to bats such as large trees for roosting and a water source.

Table 6. Threatened, endangered, and unique species in Battle Creek RNA, State status, and Natural Heritage rank

Common Name	Scientific Name	State Status, Heritage Rank[1]
Bald eagle	*Haliaeetus leucocephalus*	SC/P, S4B S4N

[1] Appendix 4: *Wisconsin Natural Heritage Working List – Rank Definitions*

(H) LIST OF RARE ELEMENTS AND RARE PLANT COMMUNITIES

Other than the old-growth hemlock and white pine, no rare elements have been identified thus far. Further survey is needed for all taxa as well as the wetland and riparian communities.

c. Resource Information

This section discusses resources that occur in the RNA framed within the context of *potentially conflicting uses*. Battle Creek RNA is owned outright by the United States government and is administered by the USDA Forest Service, Chequamegon-Nicolet National Forest. There are no outstanding timber rights on any of the tracts in the RNA, nor are there any special use permits outstanding.

(1) MINERALS

The mineral estate (100 acres) within the RNA is federally owned. Federal-owned minerals are administered by Bureau of Land Management and open to hardrock prospecting within the RNA. The Forest Service must allow access to the surface. There is potential for hardrock prospecting activity within RNA based on geology and recent hardrock prospecting permit activity in the County compared to other parts of the CNNF. The state of the knowledge of the bedrock geology and where actual ore bodies may be found (if they exist and are commercial) not precise enough to assign relative probability of prospecting activity within the county (Knight pers. comm.).

Mineral ownership does not preclude use of the site for research but if prospecting took place disturbance to localized areas could occur. There are currently no active prospecting permits within the RNA.

(2) GRAZING

There is no grazing on the Chequamegon-Nicolet National Forest. The 2004 CNNF Forest Plan has a standard that prohibits grazing in Research Natural Areas (Appendix 3 - *Forest Management Area Direction*).

(3) PLANTS (INCLUDING TIMBER AND SPECIAL FOREST PRODUCTS)

The total forested acreage in Battle Creek RNA is approximately 100 acres (40 hectares) and includes 86% upland forest and 14% lowland swamp. Stands of old-growth white pine and eastern hemlock are rare on the Wisconsin landscape and within the CNNF in general.

The 2004 CNNF Forest Plan has a guideline that prohibits gathering Special Forest Products for personal use or commercial sale within RNAs (USDA Forest Service 2004a pg 3-50). When the CNNF issues a permit to gather products such as club moss or firewood, the permittee is provided with a map of areas including RNAs that are off-limits to harvesting. The CNNF supplement to the Forest Handbook (FSH2409.18) states that "gathering small amounts of fruit, nuts, berries, and fungi (mushrooms) for personal use is allowed".

Battle Creek RNA at the time of establishment is not designated as a Tribal RNA (Tribal-USDA MOU) which would limit tribal gathering. The CNNF is continuing to work with the Tribes to protect these unique features and to provide for the exercise of treaty-reserved hunting and gathering rights. See Section d.(2) -*Cultural/Heritage* for further discussion.

(4) WATERSHED VALUES

The RNA protects a short segment of Battle Creek where it joins the North Branch Oconto River. Both these water systems within the RNA are classified by the state as Exceptional Resource Waters and are Class 1 Trout Streams; meaning they support natural reproduction of trout (WI DNR 2013a). The North Branch then joins the South Branch near the town of Suring, Wisconsin to form the Oconto River, which drains into Green Bay of the Lake Michigan drainage system. The Oconto River is valued for its fishing opportunities, recreational whitewater rafting downstream of the RNA, and scenic beauty. Fishing within the site is compatible with RNA status.

(5) RECREATION USE

Trout fishing is popular in the clear, cold waters of the entire length of the Oconto River system. Other recreation within the RNA may include hiking, and hunting for large and small game. These activities are not likely to interfere with use of the area for research and education. There are no motorized trails near the RNA (USDA Forest Service 2012). People hike in using the old road described in section c(7) or wade the river from other access points outside the RNA.

(6) WILDLIFE

Battle Creek RNA has good potential to provide habitat for numerous neotropical migrants such as wood warblers, and the large white pine adds potential habitat in the area for bald eagles.

