DESIGNATION ORDER

USDA Forest Service, Eastern Region
Chequamegon-Nicolet National Forest
Medford-Park Falls Ranger District
Taylor County, Wisconsin

Richter Lake Hemlocks

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 Richter Lake Hemlocks Research Natural Area. It shall be comprised of 330 acres (134 hectares) of land in Taylor County, in the state of Wisconsin, on the Medford-Park Falls 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, Eastern Region, USDA Forest Service

5/11/15
Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Richter Lake Hemlocks Research Natural Area

Chequamegon-Nicolet National Forest

Taylor 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 03/06/2015
Marjory E. Brzeskiewicz, Botanist, Chequamegon-Nicolet National Forest

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

Recommended by: Bob Hennes Date 3/7/15
Robert Hennes, District Ranger, Medford-Park Falls District

Recommended by: Paul I.V. Strong Date 3/17/15
Paul I.V. Strong, Forest Supervisor, Chequamegon-Nicolet National Forest

Concurrence of: Michael T. Rains Date 3/16/15
Michael T. Rains, Station Director, Northern Research Station

USDA

United States
Department of
Agriculture

Forest
Service

March 2015

TITLE PAGE

Establishment Record for
Richter Lake Hemlocks
Research Natural Area

Chequamegon-Nicolet National Forest,
Medford-Park Falls District,
Taylor County, Wisconsin

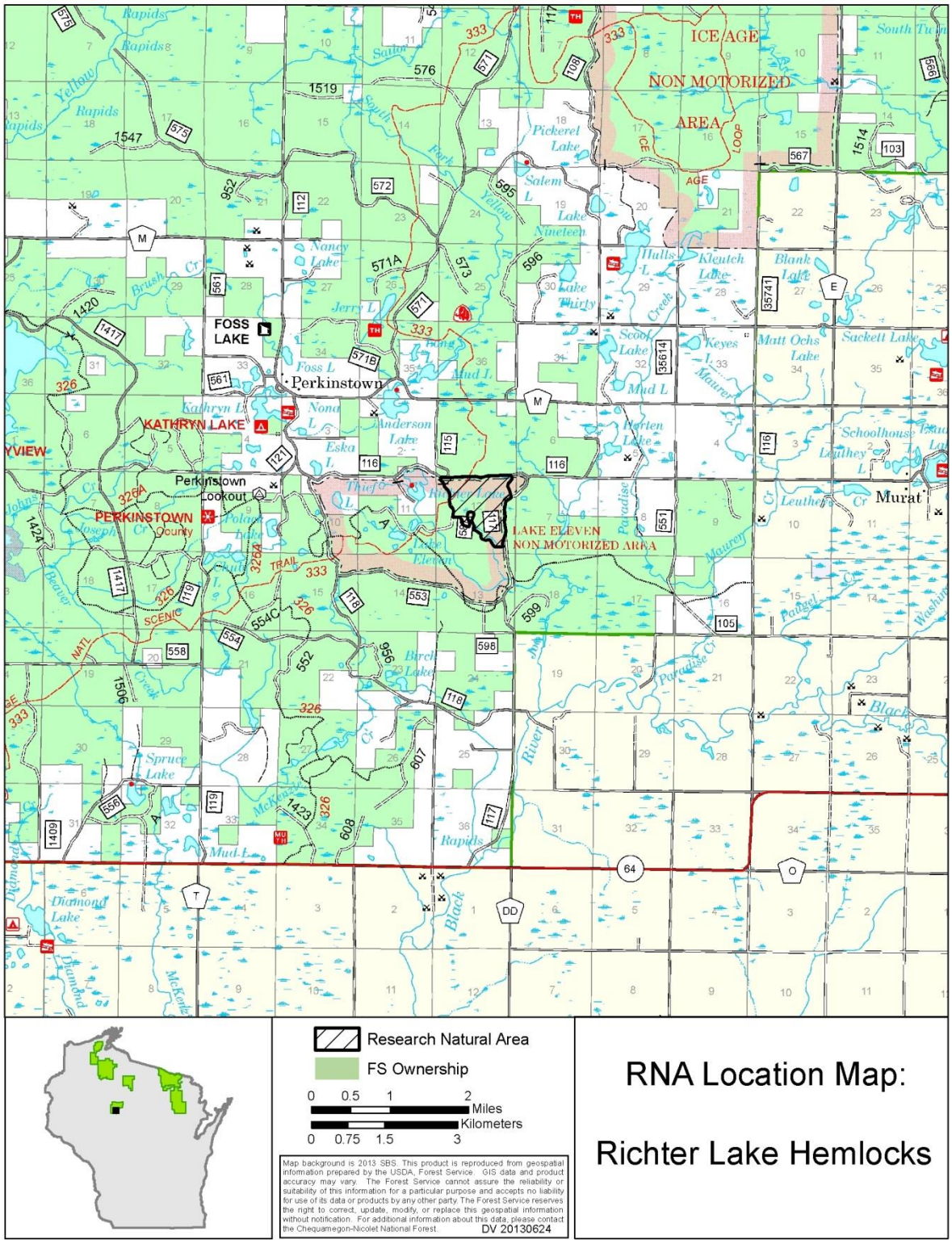
Cover photo: Wet-Mesic hardwood forest ground cover typical within Richter Lake Hemlocks RNA (Photo: Steven White, 2010)

