[redacted]

DESIGNATION ORDER

USDA Forest Service, Eastern Region
Chequamegon-Nicolet National Forest
Great Divide Ranger District
Ashland County, Wisconsin

Brunsweiler River and Mineral Lake

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 Brunsweiler River Research Natural Area. It shall be comprised of 969 acres (392 hectares) of land in Ashland County, in the state of Wisconsin, on the Great Divide 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

3/11/14
Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Brunsweiler River and Mineral Lake

Research Natural Area

Chequamegon-Nicolet National Forest

Ashland 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 11/24/2013
Marjory E. Brzeskiewicz, Botanist, Chequamegon-Nicolet National Forest

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

Recommended by: Connie Cummins Date 1/16/14
Connie Cummins, District Ranger, Great Divide District

Recommended by: Date 1/23/14
Paul I.V. Strong, Forest Supervisor, Chequamegon-Nicolet National Forest

Concurrence of: Michael T. Rains Date 3.6.2014
Michael T. Rains, Station Director, Northern Research Station

United States

Department of Agriculture

Forest Service

July 2013

TITLE PAGE

Establishment Record for Brunsweiler River and Mineral Lake Research Natural Area

Chequamegon-Nicolet National Forest,
Great Divide District,
Ashland County, Wisconsin

Cover photo: The Brunsweiler River was designated as a *Wild River* by the state of Wisconsin in 2009. Photo by Steven Spickerman

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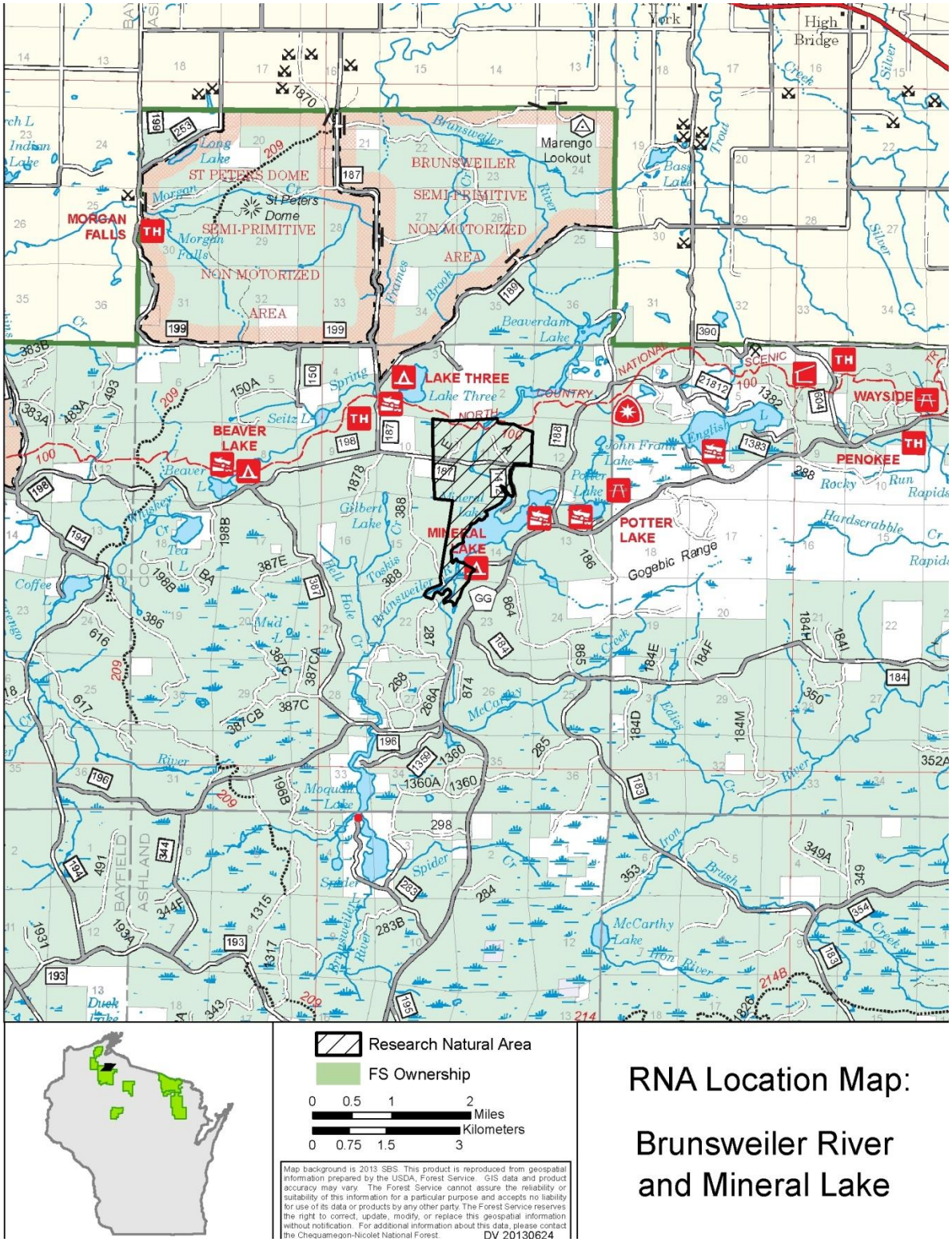
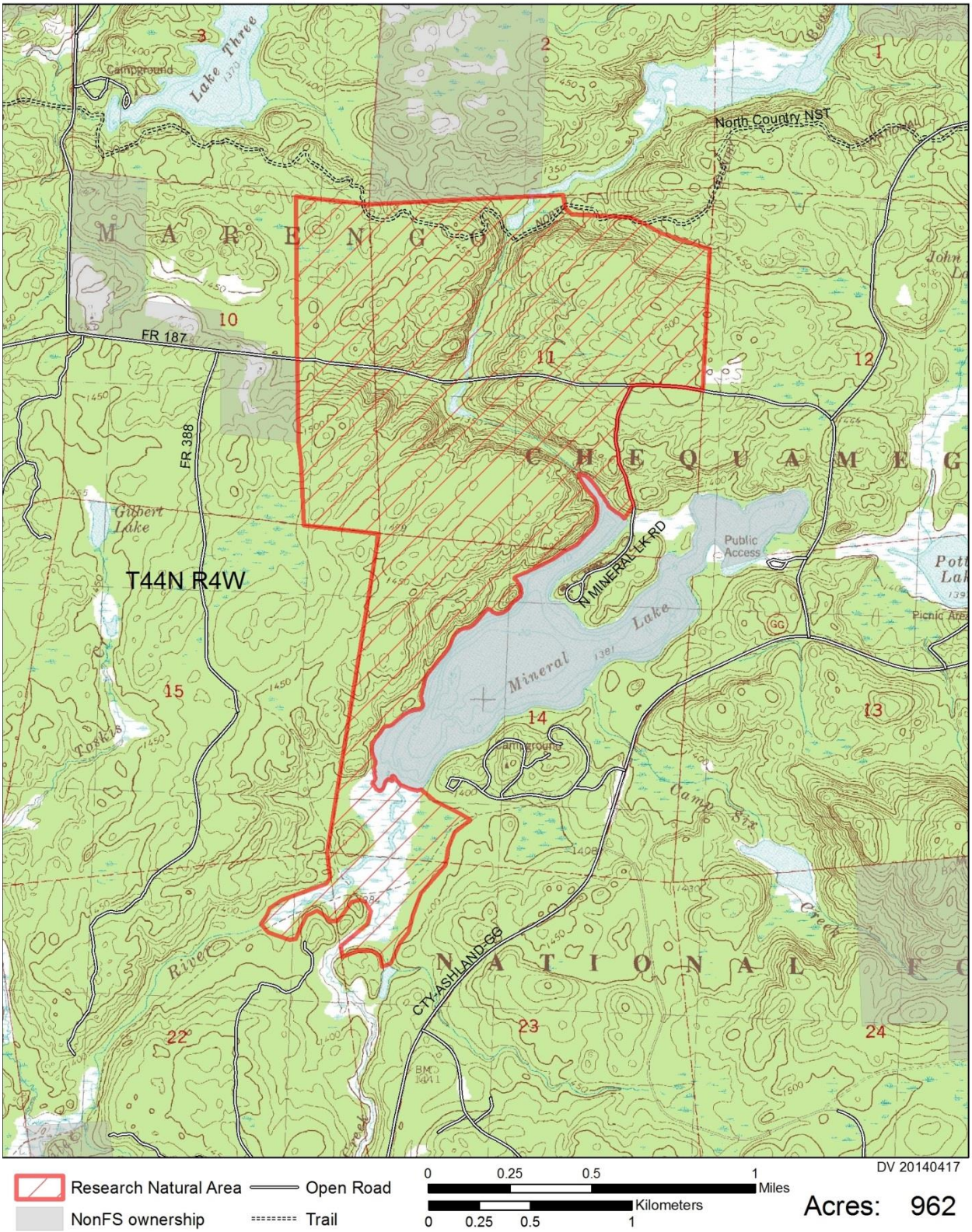
Note: The Alpha/Numeric ordering in this document follows that within Forest Service Manual direction (FSM 4063) for Establishment Records