The large trees, both living and dead, provide potential roosting structure for bats (Heeringa pers. comm.). The CNNF has not conducted bat surveys in the RNA as of 2013. The Wisconsin DNR proactively listed four resident and migratory bat species as threatened due to the risk of white-nose syndrome likely to reach the state soon (WI DNR 2013c). The State also listed the fungus that causes white-nose syndrome as a prohibited invasive species; specifying that if it appears, the land manager/owner is responsible for control (WI DNR 2010). The forest lists three bat species as Regional Forester Sensitive based on the state listing.

(7) TRANSPORTATION/ROAD SYSTEM

While old roads exist, none are open to motorized travel in Battle Creek RNA. Standards and guidelines prohibit the use of motorized vehicles, horses, and bicycles within the RNA (See Appendix 3 - *Forest Management Area Direction*). The current rule guiding motorized access is contained in the Travel Management Project Decision Notice via a Motorized Vehicle Use Map for 2012 (USDA Forest Service 2012). This map shows roads available for motorized use. No new roads or trails are planned.

Figure 6. An old road closed to motor vehicle travel leads into the RNA may need to be restored to a natural state. [S. Janke, 2012]

The old road (Figure 6) leading to the site from the west (Forest Road 3240) is gated at the boundary of the RNA but the road still shows on some older published maps as extending into the area. This road left over from past management may require intervention to restore hydrologic, geomorphic, and ecological processes and properties. Further evaluation will be included in a site plan and the CNNF will weigh the risk of such action.

d. Historical Information

(1) RESEARCH/EDUCATION USE AND INTEREST: HISTORY OF ESTABLISHMENT

Research/Education Use - There is currently no research occurring within Battle Creek. In 2000, Steven Spickerman and Marjory Brzeskiewicz inventoried the area for the Chequamegon-Nicolet National Forest Landscape Analysis and Design project. A high diversity of wood warblers (*Parulidae*) was noted and a cursory plant survey was completed. Potential research and educational uses in the future are listed in Section e(3).

History of establishment: (see *Introduction* for early history) - The CNNF began a forest-wide ecological inventory to identify high quality ecological features in the early 1990s (Parker 1999). The land on which Battle Creek RNA is located was acquired by the Forest Service in 1996, with the assistance of The Nature Conservancy, and though the site was identified late in the 2004 CNNF Forest Plan inventory process, it ranked very high based on its ecological values. It was assigned a high conservation priority and deferred from management activity. About the same time, the Eastern Region and Northern Research Station undertook a gap analysis of high-quality examples of

alliances (ecological communities) within each subsection (Tyrrell et al 2000). This site filled a cell in that gap analysis.

The Wisconsin Department of Natural Resources was also interested in achieving ecosystem representation within the State Natural Area Network. They signed a Memorandum of Understanding (MOU) in 2008 with the CNNF to co-designate all current and future RNAs and CNNF Special Management Areas (SMAs) as State Natural Areas. The management goals of State Natural Areas for research and education are compatible with the CNNF's.

Battle Creek RNA was identified as a Candidate RNA in the Draft Forest Plan and analyzed in the Environmental Impact Statement. It was recommended for designation as a Research Natural Area in the 2004 CNNF Forest Plan Record of Decision (USDA Forest Service 2004c).

A 2008 region-wide analysis was conducted in conjunction with the Northern Research Station to evaluate all candidate RNAs in the Eastern Region. Based on this analysis, the Eastern Regional Office recommended Battle Creek for establishment.

(2) CULTURAL/HERITAGE

While other Indian tribes currently live in Wisconsin Ojibwe tribes specifically retained the right to hunt, fish, and gather on lands that make up the CNNF through a series of session treaties. The Forest Service (and Eastern Region, Northern Research Station and USFS Law Enforcement) recognizes treaty rights through a "Memorandum of Understanding" with eleven sovereign and federally recognized tribes of Ojibwe Indians (Tribal-USDA MOU). Today, these treaty rights are being exercised by Ojibwe Indian tribes under rules promulgated and enforced by the tribes. One of these rules recognizes twelve existing RNAs on the CNNF as "Tribal Research Natural Areas" because it is important to protect the unique features that these areas provide. The rule prohibits gathering in Tribal RNAs except for tribally-permitted ceremonial use.