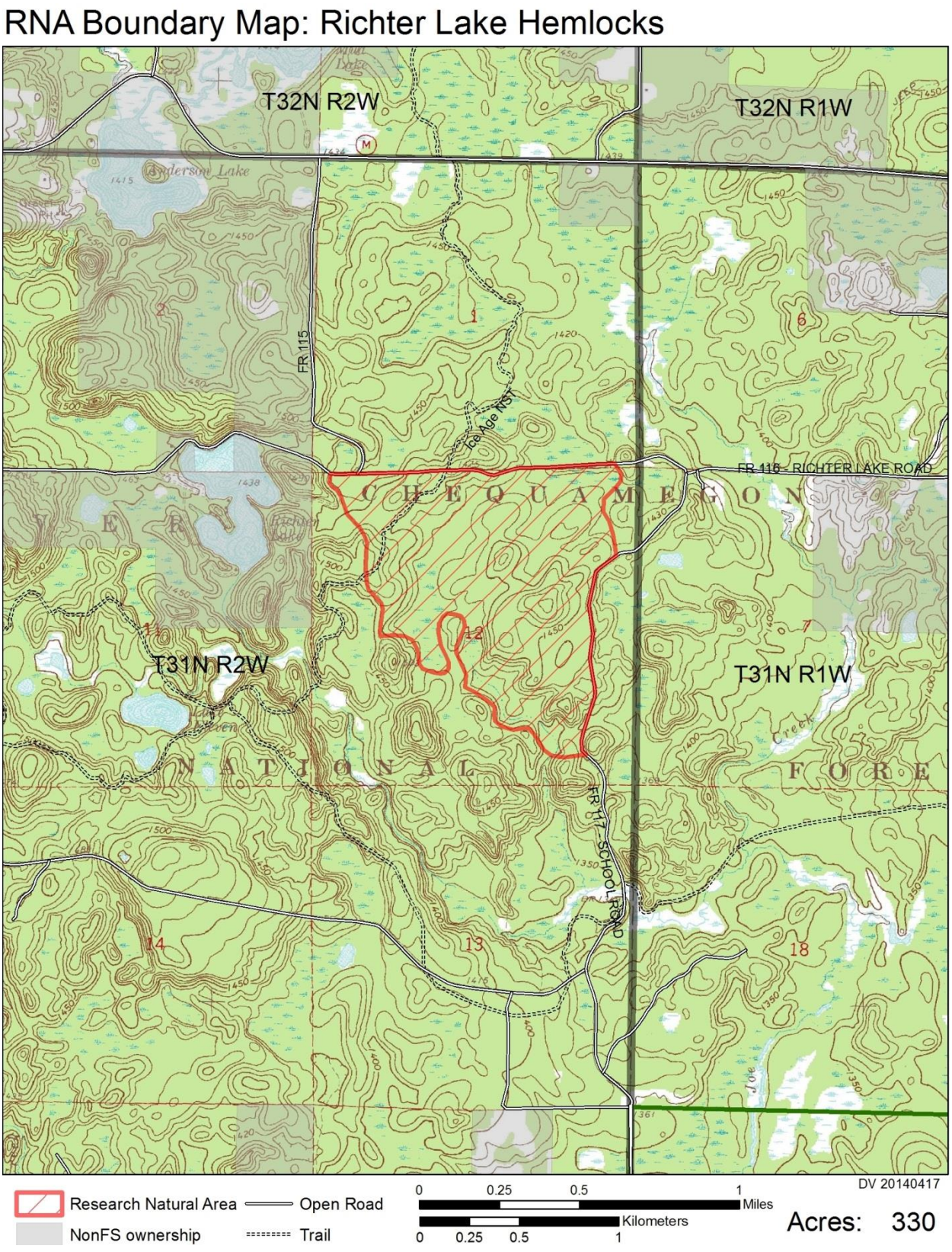
CONTENTS

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