1. IDENTIFICATION SECTION

LOCATION MAP



RNA Boundary Map: Brunsweiler River and Mineral Lake



LANDSCAPE OVERVIEW BRUNSWEILER RIVER AND MINERAL LAKE RNA

LEGAL DESCRIPTION

Brunsweiler River and Mineral Lake RNA is located on the Great Divide Ranger District of the Chequamegon –Nicolet National Forest in Ashland County, Wisconsin. Sections 10, 11, 14, 22 and 23 of Township 44 North, Range 4 West. The boundary is delineated as follows:

Beginning at the Southwest corner of Section 11,

Thence West along the South line of Section 10, approximately 1,320 feet to the East 1/16 corner of Sections 10 and 15,

Thence north along the East 1/16 line of Section 10, approximately 2,640 feet to the Center East 1/16 corner of Section 10,

Thence north along the East 1/16 line of Section 10, approximately 2,640 feet to the East 1/16 corner of Sections 3 and 10,

Thence East along the north line of Section 10, approximately 1320 feet to the Northwest corner of Section 11,

Thence east along the north line of Section 11, approximately 2,640 feet to the North ¼ corner of Section 11,

Thence East along north line of Section 11, 200.0 feet,

Thence Southeasterly the following courses:

Direction	Distance (feet)
S 9 E	206.8
S 43 E	149.8
S 88 E	211.8
S 87 E	754.7
S 64 E	291.5
S 60 E	254.1
S 72 E	738.9

to the East line of Section 11,

Thence South along the East line of Section 11, 470.7 feet to the North 1/16 corner of Sections 11 and 12,

Thence South along the East line of Section 11, approximately 1,320 feet to the East ¼ corner of Section 11,

Thence South along the East line of Section 11, approximately 350 feet to the North ROW of Forest Road #187,

Thence westerly along the North ROW of FR #187, approximately 1,150 feet to the West ROW of Forest Road #1412,

Thence Southwesterly along the West ROW of Forest Road #1412, 2030.0 feet,

Thence S 34º W approximate 250 feet to the Edge of Mineral Lake,

Thence following the Lake shore counterclockwise to the Southern most point of Mineral Lake,

Thence Southeasterly the following courses:

Direction	Distance (feet)
S 45 E	282.5
S 63 E	435.3
S 59 E	216.4

Thence Southwesterly the following courses:

Direction	Distance (feet)
S 51 W	325.3
S 22 W	273.6
S 9 W	274.2
S 41 W	606.0
S 20 W	369.7
S 15 W	289.5
S 39 W	216.9
S 22 W	227.9
S 28 W	143.8

Thence Meandering Northwesterly the following courses:

Direction	Distance (feet)
S 69 W	144.7
N 11 W	172.7
N 55 W	164.3
S 90 W	211.6
S 69 W	281.5
N 9 W	171.3
N 50 E	288.3
N 50 E	288.4
N 12 E	199.2
N 30 W	167.0
N 66 W	102.2
S 73 W	141.9
S 35 W	206.7
S 36 W	157.4
S 82 W	128.2
N 42 W	126.0
N 56 W	152.5
S 66 W	185.7
S 27 W	246.2
S 20 W	171.3
S 81 W	111.4
N 69 W	361.6
N 43 W	185.6
N 37 E	169.4
N 20 E	125.9
N 57 E	251.2

Direction	Distance (feet)
N 70 E	747.1
N 34 E	91.7
N 34 E	33.2

to the West line of Section 23,

Thence north along the west line of Section 23, 401.0 feet to the Northwest corner of Section 23,

Thence north along the west line of Section 14, approximately 2,640 feet to the West ¼ corner of Section 14,

Thence north along the West line of Section 14, approximately 2,640 feet to the **Point of Beginning**.

RNA contains approximately 962 acres.

/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 Brunsweiler River and Mineral Lake 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 200c).

The Station Director of the Northern Research Station (NRS), in consultation with the Chequamegon-Nicolet Forest (CNNF) Supervisor, Great Divide 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 specimens 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

Brunsweiler River and Mineral Lake Research Natural Area (RNA) occurs on a dramatic bedrock dominated landscape with high quality aquatic resources, old growth upland forest remnants, and rare plant and animal occurrences. It is large in size and connected to other protected areas with a similar lack of recent disturbance. This unique area contains a stretch of the Brunsweiler River, designated as a *Wild River* by the state of Wisconsin since 2009. Primary features include a large block of northern mesic forest, northern hardwood swamp, northern sedge meadow, shaded and open cliffs, and a scenic gorge carved by the Brunsweiler River. The site harbors rare plants and animals with conifers growing on undisturbed cliffs that may represent an ancient forest.

Figure 1. The Brunsweiler River cuts through a deep gorge with old growth conifer and hardwood forest on the uplands. Photo by S. Spickerman, 2004

The 962-acre (389 hectares) Brunsweiler River and Mineral Lake RNA is located on the Chequamegon-Nicolet National Forest (CNNF), Ashland County on the Great Divide Ranger District. The RNA is located entirely on National Forest Service Land and is approximately eight miles west of Mellen, Wisconsin (See Establishment Record Identification Section - *Location Map* and *Boundary Map*).

Historical Background - Native American 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. The current Bad River Ojibwe Reservation lies near the RNA as well as several others. Ojibwe tribes entered into session treaties with the United States in which rights to hunt, fish and gather were reserved by these tribes. See Section 4 d.(2) Cultural/Heritage for further explanation of Native American history.

Northern Wisconsin was surveyed in the mid 1800s. The following is an excerpt from the General Land Survey Notes: "*T44N R4W Surface generally rolling, soil 3rd rate, timber hemlock, yellow birch and a scattering of white pine. There are several large tamarack and cedar swamps. Surveyed by D. E. Norton in 1858"* (BCPL 2004). The Bearing Tree Map created in 1858 lists: "*Mostly hemlock and yellow birch with scattered sugar maple*".

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 containing the RNA then became National Forest in the 1930s. Extensive areas within the RNA have not been cut since. Timber harvests within the site in the decades of 1950-1980 were mainly selection cutting of hardwoods and clearcutting small acreages of aspen (*Populous tremuloides*).

Uses A portion of the North Country Hiking Trail passes through the northern section of the RNA. The adjacent Mineral Lake is used for motorized boating, fishing, and canoeing. The stretch of the Brunsweiler River downstream from Forest Road 187 as well as upstream from Mineral Lake is navigable but gets little canoe activity. Other uses include hunting, stream fishing, and some off-trail hiking.

Ownership & Administration Brunsweiler River and Mineral Lake RNA is owned outright by the USDA Forest Service. Administration and protection of the RNA is the responsibility of the Forest Supervisor of the Chequamegon-Nicolet National Forest (CNNF), or designate. The Great Divide Ranger District, CNNF, provides day-to-day protection and maintenance of the area.

Congressionally Designated Areas Brunsweiler River and Mineral Lake 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

Establishment of the Brunsweiler River and Mineral Lake RNA protects a portion of a fast-flowing, warm, soft-water stream and its associated chasm, enclosed by high Keweenawan granite escarpments (Smith and Meyer 1986). The RNA preserves healthy populations of fragrant fern (*Dryopteris fragrans*), spreading woodfern (*Dryopteris expansa*), Braun's holly fern (*Polystichum braunii*), state-threatened wood turtle (*Clemmys insculpta*), American martin (*Martes americana*), and state-protected timber wolf (*Canis lupus*). Also found here is a large population of Canada yew (*Taxus canadensis*), a low shrub of management concern in northern Wisconsin. Northern goshawks (*Accipiter gentilis*), another state-listed species of concern on the Chequamegon-Nicolet National Forest, have been observed within the site but no nests are recorded.