Figure 7. Two old log buildings from a bygone era crumble into decay within the RNA. [S. Janke, 2012]

At the time of establishment Battle Creek RNA has not been adopted as an Ojibwe Tribal RNA; tribal members will follow the gathering regulation in the MOU here. The CNNF is continuing to work with the Ojibwe Tribes to protect these unique features and to provide for the exercise of treaty-reserved rights. Upon establishment, the Tribes will have an opportunity to also designate it as a Tribal RNA (Tribal-USDA MOU). The 2004

CNNF Forest Plan includes an objective (USDA Forest Service 2004c p. 1-7) that "nothing in this Forest Plan or its implementation (i.e. establishing the RNA) is intended to modify, abrogate, or otherwise adversely affect tribal reserved or treaty guaranteed rights applicable within the CNNF".

USDA Forest Service cultural resource information indicates that Battle Creek RNA contains an abandoned Holt Lumber Company logging camp as well as evidence of pre-European use by native peoples in the same area (USDA Forest Service 2003).

There are two dilapidated wooden structures likely dating back to 1918 that are collapsing and rapidly decomposing (Figure 7). According to Kim Potaracke, assistant CNNF Archeologist, these structures are not eligible for the National Register of Historic Places and are not protected by this law. The CNNF proposes to remove the buildings as they may be a safety hazard but there are no plans for removal in the immediate future.

(3) DISTURBANCE HISTORY

Battle Creek RNA was only slightly affected by timber extraction and wildfire unlike much of northern Wisconsin in the late 1800s. The land that contains the RNA was acquired by the Holt Lumber Company in 1881 and it is likely that trees were selectively cut in the following decade (CNNF data). Most of the core of the area has had very little recent disturbance as evidenced by the relatively few scattered well-decayed stumps that likely date back to the late 1800s (Figure 8).

Figure 8. This stump supporting an approximately 80 year old eastern hemlock tree may itself be over 100 years old. [S. Janke, 2012]

Some individual trees or small patches of trees may have been removed in the period from the 1920s to 1990s when Battle Creek RNA was in private ownership. A gated road (Figure 6) enters the middle of the RNA that accesses three old log structures (Figure 7) built in the early 1900s (CNNF data).

A small section of red pine planted in 1960 (on the north end; east side of Battle Creek) was included in the RNA to simplify the boundary and to buffer the river (Figure 4).

(4) OCCURRENCE OF EXOTIC SPECIES

The CNNF has developed an invasive plant strategy (USDA Forest Service 2009) that utilizes adaptive pest management to discover, prioritize, and control non-native invasive plants wherever they occur. There are no invasive plants documented within the RNA as of 2013. Roads nearby have patches of reed canary grass (*Phalaris arundinacea*). RNAs are high priority areas to protect from invasive species on the CNNF and, if discovered, will be controlled with methods that avoid damage to native plants.

e. Other Information

(1) ANY PERMANENT RESEARCH PLOTS AND/OR PHOTO POINTS

There are no permanent research plots. Photos are of a general nature and others not appearing in this document are filed electronically in the Forest Service system. Battle Creek was co-designated as a State Natural Area in 2008 by the state of Wisconsin Natural Areas Program; although they labeled it "Battle Creek *Hemlocks*" (WI DNR 2011).

The Station Director shall establish and maintain a system for archiving data and reports from the RNA in a manner that will facilitate the exchange and transfer of information among Stations and scientists. Research data files are maintained by the following office: Chequamegon-Nicolet National Forest, 1170 Fourth Avenue South, Park Falls WI 54552.

Plant collections will be housed at a herbarium located at the University of Wisconsin-Madison Herbarium or a place approved by the Station Director. All animal specimens collected in the course of research will be properly preserved and maintained within the CNNF Supervisor's office or designated university.

(2) BIBLIOGRAPHY

A listing of citations used in this document, useful references, and reports and journal articles that resulted from study within this RNA are listed in Appendix 2 – *Bibliography.*

(3) POTENTIAL RESEARCH TOPICS

Because of its old-growth character, Battle Creek RNA will serve as a reference area for study of forest succession, and management techniques used elsewhere. The easy access makes it ideal for research that involves multiple visits. Possible topics include: old-growth forest, carbon storage and dynamics, climate reconstructions, bats, bryophytes, cold-water stream studies, and riparian ecology under forest canopy.