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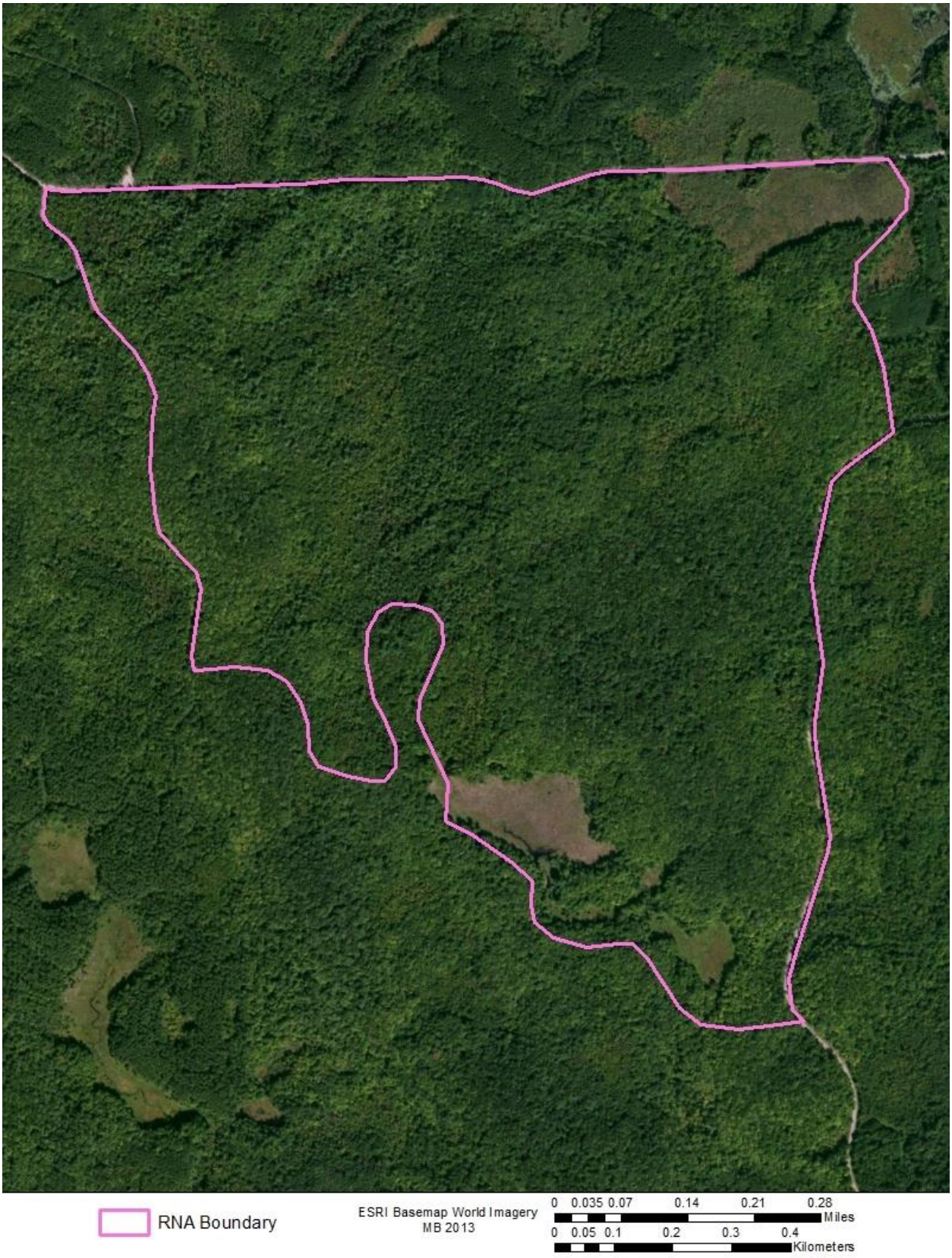
LANDSCAPE OVERVIEW RICHTER LAKE HEMLOCKS RNA