This site, with its dramatic bedrock dominated landscape, old growth remnants, high quality water resources, large size, and lack of recent disturbance represents an opportunity to protect a unique area (Spickerman 1996). In addition, this site is linked to the St. Peter's Dome RNA via the Lake Three Old Growth and Special Features CNNF management area and thus protects a large block of continuous-canopy maturing forest.

The site has numerous natural communities, which form a diverse mosaic of both aquatic and terrestrial resources. When considered with nearby or adjacent ecological reference areas, this site helps form a 10,000 acre (4,050 ha) block of rich northern mesic forest with numerous rare flora and fauna, high quality forested stands, unique habitats, and unequaled scenic qualities. This area represents one of the best remaining opportunities to protect a large block of unique, undisturbed hardwoods in northern Wisconsin (Spickerman 1996).

(2) PRINCIPAL DISTINGUISHING FEATURES

The primary feature of this site is the scenic, rocky, river gorge incised in an upland of Keweenawan granite bedrock, and several high quality old growth hemlock-hardwood stands embedded in a large tract of maturing northern mesic hardwoods that includes some of the largest yellow birch on the forest (Spickerman 1995). In this region, the Brunsweiler River flows north through Mineral lake, a natural, glacially-created lake, and then through a man-made reservoir (Beaverdam Lake) with high gradients and deeply-cut chasms between the lakes (Smith and Meyer 1986). Some stretches of the river contains slack water, in the form of shallow pools, and are interspersed with rapids flowing over large, granitic boulders (Figures 1 and 11). Two small, intermittent feeder streams, which drain the adjacent uplands, flow into the river from the east. A bridge crossing FR 187 spans the river (Figure 2) and a footbridge for the North Country Trail crosses the river at the northern edge. The river itself is in natural condition, of high quality and supports a diverse fishery.

Powerful geologic forces created numerous streamside cliffs (Figure 1), both open and shaded, some of which harbor a large population of the rare fragrant fern. A mesic north-facing slope with exposed bedrock and mature hemlock-hardwood forest provides habitat to Braun's holly fern.

Figure 2. A view to the north from the top of the gorge of the northern part of Brunsweiler River and Mineral Lake RNA; bridge is on Forest Road 187. Photo by S. Spickerman, 2003

Other features include old growth hemlock-yellow birch-sugar maple forest with upland cedar and scattered super canopy white pine and white spruce; old growth upland cedar forest on exposed bedrock; advanced regeneration of browse sensitive conifer species; about a third of the shoreline of the 225 acre (90 ha) largely undeveloped Mineral Lake. Lakes of this size and lack of development are listed in a 1996 Dept. of Natural Resources report on the state of Wisconsin's lakes as very rare, with only four percent of its type in public ownership. The site

contains extensive Canada yew within the gorge; an active bald eagle nest; an active timber wolf pack ; and a state threatened wood turtle population (Spickerman 1996). The old-growth forest, gorge, and stream offer numerous research opportunities (Hoffman 1989).

(3) OBJECTIVES

The Brunsweiler River and Mineral Lake RNA will be managed to meet the research and education objectives of the national RNA program. Specifically this RNA will preserve high quality areas that are representative of upland mesic forest, hardwood swamp forest, and those plant communities unique to granitic cliffs of the area. It will maintain genetic diversity and serve as a control for measuring ecological changes and to compare with manipulated areas. This RNA is interconnected with several other protected management areas to form the Forest's "*Brunsweiler River and Mineral Lake"* Ecological Reference Area of approximately 12,000 acres (4,800 ha).

c. LAND MANAGEMENT PLANNING

Brunsweiler River and Mineral Lake 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). The alternative effects of 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). Brunsweiler River and Mineral Lake 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 Forest have been assigned to a management prescription that is consistent with RNA objectives (USDA Forest Service 2004c pg 9).

In summary, 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 Chequamegon-Nicolet National Forest. Plant communities are generally of an older age class and contain all or most species characteristic of that community in the region.

d. MANAGEMENT PRESCRIPTION

The management prescription for Brunsweiler River and Mineral Lake RNA is embodied in the management area direction and guidance presented in the 2004 CNNF Forest Plan under Management Area 8E - Existing and Candidate Research Natural Areas (Appendix 3 - *Forest Management Area Direction* and USDA Forest Service 2004a pg 3-50).

The management objective of the RNA is to maintain and protect the ecologically significant community types and the site's special plant and animal species. RNA establishment will allow natural vegetation succession to occur unmodified by human activities.

The CNNF has not developed an individual site management plan for the 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. In general, the management objectives are to allow natural

processes to drive the structure and function of the ecosystems. Any site plans will be coordinated with the state as this is also a State Natural Area and as such has compatible management goals. The CNNF non-native invasive plant strategy (USDA Forest Service 2009) 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 upland hardwood community types. Fire is allowed per 2004 CNNF Forest Plan guidelines if needed for specific objectives however, fire has not been identified as a management need.

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 can be obtained from the CNNF RNA Coordinator.

a. PHYSICAL SITE DESCRIPTION AND CLIMATIC CONDITIONS

(1) LOCATION

Brunsweiler River and Mineral Lake RNA is located on the Great Divide Ranger District of the Chequamegon-Nicolet National Forest, Ashland County, in the state of Wisconsin. The RNA's Mercator coordinates are 46º 19' N latitude and 90º 50' W longitude (map datum WGS 84).

See Establishment Record Identification Section for *Location Map* and *Boundary Map*.

(2) SIZE IN ACRES/HECTARES

The RNA is comprised of 962 acres (389 hectares).

(3) ELEVATION RANGE

Elevations range from 1,340 feet (408 meters) to 1,510 feet (460 meters) above sea level.

(4) ACCESS TO THE SITE

Brunsweiler River and Mineral Lake RNA is located 8 miles west of Mellen, WI. From Mellen take County Highway GG to FR 187, which passes along and then through the site (Identification Section: *Location Map* and *Boundary Map*).

(5) CLIMATIC DATA

The weather station nearest to the Brunsweiler River and Mineral Lake RNA is Mellen 4 NE (Station no. 475286 latitude 46º 25' N, longitude 90º 37' W). The station is about 8 mi (13 km) to the east of the RNA and would have very similar weather and climate. Temperature data has been continuously recorded since 1948 and precipitation data since 1928 (Midwestern Regional Climate Center 2003).

Table 1. Temperature and precipitation data for Mellen, NE, Ashland County, Wisconsin from the years 1928 to 2000

Temperature	°F	°C
Mean annual	39.5	4.2
Mean April through September	56.3	13.6
Mean October through March	22.6	-5.2
Average daily maximum	50.3	10.2
Average daily minimum	28.6	-1.9
Record high	101.0	38.3
Record low	-49.0	-45.0
Precipitation	**in**	**mm**
Mean annual rainfall	33.4	847.0
Mean April through September	3.6	90.0
Mean October through March	2.0	51.0
Mean annual snowfall	102.2	2,591.0

B. ECOLOGICAL DESCRIPTION

Nomenclature for flora follows the USDA PLANTS database (USDA, NRCS. 2012); 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).

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

Brunsweiler River and Mineral Lake RNA is located in the Laurentian Mixed Forest Province, 212J Southern Superior Uplands Section, Subsection Jb Gogebic/Penokee Iron Range and Jc Vinegar Moraines of the Ecological Units of the Eastern United States (Cleland et al. 2007). It includes Land Type Associations (LTA[s]) Jb01 Gogebic/Penokee Iron Range and Jc05 Valhalla/Marinesco Moraines.