The Northern Research Station along with the Chequamegon-Nicolet National Forest shall encourage the use of this RNA by scientists and educators. This site has been co-designated by the State of Wisconsin as a State Natural Area and as such appears on their web site with the name "Battle Creek Hemlocks" (WI DNR 2011).

f. Evaluation of Specific Management Recommendations on the RNA

(1) POTENTIAL OR EXISTING CONFLICTS; PRINCIPAL MANAGEMENT ISSUES

The CNNF may decide to remove the dilapidated buildings for safety reasons (Figure 7). Although they do add a certain historical *charm* to the site they are not protected under the Historic Preservation Act (CNNF data 2013). Development of a Battle Creek RNA management plan may identify a need to reestablish native flora on the old road leading to these buildings. Continued monitoring of the gate will discover any illegal use of the road but there has been none so far and shrubs are beginning to close off the opening (Janke).

The site is surrounded by federally owned land with the exception of the northern-most boundary within the Battle Creek corridor and a narrow strip on either side of the North Branch Oconto River where it leaves the RNA. Both are privately owned parcels. The CNNF lands surrounding Battle Creek RNA are designated for Early Successional Aspen-Hardwood (1C) and Even-Aged hardwood Oak-Aspen (3C) management in the 2004 CNNF Forest Plan. Several stands adjacent to the RNA are scheduled for harvest (thinning and small clear cuts) although a buffer strip with no cutting was created adjacent to the RNA boundary (CNNF data).

To the southwest of the RNA approximately 1,200 feet (365 m), is the Battle Creek Old Growth and Natural Features Management Area (8G). This area identified in the 2004 CNNF Forest Plan also protects old-growth forest but was not selected to be designated as an RNA. It is also a Wisconsin State Natural Area and appears on the state website (WI DNR 2011). Other lands within one half mile of the RNA include private lands and recreational homes.

(2) SPECIAL MANAGEMENT AREA IF THE RESEARCH NATURAL AREA IS WITHIN ONE

The RNA is not located within or adjacent to any congressionally designated area.

g. Photographs

All photographs used in this Establishment Record are the property of the Chequamegon-Nicolet National Forest but not copyrighted. An electronic file is part of this establishment record.

Figure 9. Large white pine 28-36" DBH (71- 91 cm) in the western portion of the RNA are well over 100 years old and among the largest on the CNNF. [S. Janke 2012]

Figure 10. Oconto River within the RNA. Caution poison ivy occurs along the bank here. [S. Janke 2012]

APPENDIX 2 BIBLIOGRAPHY

Below is all literature cited in this establishment record and other references useful for researchers.

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APPENDIX 3 FOREST MANAGEMENT AREA DIRECTION

The management prescription for the Battle Creek RNA is embodied in the management area (MA) direction and guidance presented in the Chequamegon-Nicolet National Forests 2004 Land and Resource Management Plan under Management Area 8E - Existing and Candidate Research Natural Areas (USDA Forest Service 2004b pg 3-50). A copy of that management prescription follows:

MA 8E Existing and Candidate Research Natural Areas (RNA)

Theme

In this document, the term RNA will refer to both Existing and Candidate Research Natural Areas. MA 8E is characterized by ecologically significant natural features, representative ecosystems, and/or unique areas managed as Candidate or Existing Research Natural Areas. A broad representation of Forest community types is included in this MA. In combination with other RNAs in the nation, they form a national network of ecological areas for research, monitoring, education, and maintenance of biological diversity.

Landscape Description

MAs 8E is characterized by nearly level to steep topography with slope gradients ranging from 0 to 30%. Glacial landforms include drumlin ground moraine, collapsed and uncollapsed outwash plains, washed moraines and eskers. The soils range from sandy to silty in the surface over loamy to sandy sediments. Soil moisture regimes range from dry to mesic and nutrient status ranges from poor to rich. A broad array of Forest Habitat Types and LTAs are represented in this MA.

Desired Future Condition

Landscape Composition and Structure

RNAs are chosen as high quality representatives of ecological communities found on the Forest. In general, they exhibit minimal evidence of past human disturbance, and contain all or most species characteristic of that community in the region. They may range in size from less than 100 acres to thousands of acres. They are generally well buffered from incompatible activities on nearby lands. RNAs are meant to include a representation of ecological types and vegetative cover across the Forest. However, composition results primarily from natural ecological processes rather than human-caused activities. As a result, late-successional upland types such as northern hardwoods, northern hardwood/hemlock, and mixed-conifers dominate the MA. A variety of wetland types may be present, from small isolated ponds and bogs to large (over 1000 acre) wetland complexes.