LEGAL DESCRIPTION

Richter Lake Hemlocks RNA is Located on the Park Falls-Medford District of the Chequamegon-Nicolet National Forest in Taylor County, State of Wisconsin; T 31 N R 02 W Sections 1 and 12. The boundary is delineated as follows:

Commencing at the Northeast Corner of Section 12, thence west along the north line of Section 12, 371.4 feet to the **Point of Beginning**.

Thence southeasterly the following courses:

Direction	Distance feet
S 32 E	126.3
S 3 W	112.7
S 39 W	144.2
S 44 W	266.8
S 3 W	202.9
S 30 E	189.3
S 18 E	224.4
S 9 E	262.0
S 9 E	95.5

to the west ROW of Forest Road 117,

Thence southwesterly along the West ROW of FR 117, 3530.7 feet,

Thence Northwesterly the following courses:

Direction	Distance feet	Direction	Distance feet
S 83 W	147.8	N 74 W	99.8
S 83 W	215.7	N 85 W	124.4
N 83 W	215.8	S 57 W	93.7
N 53 W	148.6	S 29 W	128.6
N 33 W	342.1	S 2 W	157.7
N 49 W	103.8	S 11 E	206.5
N 86 W	79.0	S 28 E	146.1
S 83 W	176.1	S 22 E	151.6
N 75 W	192.6	S 0 W	112.6
N 50 W	139.8	S 36 W	96.9
N 11 W	91.6	S 86 W	84.6
N 2 E	140.9	N 77 W	127.0
N 48 W	159.5	N 71 W	172.7
N 55 W	267.1	N 34 W	101.4
N 63 W	163.7	N 2 W	146.5
N 5 E	209.0	N 18 W	130.0
N 25 W	385.4	N 34 W	142.2
N 3 E	112.7	N 60 W	123.7
N 22 E	340.8	N 85 W	186.5
N 3 W	107.2	S 85 W	118.7
N 36 W	96.9	S 85 W	102.5

to East ROW of Forest Road 597,

Thence Northwesterly along the east ROW of FR 597, approximately 2981 feet to the South ROW of FR 116,

Thence Southeasterly along the South ROW of FR 116, 4728.5 feet,

Thence S 31º E approximately 71 feet to the Point of Beginning.

The boundary describes approximately 330 acres (134 ha).

_/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 Richter Lake Hemlocks 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 2004c).

The Station Director of the Northern Research Station (NRS) in consultation with the Chequamegon-Nicolet Forest (CNNF) Supervisor, Medford-Park Falls 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

Richter Lake Hemlocks Research Natural Area (RNA) is a mosaic of natural plant communities: northern mesic forest, northern wet-mesic forest, northern hardwood swamp, and a collapsed ice-walled lake plain glacial geologic feature (Hoffman 1999). It contains a microcosm of many of the predominant natural features associated with the Perkinstown End Moraine glacial deposit. The complex topography within this RNA (Identification Section-*Boundary Map*) permits rapid changes in tree cover over short distances promoting a heterogeneous forest of many types including old-growth pockets of eastern hemlock (*Tsuga canadensis*). Two rare plants; little goblin moonwort (*Botrychium mormo)* and autumn coralroot (*Corallorhiza odontorhiza*) occur here.

The 330-acre (135 hectares) Richter Lake Hemlocks RNA is located approximately 20 miles (32 km) northwest of Medford, Wisconsin on the Medford-Park Falls Ranger District of the Chequamegon-Nicolet National Forest (CNNF). The site is located entirely on National Forest Service land.

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 and future pertaining to the RNA.

The land was surveyed in the mid-1800s. Of interest are the General Land Survey notes for T31N R2W from Alexander S. Martin in 1857: "*This township contains numerous small tamarack and cedar swamps. Timber is heavy all over the township. Chiefly hemlock, birch, sugar, maple, and pine. There is a windfall made last spring in the northern part of the township*" (BCPL 2004).