(2) PLANT COMMUNITY TYPES

The closed canopy northern mesic forest is dominated by sugar maple (*see Table 4 for scientific names*), hemlock, and yellow birch (Figure 4: types 85 and 89; and Figure 5). Although several stands were cut about fifty years ago, the overall integrity of the site is intact. Average diameters range between 12 and 18 inches (30 - 46 cm) with the largest trees routinely over 30 in. (76 cm) and several over 40 in. (100 cm). Snags and large, downed woody debris are common. American fly honeysuckle is the dominant shrub with leatherwood, Canada yew, and alternate-leaved dogwood also present. The ground flora is diverse. Common ferns include intermediate wood fern, and lady fern. Grass and grass-like species include sedges, rattlesnake manna grass, and bottlebrush grass. Other common herbaceous plants include club-moss, sessile-leaved bellwort, large-flowered trillium, rosy twisted stalk, dutchman's breeches, baneberry species, and *Aralia* species.

The flora of the gorge varies considerably from streamside to the adjacent ridgetops (Smith and Meyer 1986). The lowland areas and low, shaded cliffs are dominated by a canopy of northern white cedar, yellow birch, eastern hemlock, and black ash. Canada yew and mountain maple are present in the midstory and on shaded cliff ledges. Ferns, especially *Dryopteris* species, are abundant in the understory. Speckled alder dominates lower, wetter portions of the bank.

Cliff communities found in the Brunsweiler River Gorge (Figure 4 mostly within type 4) include wet, shaded cliff and xeric, open cliff; each community containing its own mix of specialized plant, moss, and lichen species. Fragrant fern (a species listed as *Regional Forester Sensitive*) is found growing on moister and protected, north facing cliffs. Additional species listed rare in the state may be discovered with further survey as there is suitable habitat. Plant associates include northern fragile fern, cliff fern, and longbeech fern. In addition, the northern white cedar found growing on the largely undisturbed cliffs in the Brunsweiler Gorge might represent a rare ancient forest community. Northern white cedar along with Canada yew found growing on cliffs has been aged at more than a 1,000 years old elsewhere in the upper Great Lakes region and these unique forest communities represent important refugia for the surrounding area.

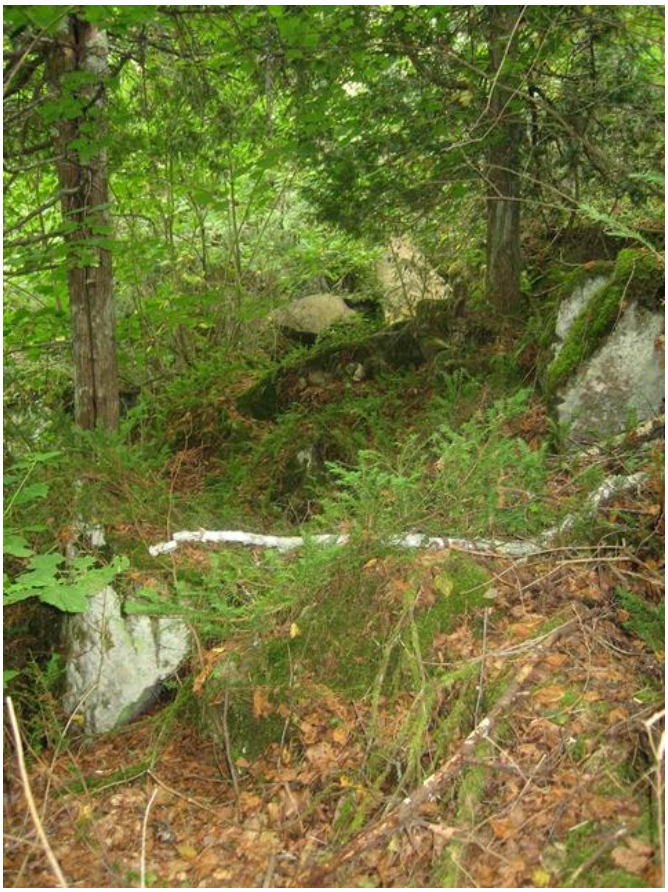


Figure 3. Talus Forest along the Brunsweiler River supports upland northern white cedar and Canada yew. Photo by S. Spickerman, 2004.

The dry cliff-tops support a very narrow band of xeric forest with paper birch, white pine and scattered large red pine (Figure 6). Away from the river the forest becomes more mesic with sugar maple and basswood.

Talus forest develops on granitic substrates and typically reflects the composition of forests in the surrounding landscape but includes plants and animals adapted to take advantage of the unique nature of this community (Figure 3). Important attributes of talus forest communities include exposed, broken rock substrate, cold air drainage, and groundwater seepage. The talus forest communities found in this site are "sandwiched" between the Brunsweiler River and vertical cliffs downstream from Mineral Lake. Overstory trees include yellow birch, northern white cedar, and eastern hemlock. There is a strong mid-level canopy of mountain maple and the Forest Management Indicator Species shrub Canada yew is found in dense, unbrowsed pockets. The Regional Forester Sensitive Species (RFSS) spreading wood fern and Braun's holly fern found here are both strongly associated with this community type (Spickerman, personal communication, 2011).

Aquatic plants inhabiting the quiet pools of the Brunsweiler River include bur-reed (*Sparganium* sp), bull-head pond lily (*Nuphar variegata*), and common arrowhead (*Sagittaria latifolia*).

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

Community Type (Curtis 1959)	**Habitat Types** (Kotar et al. 2002)	**Dominant Species**	**NVCS Associations** (NGDC 2012)*
Northern wet-mesic forest	TMC	hemlock, yellow birch	Tsuga canadensis - (Betula alleghaniensis) Forest CEGL002598
Northern mesic forest	ATM,	hemlock, sugar maple, yellow birch	Tsuga canadensis - Acer saccharum - Betula alleghaniensis Forest CEGL005044
Northern mesic forest	AOCa	Sugar maple, yellow birch, basswood (the most common community in RNA)	Acer saccharum - Betula alleghaniensis - (Tilia americana) Forest CEGL002457 Acer saccharum - Fraxinus americana - Tilia americana / Acer spicatum / Caulophyllum thalictroides Forest CEGL005008
Northern mesic forest	ATM/ATD	quaking aspen (succeeding to mixed hardwood forest)	Populus tremuloides - Betula papyrifera / Acer saccharum - Mixed Hardwoods Forest
Talus Forest	TMC	yellow birch, mountain maple, white cedar	Thuja occidentalis - Betula alleghaniensis Forest CEGL002450
Northern wet forest	N/A	black ash, white cedar, hemlock	Fraxinus nigra - Mixed Hardwoods - Conifers / Cornus sericea / Carex spp. Forest CEGL002105
Northern hardwood swamp	N/A	black ash, yellow birch, red maple	similar to above
Dry Cliff (open, xeric, vertical cliff)	N/A	lichen, red pine, white pine	Igneous - Metamorphic Northern Dry Cliff Sparse Vegetation CEGL002300
Moist Cliff (shaded, wet, vertical cliff)	N/A	hemlock, white cedar, *Polypodium vulgare*, *Dryopteris* spp.	Tsuga canadensis - (Betula alleghaniensis) Forest CEGL002598
Shrub Carr	N/A	willow/red-osier dogwood/meadow sweet	Salix sericea Shrubland CEGL006305
Open bog	N/A	leatherleaf, Labrador tea, bog laurel	Chamaedaphne calyculata - Ledum groenlandicum - Kalmia polifolia Bog Dwarf-shrubland CEGL005278
Northern sedge meadow	N/A	(blue joint grass/tussock sedge)	Calamagrostis canadensis - Eupatorium maculatum Herbaceous Vegetation CEGL005174
Ephemeral ponds	N/A	mostly unvegetated (*Carex* spp, *Sium suave)*	undetermined
River	N/A	Sparganium, Nuphar, Sagittaria	Nymphaea odorata - Nuphar variegata Herbaceous Vegetation CEGL002562 (CEGL006086)

* These National Vegetation Classification System associations are initial approximations - further review needed.