Site-Level Composition and Structure

Compositional diversity typically reflects late successional mature conditions. Dominant upland tree species are sugar maple, hemlock, yellow birch, basswood, and American beech. Lowland areas support tree species such as black spruce, northern-white cedar, and tamarack. Shade-intolerant species such as aspen, white birch, and jack pine are uncommon, limited to areas affected by natural disturbance such as windfall. Ground flora reflects the full diversity of native upland and lowland communities, and is generally unaffected by invading exotics. Structural diversity is complex, with features such as super-canopy trees, snags, den trees, downed woody debris, and canopy gaps commonly found.

Disturbance Regime

Natural ecological processes and natural disturbances shape the landscape-level and site-level vegetation composition. Components of the natural disturbance regime include individual tree throw and infrequent

larger scale blowdown, infrequent low-intensity fire, insect damage, and beaver flooding. Timber harvesting does not occur.

Standards and Guidelines

Minerals

Standard:

• Prohibit the development of new sources of common variety minerals.

Guidelines:

• Surface disturbing mineral activities and will be approved or disapproved on a case-by- case basis where minerals are federally owned. Whenever possible surface disturbance will be limited.
• When surface disturbing mineral exploration and development of reserved and outstanding mineral rights is proposed, consider reasonable alternatives that minimize impacts to RNA values.
• Acquisition of reserved and outstanding mineral rights will be considered on a willing seller / willing buyer basis.
• Existing common variety minerals developments may be utilized. Consider RNA values if full utilization requires vegetation disturbance.

Biological Diversity

Guideline:

• Use native plant species for restoration activities. Use non-native plant species only if they are needed to prevent irreversible resource damage.

Vegetation

Standard:

• Prohibit domestic livestock grazing.

Guidelines:

• Vegetation management is not permitted unless the desired vegetation type would be lost or degraded without treatment. Management practices will approximate the vegetation and processes that govern natural succession.
• Hazard trees may be cut but not removed.

Special Forest Products

Guideline:

• Prohibit the gathering of special forest products for personal use or commercial sale.

Wildlife and Fish

Guideline:

• Wildlife and fish habitat manipulation will not be permitted unless it's consistent with RNA objectives and is needed to maintain the character or purpose of the area.

Fire Management

Guidelines:

• Allow prescribed fire within a prescription designed to accomplish specific RNA objectives where it is part of the natural disturbance regime, where it is needed to maintain or restore ecosystems, and where it is called for in the establishment record.
• Minimize the disturbance of soil and water resources by designing fire suppression activities to fit each individual situation.

Insects and Disease

Guideline:

• Minimize the disturbance of soil and water resources. Minimize control actions against native insects and diseases, and native plant and animal pests. Allow limited control actions to protect adjacent resources or the features for which the research natural area was established.

Recreation

Standard:

• Prohibit recreational use that threatens or interferes with the objectives or purposes for which the RNA was established.

Guidelines:

• Do not install signs or construct trails or other improvements unless they contribute to RNA objectives or area protection.
• Prohibit the use of horses, bicycles, and motorized vehicles on RNA trails.

Heritage Resources

Guideline:

• Protect significant heritage resources by dispersing or limiting public use of RNAs.

Lands

Guideline:

• Clearly identify RNA boundaries, monument corners, and turning points.

Special Uses

Standard:

• Prohibit the establishment of new facilities and corridors for utility rights-of-way.

Guideline:

• Do not issue special use permits except as mandated by law or agreement. Exceptions may be made for research or educational activities. Phase out existing special use permits when feasible.

Facilities

Guideline:

• Do not construct buildings unless they are needed to meet RNA objectives. Existing structures may be maintained.

Transportation Systems

Guidelines:

• Do not construct new roads.
• Restore all decommissioned roads to some level of landscape restoration.

Research

Standard:

• Permit educational and research use as long as it will not result in unacceptable impacts to RNA values.