Northern Wisconsin was extensively logged in the late 1800s, essentially clear cutting much of the northern third of the state. Catastrophic wildfires burned the logging slash across the region. However, the land containing the RNA may have escaped this widespread clearing. Vegetation maps from 1938 indicate that the area was moderately stocked hardwood forest with average tree diameters between 12 and 18 inches (30-45 cm) DBH (UWDC 2011). The land became National Forest in the 1930s and timber harvests within the site since then consisted of selection cutting of hardwoods in the late 1970s and early 1980s (CNNF data).

In 1993, Plant Ecologist Steven Spickerman located the state-endangered little goblin moonwort (*Botrychium mormo*) as part of a rare plant search prior to a proposed timber project. The high quality hardwood stand containing the goblin fern was then deferred from any management. In 1994, an inventory of the site by botanist Douglas Fields to identify representative natural areas located the special concern plant, autumn coralroot (*Corallorhiza odontorhiza*). Ecologist John Krause surveyed the project area in 1997 to inventory the site's flora and fauna as part of the CNNF natural area inventory.

Uses - The site is within a larger semi-primitive, non-motorized area and receives only foot traffic by hikers and hunters. The Ice Age National Scenic Hiking Trail traverses the northwest corner of the RNA (see Identification Section - *Location Map*).

Ownership & Administration - Richter Lake Hemlocks 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, or designate. The Medford-Park Falls Ranger District, CNNF, provides day-to-day protection and maintenance of the area.

Congressionally Designated Areas - Richter Lake Hemlocks RNA does not occur within any other federal 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

Figure 1. Old-growth eastern hemlock and hardwood forest types occur on hills and are surrounded by lowland swamps. (Photo: S. Spickerman 2004)

Of ecological significance within this RNA are pockets of old-growth within a matrix of conifer-hardwood and black ash (*Fraxinus nigra*) swamps (Hoffman 1999; Krause 1997). Eastern hemlock dominates these "islands" and complex topography permits rapid changes in tree cover over short distances creating a heterogeneous forest of many types. Also included within the site is a partially collapsed ice-walled lake plain glacial feature, where the nutrient-rich soil supports deciduous forest. Forested examples of these ice-walled lake plains are rare in Wisconsin. Two rare plants, autumn coralroot and the state-endangered little goblin moonwort are present here. A small, perennial fern, the little goblin moonwort is found only within the Upper Great Lakes Region. Other notable plants are the silvery glade fern (*Deparia acrostichoides*) and American witch-hazel (*Hamamelis virginiana*) – both unusual species for this region of Wisconsin.

Micro-topographies within this landform include a well-developed erosion channel with an intermittent stream channel, which drains a 'perched' mixed hardwood swamp dominated by black

ash (Krause 1997). Altogether this relatively small site contains a microcosm of many of the predominant natural features associated with the Perkinstown End Moraine.

(2) PRINCIPAL DISTINGUISHING FEATURES

This complex of natural features includes a large tract of debris flow glacial till with colluvium drainages and potholes between uplands which support good quality stands of eastern hemlock dominated forest (Krause 1997). Yellow birch (*Betula alleghaniensis*) and red maple (*Acer rubrum*) are common canopy associates with super-canopy white pine (*Pinus strobus*) and occasionally red pine (*Pinus resinosa*) common throughout. Most upland forest types occur as low "islands" within a matrix of mixed conifer-hardwood swamp drained by black ash-dominated drainages. Also included to the southeast is a partially collapsed ice-walled lake plain glacial feature, which supports a pole-sized stand of second growth rich, mesic hardwood forest dominated by sugar maple, basswood, and white ash.

Two rare plant populations occur on upland stands; the state-endangered little goblin moonwort and autumn coralroot. This site is embedded within an area recognized by the Wisconsin Bird Conservation Initiative as the *Perkinstown Important Bird Area* which by definition 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.

(3) OBJECTIVES

Richter Lake Hemlocks RNA was recommended for RNA designation in the 2004 Chequamegon and Nicolet National Forest 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 (MA8E) and Special Management Areas (MA8F), as well as Old Growth and Natural Features Complexes (MA8G) serve in the role of 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.