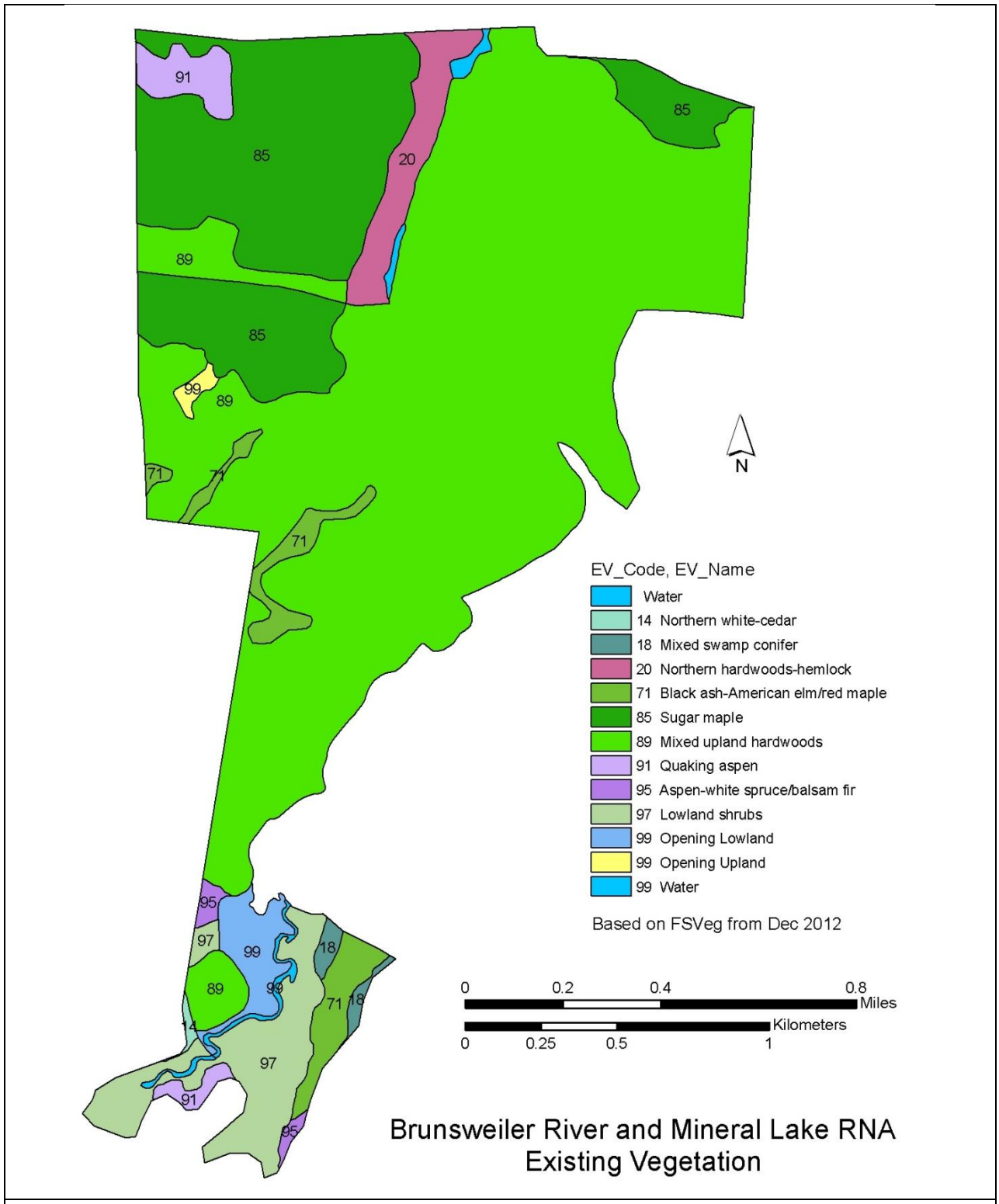


Figure 4. Existing Vegetation (formerly Forest Type) within Brunsweiler River and Mineral Lake RNA (CNNF data 2012)

Table 3. Existing Vegetation (EV) by acres and hectares in Brunsweiler River and Mineral Lake RNA. Codes used in Figure 4.

EV Code	Existing Vegetation (EV)	Acres	Hectares
14	Northern white cedar	1.2	0.5
18	Mixed swamp conifer	4.8	2
20	Northern hardwoods-hemlock	27	10.9
71	Black ash-American elm/red maple	29.4	11.8
85	Sugar maple	203.8	82.4
89	Mixed upland hardwoods	597.5	241.8
91	Quaking aspen	16.9	6.8
95	Aspen-white spruce/balsam fir	3.9	1.6
97	Lowland shrubs	51.7	21
99	Opening Upland	2.7	1.1
	Opening Lowland	16.1	6.5
	Water	3	1.2
(blank)	Water	4.1	1.7
Grand Total		962.1	389.3

Figure 5. Mesic Hardwood forest on the rocky slopes of Brunsweiler River and Mineral Lake RNA. Photo by S. Spickerman 2004.

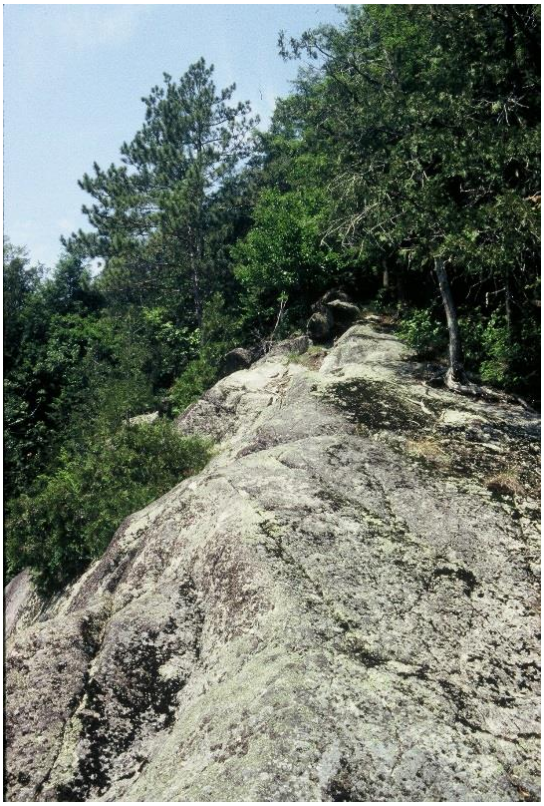


Figure 6. A narrow xeric cliff plant community with lichens and sparse vegetation. Photo by S. Spickerman 2004.

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

(A) FLORA LIST

Table 4. Flora of Brunsweiler River and Mineral Lake RNA (surveys of Spickerman, Vora, Brzeskiewicz, Leach 1990s)

Scientific name	Common Name
Abies balsamea	balsam fir
Acer rubrum	red maple
Acer saccharum	sugar maple
Acer spicatum	mountain maple
Actaea pachypoda	white baneberry
Actaea rubra	red baneberry
Adiantum pedatum	maidenhair fern
Agrostis gigantea	redtop
Allium tricoccum	wild leek
Alnus incana	gray alder
Amelanchier sp	serviceberry
Anemone quinquefolia	woods anemone
Aquilegia canadensis	columbine
Aralia nudicaulis	wild sarsaparilla
Aralia racemosa	spikenard
Arisaema triphyllum	jack-in-the-pulpit
Athyrium filix-femina	lady fern
Betula alleghaniensis	yellow birch
Betula papyrifera	paper birch
Brachyelytrum erectum	northern shorthusk
Calla palustris	water arum
Carex arctata	drooping woodland sedge
Carex intumescens	greater bladder sedge
Carex pedunculata	long-stalked sedge
Carex pensylvanica	Pennsylvania sedge
Carex tenera	Marsh straw sedge
Caulophyllum thalictroides	blue cohosh
Chamaedaphne calyculata	leatherleaf
Chrysosplenium americanum	American golden saxifrage
Cicuta maculata	spotted water hemlock
Circaea alpina	Dwarf enchanter's nightshade
Circaea lutetiana ssp. canadensis	Enchanter's nightshade
Claytonia caroliniana	Carolina spring beauty
Clintonia borealis	bluebead lily
Coptis trifolia	goldthread
Corallorhiza maculata	summer coralroot
Cornus alternifolia	alternate-leaved dogwood
Corydalis sempervirens	pale corydalis
Cystopteris fragilis	brittle bladderfern
Deparia acrostichoides	silvery glade fern
Dicentra cucullaria	Dutchman's breeches
Diervilla lonicera	northern bush honeysuckle