APPENDIX 4 WISCONSIN NATURAL HERITAGE WORKING LIST – RANK DEFINITIONS

The Wisconsin NHI Working List records which elements are tracked in the state. The working list is revised as species' populations change (increase or decrease) and as knowledge about their status and distribution in Wisconsin increase. The Working List was revised in 2012. Definitions of ranks are provided below, along with definitions for other abbreviations used in the Working List.

US Status: Current federal protection status designated by the Office of Endangered Species, U.S. Fish and Wildlife Service indicating the biological status of a species in Wisconsin. LE = listed endangered; LT = listed threatened; PE = proposed as endangered; NEP = nonessential experimental population; C = candidate for future listing; CH = critical habitat

State Status: Protection category designated by the Wisconsin DNR. END = Endangered; THR = Threatened; SC = Special Concern.

WDNR and federal regulations regarding Special Concern species range from full protection to no protection. The current categories and their respective level of protection are as follows: SC/P = fully protected; SC/N = no laws regulating use, possession, or harvesting; SC/H = take regulated by establishment of open closed seasons; SC/FL = federally protected as endangered or threatened, but not so designated by WDNR; SC/M = fully protected by federal and state laws under the Migratory Bird Act.

Special Concern species are those species about which some problem of abundance or distribution is suspected but not yet proved. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

Global Element Ranks

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single state or physiographic region), or because of other factor(s) making it vulnerable to extinction throughout its range; typically 21-100 occurrences.

G4 = Uncommon but not rare, (although it may be quite rare in parts of its range, especially at the periphery) and usually widespread. Typically >100 occurrences.

G5 = Common, widespread, and abundant (although it may be quite rare in parts of its range, especially at the periphery). Not vulnerable in most of its range.

GH = Known only from historical occurrence throughout its range, with the expectation that it may be rediscovered.

GNR = Not ranked. Replaced G? rank and some GU ranks

GU = Currently unrankable due to lack of data or substantially conflicting data on status or trends. Possibly in peril range-wide, but status is uncertain.

GX = Presumed to be extinct throughout its range (e.g. Passenger pigeon) with virtually no likelihood that it will be rediscovered.

Species with a questionable taxonomic assignment are given a "Q" after the global rank.

Subspecies and varieties are given subranks composed of the letter "T" plus a number or letter. The definition of the second character of the subrank parallels that of the full global rank. (Examples: a rare subspecies of a rare species is ranked G1T1; a rare subspecies of a common species is ranked G5T1.)

State Element Ranks

S1 = Critically imperiled in Wisconsin because of extreme rarity, typically 5 or fewer occurrences and/or very few (<1000) remaining individuals or acres, or due to some factor(s) making it especially vulnerable to extirpation from the state.

S2 = Imperiled in Wisconsin because of rarity, typically 6 to 20 occurrences and/or few (1000-3000) remaining individuals or acres, or due to some factor(s) making it very vulnerable to extirpation from the state.

S3 = Rare or uncommon in Wisconsin, typically 21-100 occurrences and/or 3000-10,000 individuals.

S4 = Apparently secure in Wisconsin, usually with >100 occurrences and >10,000 individuals.

S5 = Demonstrably secure in Wisconsin and essentially ineradicable under present conditions.

SNA = Accidental, non-native, reported, but unconfirmed, or falsely reported.

SH = Of historical occurrence in Wisconsin, perhaps having not been verified in the past 20 years, and suspected to be still extant. Naturally, an element would become SH without such a 20-year delay if the only known occurrence were destroyed or if it had been extensively and unsuccessfully looked for.

SNR = Not Ranked, a state rank has not yet been assessed.

SU = Currently unrankable. Possibly in peril in the state, but status is uncertain due to lack of information or substantially conflicting data on status or trends.

SX = Apparently extirpated from the state.

State Ranking of Long-Distance Migrant Animals

Ranking long distance aerial migrant animals presents special problems relating to the fact that their non-breeding status (rank) may be quite different from their breeding status, if any, in Wisconsin. In other words, the conservation needs of these taxa may vary between seasons. In order to present a less ambiguous picture of a migrant's status, it is necessary to specify whether the rank refers to the breeding (B) or non-breeding (N) status of the taxon in question. (e.g. S2B,S5N). http://dnr.wi.gov/topic/nhi/ click on Review (the natural heritage working list) Last Revised: May 31, 2012

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