The Richter Lake Hemlocks RNA is one of thirty areas on the CNNF that will be managed to meet the research and educational objectives of the national RNA program. The specific objectives of this RNA are to preserve the special characteristics of the forest and wetland communities that typify the area. It will serve as a reference area for the study of succession as well as a control area for comparing results from manipulative research and resource management techniques executed elsewhere. It will maintain genetic diversity in a complex of lowland and upland habitats where researchers can measure ecological changes. Here succession will occur naturally following community-changing events such as wind throw, ice storms, and beaver flooding.

c. LAND MANAGEMENT PLANNING

The 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). Richter Lake Hemlocks 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 CNNF.

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 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 (Appendix 3 - *Forest Management Area Direction* and USDA Forest Service 2004a pg 3-50).

d. MANAGEMENT PRESCRIPTION

The management prescription for Richter Lake Hemlocks RNA is embodied in the management area direction and guidance presented in the 2004 Forest Plan under Management Area 8E - Existing and Candidate Research Natural Areas (Appendix 2 and USDA Forest Service 2004a pg 3-50).

The CNNF has not developed an individual site management plan for this RNA. When developed, such a plan will provide more specific detail of any 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 mesic hardwood and wetland community types. Fire is allowed if needed for specific objectives however, fire has not been identified as a management need.

According to CNNF fire management records, 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 (40 ha). 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 Final 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

Richter Lake Hemlocks RNA is located on the Park Falls-Medford Ranger District of the Chequamegon-Nicolet National Forest, Taylor County, in the state of Wisconsin. The RNA's Mercator coordinates are 45º 11' N latitude and 90º 33' W longitude. See Establishment Record Identification Section for *Boundary Certification*, *Location Map* and *Boundary Map*.

(2) SIZE IN ACRES/HECTARES

The RNA is comprised of 330 acres (135 hectares).

(3) ELEVATION RANGE

Elevations range from 1,420 feet (433 m) to 1,475 feet (450 m) above sea level. These elevation changes within the RNA can be abrupt. As a comparison, the highest elevation in Wisconsin at nearby Timm's Hill in Price County is 1,951 feet (595 m) above sea level.

(4) ACCESS TO THE SITE

The RNA can be accessed from Medford in Taylor County, Wisconsin. Go 4 miles (6.4 km) north on State Highway 13. Turn left (west) on County M, proceed 12 miles (19 km) and turn left (south) on FR 115 (Richter Rd) for 1 mile (1.6 km) to FR 116 (Perkinstown Avenue). The site lies south of this road.

(5) CLIMATIC DATA

The weather station nearest to the Richter Lake Hemlocks RNA is Medford 1 SW (station no. 475255, latitude 45° 7' N, longitude 90° 20' W). The station is about 12 mi (19 km) to the southeast of the RNA and experiences similar weather and climate. This station has recorded temperature and precipitation since 1896 (Midwestern Regional Climate Center 2003).

Table 1. Temperature and Precipitation data for Richter Lake Hemlocks RNA from 1896 to 2000

Temperature	°F	°C
Mean annual	41.2	5.1
Mean April through September	58.6	14.8
Mean October through March	23.9	-4.5
Average daily maximum	51.3	10.7
Average daily minimum	31.1	-1.0
Record high	104.0	40.0
Record low	-45.0	-42.0
Precipitation	**in**	**mm**
Mean annual rainfall	33.2	843.0
Mean monthly - April through September	3.8	96.5
Mean monthly - October through March	1.7	43.2
Mean annual snowfall	40.3	1023.0

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).

Richter Lake Hemlocks RNA is located in the Laurentian Mixed Forest Province, 212X Northern Highland Section, Subsection Xe Perkinstown End Moraine, of the Ecological Units of the Eastern United States (Cleland et al. 2007). It includes Land Type Association (LTA) Xe05 Perkinstown End Moraine.

(2) PLANT COMMUNITY TYPES

Richter Lake Hemlocks RNA contains a heterogeneous forest of several community types (Hoffman 1999). Primary features of this site include a mosaic of rich upland northern mesic forest (Curtis 1959) as well as northern wet-mesic forest, and northern hardwood swamp. Eastern hemlock dominates "islands" within larger hardwood stands and complex topography permits rapid changes in tree cover over short distances. This has allowed the CNNF to separate out the discrete small stands depicted in Figure 3. Rare plants include the state-endangered little goblin moonwort and

autumn coralroot. Also present are witch-hazel and silvery glade fern, both uncommon in this region of Wisconsin.