Scientific name	Common Name
Dirca palustris	leatherwood
Dryopteris carthusiana	toothed wood fern
Dryopteris cristata	crested wood fern
Dryopteris expansa	spreading wood fern
Dryopteris fragrans	fragrant fern
Dryopteris intermedia	fancy wood fern
Elymus hystrix	eastern bottlebrush grass
Erythronium americanum	trout lily
Fragaria virginiana	strawberry
Fraxinus americana	white ash
Fraxinus nigra	black ash
Galium asprellum	rough bedstraw
Galium triflorum	sweet-scented bedstraw
Glyceria canadensis	rattlesnake mannagrass
Gymnocarpium dryopteris	oak fern
Huperzia lucidula	shining club-moss
Impatiens capensis	jewelweed
Kalmia polifolia	bog laurel
Laportea canadensis	Canadian wood nettle
Ledum groenlandicum	Labrador tea
Linnaea borealis	twinflower
Lonicera canadensis	American fly honeysuckle
Luzula acuminata	hairy wood rush
Lycopodium annotinum	bristly club-moss
Lycopodium clavatum	running club-moss
Lycopodium dendroideum	northern tree club-moss
Lycopodium obscurum	rare club-moss
Maianthemum canadense	wild lily-of-the-valley
Matteuccia struthiopteris	ostrich fern
Mitchella repens	partridgeberry
Monotropa uniflora	Indian pipe
Myosotis scorpioides	true forget-me-not
Nuphar variegate	bulkhead lily
Nymphaea odorata	American white waterlily
Onoclea sensibilis	sensitive fern
Oryzopsis asperifolia	roughleaf ricegrass
Osmorhiza claytonii	sweet cicely
Osmunda claytonii	interrupted fern
Ostrya virginiana	ironwood
Oxalis montana	mountain wood sorrel
Oxalis stricta	common yellow oxalis
Panax trifolius	dwarf ginseng
Parthenocissus vitacea	woodbine
Phegopteris connectilis	northern beech fern

Scientific name	Common Name
Picea glauca	white spruce
Picea mariana	black spruce
Pinus resinosa	red pine
Pinus strobus	white pine
Polygonatum pubescens	hairy Solomon's-seal
Polypodium virginianum	rock polypody
Polystichum braunii	Braun's hollyfern
Populus grandidentata	big-tooth aspen
Populus tremuloides	quaking aspen
Prunus serotina	black cherry
Pteridium aquilinum	bracken fern
Quercus rubra	red oak
Ribes cynosbati	prickly gooseberry
Ribes glandulosum	skunk currant
Rubus alleghaniensis	blackberry
Rubus idaeus	red raspberry
Rubus pubescens	dwarf red blackberry
Rumex crispus	curly dock
Sagittaria latifolia	broadleaf arrowhead
Salix spp.	willow
Sambucus pubescens	elderberry

Scientific name	Common Name
Sanguinaria canadensis	bloodroot
Saxifraga pensylvanica	swamp saxifrage
Sorbus americana	mountain ash
Streptopus lanceolatus v. longipes	rosy twisted stalk
Taxus canadensis	Canada yew
Thuja occidentalis	northern white cedar
Tilia americana	basswood
Toxicodendron radicans	poison ivy
Trientalis borealis	starflower
Trillium cernuum	nodding trillium
Trillium grandiflorum	large-flowered trillium
Tsuga canadensis	eastern hemlock
Uvularia grandiflora	large-flowered bellwort
Uvularia sessilifolia	sessile bellwort
Vaccinium myrtilloides	velvet-leaf blueberry
Viola macloskeyi	smooth white violet
Viola novae-angliae	New England violet
Viola pubescens	downy yellow violet
Woodsia ilvensis	rusty woodsia fern

(B) FAUNA LIST

There has not been a complete inventory of fauna of The Brunsweiler River and Mineral Lake RNA. species assumed to be present are included in Table 5.

Table 5. Brunsweiler and Mineral Lake RNA Fauna List*

Brunsweiler River and Mineral Lake Fauna List*	
Common Name	Scientific Name
Reptiles and Amphibians	
American toad	*Bufo americanus*
Wood frog	*Rana sylvatica*
Northern Green frog	*Rana clamitans melanota*
Mink frog	*Rana septentrionalis*
Eastern gray tree frog	*Hyla versicolor*
Northern Spring peeper	*Pseudacris crucifer*
Blue spotted salamander	*Ambystoma laterale*
Wood turtle	*Clemmys insculpta*
Mammals	
Timber wolf	*Canis lupus*
Whitetail deer	*Odocoileus virginiana*
American beaver	*Castor canadensis*
Fish	
common shiner	*Notropis cornuta*
blacknose dace	*Rhinichthys atratulus*
longnose dace	*Rhinichthys cataractae*
logperch	*Percina caprodes*

Brunsweiler River and Mineral Lake Fauna List*	
Common Name	Scientific Name
Johnny darter	*Etheostoma nigrum*
brook stickleback	*Culea inconstans*
central mudminnow	*Umbra limi*

*Smith and Meyer 1986

Table 6. A preliminary list of Birds of Brunsweiler River and Mineral Lake RNA (observed by Spickerman 1995)

Brunsweiler River and Mineral Lake RNA Bird List			
Common Name	Scientific Name	Common Name	Scientific Name
Broad-winged hawk	*Buteo platypterus*	Veery	*Catharus fuscescens*
Sharp-shinned hawk	*Accipiter striatus*	Hermit thrush	*Catharus guttatus*
Bald eagle	*Haliaeetus leucocephalus*	Swainson's thrush	*Catharus ustulatus*
Northern goshawk	*Accipiter gentilis*	Black-throated green warbler	*Dendroica virens*
Sandhill crane	*Grus canadensis*	Black-throated blue warbler	*Dendroica caerulescens*
Ruffed grouse	*Bonasa umbellus*	Northern parula	*Parula americana*
Black-bellied plover (migrant)	*Plucialis squatarola*	Ovenbird	*Seiurus aurocapillus*
Chimney swift	*Chaetura pelagica*	Northern waterthrush	*Seiurus noveboracensis*
Pileated woodpecker	*Dryocopus pileatus*	Common yellowthroat	*Geothylpis trichas*
Yellow-bellied sapsucker	*Syphyrapicus varius*	Rose-breasted grosbeak	*Pheucticus ludovicianus*
Great crested flycatcher	*Myiarchus crinitus*	Red-winged blackbird	*Agelaius phoeniceus*
Blue-headed vireo	*Vireo solitarius*	Chipping sparrow	*Spizella passerina*
Red-eyed vireo	*V. olivaceous*	Song sparrow	*Melospiza melodia*
Barn swallow	*Hirundo rustica*	Swamp sparrow	*M. georgiana*
Winter wren	*Troglodytes troglodytes*	White-throated sparrow	*Zonotrichia albicollis*

(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 includes igneous, metamorphic, and volcanic rock (Wisconsin Department of Natural Resources 2003). While bedrock rises above the general landscape in places (Figure 7), the majority of the RNA has bedrock between 50 feet and 5 feet below the land surface. Geomorphologic processes include till deposition and water erosion.

(D) SOILS

Most of the RNA contains hilly to steep well drained soils that correspond to the Gogebic-Michigamme-Rock outcrop complex (NRCS Official Soil Series Descriptions, 2013). Areas of moderately well drained soils are found intermingled with well drained soils. Prominent bedrock outcrops are common. The soils are typically characterized by fine sand or very fine sandy loam surface over bedrock. Bedrock is usually within 40 inches (100 cm) of the surface. An estimate of 2-10 percent of the surface area of this ecological land type is bedrock outcrops. The outcrops are typically elongated knobs, oriented in an east-west or northeast-southwest direction. Their size ranges from 10 to 50 feet in width, and 20 to 300 feet in length. Typically, they are less than 100 feet long. Rock exposures are generally 100-500 feet apart. Locally, high concentrations of surface rock fragments may be present.

This Ecological Land Type Phase (ELTP) is associated with the resistant quartzite formation (the Penokee-Gogebic Range) that had been scoured by several glacial advances. It also includes smaller monadnocks isolated from the main body of the Penokee-Gogebic Range. Upland hardwoods with a heavy sugar maple component are the dominant tree species. Other species that can be found are basswood, white ash, and to a lesser extent, yellow birch, paper birch, quaking aspen, red maple, and white spruce.

Also present are deep, slightly acid or neutral, well decomposed organic soils. The organic material is largely derived from woody and herbaceous plants and is at least 40 inches (100 cm) deep. Existing vegetation is usually lush and the water table is at the surface except under extended dry conditions. Within the RNA, soils of this type contain black ash and red maple.

Figure 7. Granitic bedrock is exposed throughout the Brunsweiler River and Mineral Lake RNA and greatly influences the vegetation both physically and through soil chemistry. Photo by S. Spickerman, 2007.

(E) TOPOGRAPHY

Topography is rolling and hilly throughout with steep granite cliffs along the Brunsweiler River. The characteristic landform is primarily hilly bedrock-controlled moraine as well as rolling collapsed moraine (Wisconsin Department of Natural Resources 2003).

(F) AQUATIC/RIPARIAN

Draining the west central section of the county, the Brunsweiler River has several natural glacial lakes along its course and feeders. Its principal water tributaries are Spider Creek, Hell Hole Creek, Camp Six Creek, and several other unnamed feeder streams (Sather and Threinen 1966). The 22-

mile (35 km) long river begins as a drainage stream but picks up spring water below the outlet of Beaverdam Lake.

Figure 8. The outlet of Mineral Lake was formed by bedrock and glacial deposits. Photo by S. Spickerman 2006.

The 225-acre (91 ha) Mineral Lake is a soft water drainage lake (Sather and Threinen 1966). A natural boulder outcrop of bedrock at the outlet serves to maintain the lake level at its downstream boundary (Figure 8).

Aquatic values as listed by Wisconsin Department of Natural Resources:

-Lake – deep, hard, drainage (Mineral Lake)
-Stream – fast, soft, warm (Brunsweiler River)
-Stream – slow, soft, warm (Brunsweiler River)
-Ephemeral ponds
-Emergent aquatic
-Submergent aquatic

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

Table 7. Threatened, endangered, and unique species in Brunsweiler River and Mineral Lake RNA, State status and Natural Heritage rank

Common Name	Scientific Name	State Status, Heritage Rank[1]
Animals		
Timber wolf	*Canis lupus*	SC/P, S4
Bald Eagle	*Haliaeetus leucocephalus*	SC/P, S4B,S4N
American martin	*Martes americana*	END, S2
Wood turtle	*Glyptemys insculpta*	THR, S2
Swainson's thrush	*Catharus ustulatus*	SC/M, S2B
Northern goshawk	*Accipiter gentilis*	SC/N. S2B,S2N
Plants		
Fragrant fern	*Dryopteris fragrans*	SC, S3
Spreading wood fern	*Dryopteris expansa*	SC, S2
Braun's holly fern	*Polystichum braunii*	THR, S3
Purple clematis	*Clematis occidentalis*	none (uncommon on Forest)
Canada yew	*Taxus canadensis*	none (indicator species at Forest level)

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

Figure 9. Rare plants known from Brunsweiler River and Mineral Lake RNA include (left to right) *Dryopteris expansa* (spreading wood fern), *Polystichum braunii* (Braun's holly fern), and *Dryopteris fragrans* (fragrant wood fern). CNNF Photos

(H) LIST OF RARE ELEMENTS AND RARE PLANT COMMUNITIES

Table 8. List of plant communities with State Rank below S4 within Brunsweiler RNA

Element/Community Name	Global Rank	State Rank[1]
Hardwood Swamp	*G4*	*S3*
Talus Forest	*G4G5*	*S1*
Northern Sedge Meadow	*G4*	*S3*
Lake - deep, hard drainage	*GNR*	*S3*

[1] see Appendix 4: *Natural Heritage Rank Definitions*

This site is embedded within an area recognized by the Wisconsin Bird Conservation Initiative as an *Important Bird Area* named St. Peters Dome and provides essential habitat to one or more species of breeding or non-breeding birds (Steele 2007). The identification of a site as an Important Bird Area carries no legal status or regulatory requirements.

c. RESOURCE INFORMATION

This section discusses resources that occur in the RNA framed within *the context of potentially conflicting uses.* Brunsweiler River and Mineral Lake RNA is owned outright by the United States government and is administered by the USDA Forest Service, Chequamegon-Nicolet National Forest.

(1) MINERALS

The mineral estate ownership within the RNA is outstanding and reserved (see Table 9). Outstanding and Reserved minerals are open to hardrock prospecting within the Research Natural Area and the Forest Service must allow access to the surface to the mineral owner. 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) is not precise enough to say the potential for prospecting is "high" or "low" within the RNA (Knight pers comm 2013). Mineral ownership does not preclude use of the site for research but if prospecting took place disturbance to localized areas could occur

To date there has been no hardrock prospecting permit activity in the RNA.

Table 9. Mineral estate ownership within the RNA

Township-Range	Section	Acres*	Hectares	Mineral ownership	Comments
44N 4W	10	80 80	32 32	Outstanding Outstanding	 Statement of Mineral Claim Filed
	11	120 120	49 49	Reserved Outstanding	 Statement of Mineral Claim Filed
	14	all	all	Outstanding	Statement of Mineral Claim Filed
	22, 23	all	all	Reserved	

Definitions:

Outstanding: Third party (mineral rights were not owned by the surface land owner when the land was sold to the National Forest) mineral ownership rights are described in deed and State Law. Forest Service must allow access to the surface to the mineral owner.
Reserved: The surface land owner owned the mineral rights and retained those mineral rights when they sold the surface land to the National Forest. These mineral rights are subject to Secretary of Agricultures Rules & Regulations and State laws based on date of land purchase. Forest Service must allow access to the surface to the mineral owner.
Statement of Mineral Claim was filed by the Forest Service: State of Wisconsin Law provides a way for a surface owner to file for and acquire the Outstanding mineral rights when those rights have become "dormant". Dormant mineral rights are acquired by filing a Statement of Mineral Claim.
All: Means the total acreage within the RNA boundary in that section.
***Acres**: This represents only a rough estimate of the number of acres within the proposed RNA boundary. Mineral ownership acreage is estimated because RNA boundaries are meander lines and mineral ownership is a legal description.

(2) GRAZING

There is no grazing on the Chequamegon-Nicolet National Forest. The Forest land and Resource Management 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 the RNA is 885 (358 hectares) ninety-six percent of which is upland. In the last five decades the Chequamegon-Nicolet National Forest has chosen not to harvest timber on this steep and rocky terrain. It has long been distinguished as a unique assemblage of plant communities and geologic features.

The 2004 CNNF Forest Plan includes 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, which 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" in RNAs.

This new RNA has not as yet been 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 rights. See Section d.(2) - *Cultural/Heritage* for further discussion.

(4) WATERSHED VALUES

This RNA is situated within the Marengo River Watershed and flows into the Lake Superior basin. Due to erosion and sedimentation caused by land use, topography, and geologic conditions within the watershed, the Marengo River Watershed has become an important focus area for highlighting "slow the flow," the key management strategy to reducing sedimentation in Wisconsin's Lake Superior Basin (WI DNR 2012).

The Brunsweiler River has carved out a scenic gorge from the Keweenawan granite bedrock itself somewhat altered by the last glacier. RNA designation protects the geologic features associated with the river as well as the rare plants found within the river cliffs. While Mineral Lake is not within the RNA boundary, about one third of the shoreline is protected by RNA designation.

(5) RECREATION USE

The intensity of human use of the RNA is undocumented. The North Country Hiking Trail skirts the northern boundary of the site and provides back-country access. Only very limited portions of the Brunsweiler River within the RNA boundary are navigable via canoe. Angling is popular in the adjacent Mineral Lake and in the Brunsweiler River.

Mineral Lake campground, a picnic area, and boat launch are outside of the RNA on the east side of the lake. Motorized boats are currently allowed but their impact has not been studied. Bald eagles continue to nest near the lake despite human activity. Mineral Lake is a *Great Wisconsin Birding & Nature Trail* site: Lake Superior Northwoods Region, a compendium of birding hot spots (WI DNR. 2010).

(6) WILDLIFE

The extensive forest harbors numerous warblers and contains large nesting trees for bald eagles. RNA designation protects the rare plants and animals that depend on the habitat found within the site. RNA status will positively affect huntable and trappable wildlife that occur here includes whitetail deer, black bear, beaver, ruffed grouse and various small game (e.g. squirrels and rabbits). Hunting is compatible with RNA status and may be desirable to control high populations of white-tailed deer.

(7) TRANSPORTATION/ROAD SYSTEM

There is no motorized access within the boundary of the RNA itself with the exception of Forest Road 187 (a town-maintained road) which crosses east/west through the northern part (see Identification Section: *Location Map*). 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. Gravel arterial roads and native-surface collector roads left over from past management needs will be treated if necessary to restore hydrologic, geomorphic, and ecological processes and properties. Relocation of the power line would reduce site fragmentation.

d. HISTORICAL INFORMATION

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

History of establishment:

The CNNF began a forest-wide ecological inventory to identify high quality ecological features in the early 1990s (Parker 1999). Brunsweiler River and Mineral Lake was one of the highest ranking sites 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* (unique ecological communities) within each subsection (Tyrrell et al 2000). This site filled a cell in that gap analysis.

Figure 10. The boulder-strewn bed of the Brunsweiler River during a low-water period in the fall. Photo by Steven Spickerman, October 2004.

The Natural Heritage Inventory Section of the Bureau of Endangered Resources, Wisconsin DNR, worked closely with Forest ecologists in evaluating this site, making numerous field visits and assisting with ecological inventory and evaluation. They completed a *Site Evaluation* and recommended the Brunsweiler River and Mineral Lake area for protection.

The Wisconsin Department of Natural Resources is also interested in achieving ecosystem representation within the State Natural Area Network. They signed a Memorandum of

Understanding with the CNNF to co-designate all current and future RNAs and SMAs as State Natural Areas.

Brunsweiler River and Mineral Lake 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 Land and Resource Management 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 Brunsweiler River and Mineral Lake RNA for establishment.

Beginning in 1990, the Chequamegon-Nicolet National Forest established an extensive set of long-term monitoring plots on the Chequamegon side of the forest. The intent was to provide baseline data and a means by which managed forests could be rigorously compared to unmanaged forests for forest health and biodiversity indicators (Vora 1997). This RNA includes one of the control (unmanaged) plots in this monitoring network.

Dr. James Cook (University of Wisconsin Stevens Point) and several graduate students began a study to look at change within the Chequamegon National Forest vegetation monitoring network, and comparisons of managed and unmanaged forests (Cook).

(2) CULTURAL/HERITAGE

Cultural resources in Brunsweiler River and Mineral Lake RNA include an old homestead site but no above-ground structures remain (USDA Forest Service 2003).

Ojibwe tribes 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.

Since the RNA has not been adopted as an Ojibwe Tribal RNA as of 2013; tribal members may exercise these rights here. The CNNF is continuing to work with the Tribes to protect these unique features and to provide for the exercise of treaty-reserved rights. 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”.

(3) DISTURBANCE HISTORY

Most of the area was harvested during a period of extensive logging (100+ years ago), with nearly all white pine and a large amount of the hemlock cut (note those stands referred to as "old growth" still have their hemlock component). A gravel arterial road (FR 187) bisects the site east to west in the northern part. Other legacy gravel collector roads and native surface old logging roads exist within the site. A power line corridor crosses a portion of the site visible on the Landscape

Overview satellite photo in the *Identification Section*. Motorized access is prohibited but the site may get occasional illegal all-terrain vehicle use. Regular monitoring will indicate if this is happening.

(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. The only non-native invasive plants currently known within the RNA is a patch of true forget-me-not (*Myosotis scorpioides*) where the North Country Trail crosses the Brunsweiler River in section 11. True forget-me-not is listed as a high priority species to treat on the CNNF and will be controlled with methods that avoid damage to other native plants. Other invasive plants nearby, but outside the RNA, are reed canary-grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*).

e. OTHER INFORMATION

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

Previous surveys include Natural Heritage Evaluation of selected plant communities by Spickerman (1995, 1996); TES plant inventory by Spickerman, Leach and Vora (1990); and aquatic vegetation survey by Spickerman and Brzeskiewicz (1995). There is a permanent vegetation monitoring plot placed in 1990 that also has photo points.

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 Chequamegon-Nicolet National Forest Supervisor's office or designated university.

(2) BIBLIOGRAPHY

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

(3) POTENTIAL RESEARCH TOPICS

RNA designation may attract researchers interested in the rare plants, animals, old-growth forest, geologic features, and stream ecology of the site. A study of the age of the old northern white cedar and Canada yew growing on the protected cliff faces may show it as ancient and provide opportunity for long term climate assessments through dendrochronologies if warranted. A survey of bats has not been done and is desirable due to their declining numbers from “white-nose syndrome” that is spreading in North America.

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 (WI DNR 2011).

f. EVALUATION OF SPECIFIC MANAGEMENT RECOMMENDATIONS ON THE RESEARCH NATURAL AREA

(1) POTENTIAL OR EXISTING CONFLICTS; PRINCIPAL MANAGEMENT ISSUES

Management needs include the continued inventory of natural communities, in particular, of cliff and talus communities for rare vascular plant, lichen and gastropod species, monitoring of resident American martin population, bats, and upland breeding bird surveys.

The Brunsweiler River and Mineral Lake RNA is embedded within an area of compatible management known as Management Area 2B characterized by relatively continuous mid to late successional uneven-aged northern hardwood and hemlock-hardwood forest communities. Although most of the site is either bounded by road or distinct habitat changes (upland versus lowland), in locations where RNA upland forest stands abut managed forest stands, care should be taken during potential management activities to minimize impact to adjacent RNA stands. Work on the North Country National Scenic Trail, the Mineral Lake campground, boat landing, and fisheries improvement projects should all take into account the status of this area as an RNA.

A number of old two-track roads enter the RNA off Forest Roads 187 and 388. These include numbered roads such as FR 187A and 187E and old logging or user developed roads. These roads will be closed and obliterated to restore ecological function. ATV as well as truck traffic on these native surface two-tracks increases the chance for invasive plant or earthworm invasion into interior forest areas.

There are no outstanding timber rights on any of the tracts in the RNA, nor are there any special use permits outstanding.

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

The Brunsweiler River and Mineral Lake RNA is not located within or adjacent to any congressionally designated area. Some of the lands surrounding the RNA are part of a larger ecological reference area complex known as *Brunsweiler River and Mineral Lake.*

This reference area includes the Lake Three Hemlocks and Ash Swamp Old Growth and Special Features protected area and the 925 (374) acre former University of Wisconsin-Madison Arboretum property (now federal land) that surrounds Beaverdam Lake (along the RNA's east boundary). Together, these areas comprise approximately 12,000 acres (4,856 ha) of sparsely developed, protected lands in an interconnected *reference area complex*.

The Brunsweiler River was designated by the state as a Wild River in 2009. Although this designation does not necessarily afford any additional protection, it does bring a certain amount of notoriety and may therefore increase visitor use of the area.

g. PHOTOGRAPHS

All photographs used in this Establishment Record are the property of the Chequamegon-Nicolet National Forest but not copyrighted. Older slide photos were scanned in some cases and are with the site file housed in the Park Falls office of the Chequamegon-Nicolet National Forest. An electronic file is part of this establishment record.

Figure 11. A quiet pool of Brunsweiler River below a shallow riffle area. Photo by Steven Spickerman, 1995.

APPENDIX 2 BIBLIOGRAPHY

Below is all literature cited in this establishment record, references useful for researchers, and journal articles or publications that have resulted from study conducted on the site.

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APPENDIX 3 FOREST MANAGEMENT AREA DIRECTION

The management prescription for the Brunsweiler River and Mineral Lake 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 presented here was revised June 2012. Definitions of ranks are provided below, along with definitions for other abbreviations used in the Working List. http://dnr.wi.gov/topic/NHI/documents/NHIWorkingList.pdf

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 WI Status: Protection category designated by the Wisconsin DNR. END = endangered; THR = threatened; SC = Special Concern.

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.

SGCN: Indicates that an element is a Species of Greatest Conservation Need from Wisconsin's Wildlife Action Plan. http://dnr.wi.gov/org/land/er/WWAP/

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/documents/NHIWorkingList.pdf Last Revised: May 5, 2012)

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