Eastern hemlock and sugar maple, with yellow birch and red maple as common canopy associates, dominate the northern mesic forest (Krause 1997). Super-canopy white pine and occasionally red pine are common throughout. Associated trees include basswood (*Tilia americana*), white ash (*Fraxinus americana*), paper birch (*Betula papyrifera*), bitternut hickory (*Carya cordiformis*), butternut (*Juglans cinerea*) and white pine. The mid-story includes balsam fir (*Abies balsamea*), eastern hop hornbeam (*Ostrya virginiana*) and red maple. The understory shrub layer is generally sparse but populated by a diversity of species including American hornbeam (*Carpinus caroliniana*), mountain maple (*Acer spicatum*), and witch-hazel. Dominant understory plants recorded on a rare plant reporting form in 2006 include sweet cicely (*Osmorhiza claytonii*), sarsaparilla (*Aralia nudicaulis*), sessileleaf bellwort (*Uvularia sessilifolia*), Virginia waterleaf (*Hydrophyllum virginianum*), tree groundpine (*Lycopodium dendroideum*), and rattlesnake fern (*Botrychium virginianum*).

Figure 2. Old growth characteristics such as large down logs are important to the ecosystem. The photo shows eastern hemlock regenerating well in canopy gaps created by the death of large trees. (Photo: Linda Parker 2010)

Within the site is a partially collapsed ice-walled lake plain glacial feature, which supports a second-growth northern mesic forest dominated by sugar maple, basswood, and white ash. Trees range in

diameter from 6 to 14 inches DBH (15 to 35 cm). Ground flora includes sedges (*Carex* spp), wood ferns (*Dryopteris* spp), rattlesnake fern (*Botrychium virginianum*), and maidenhair fern (*Adiantum pedatum*).

Micro-topography within this landform includes an intermittent stream channel, which drains a northern hardwood swamp dominated by black ash with basswood, American elm (*Ulmus americana*), and red maple. American elm persists as small diameter trees up to 10" dbh (25 cm) despite past waves of infestation and tree death caused by Dutch elm disease.

Northern white cedar (*Thuja occidentalis*), black spruce, and black ash are common within the northern wet-mesic forest. Shrubs include mountain holly (*Ilex mucronata*), American fly honeysuckle (*Lonicera canadensis*), and white meadowsweet (*Spiraea alba*).

Table 2. Natural vegetation community types within Richter Lake Hemlocks RNA using common classification systems for Wisconsin (Curtis 1959 and Kotar et al. 2002) and NGDC (2012)

Community Type (Curtis 1959)	**Habitat types** (Kotar et al. 2002**)**	**Dominant Species**	**NVCS Associations** (NGDC 2012)*
Northern mesic forest	AH	Sugar maple, basswood, white ash, bitternut hickory, butternut	Acer saccharum - Fraxinus americana - Tilia americana / Acer spicatum / Caulophyllum thalictroides Forest CEGL005008
Northern mesic forest	ATM	eastern hemlock, yellow birch, paper birch, white pine	Tsuga canadensis - Acer saccharum - Betula alleghaniensis Forest CEGL005044
Northern mesic forest	ATM	sugar maple, eastern hemlock	Tsuga canadensis - Acer saccharum - Betula alleghaniensis Forest CEGL005044
Northern mesic forest	AViO	sugar maple, basswood	Acer saccharum - Betula alleghaniensis - (Tilia americana) Forest CEGL002457
Northern wet-mesic forest	TMC	eastern hemlock, yellow birch, red maple, white pine	Tsuga canadensis - Betula alleghaniensis Saturated Forest CEGL005003
Northern wet forest	N.A.	tamarack, black spruce, black ash, red maple, yellow birch, hemlock, white pine	Fraxinus nigra - Mixed Hardwoods - Conifers / Cornus sericea / Carex spp. Forest CEGL002105
Northern sedge meadow	N.A.	Blue-joint grass, spotted joe-pye weed	Calamagrostis canadensis - Eupatorium maculatum Herbaceous Vegetation CEGL005174 or Carex stricta - Carex spp. Herbaceous Vegetation CEGL002258
Ephemeral Stream	N.A.	Not inventoried	N.A.

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

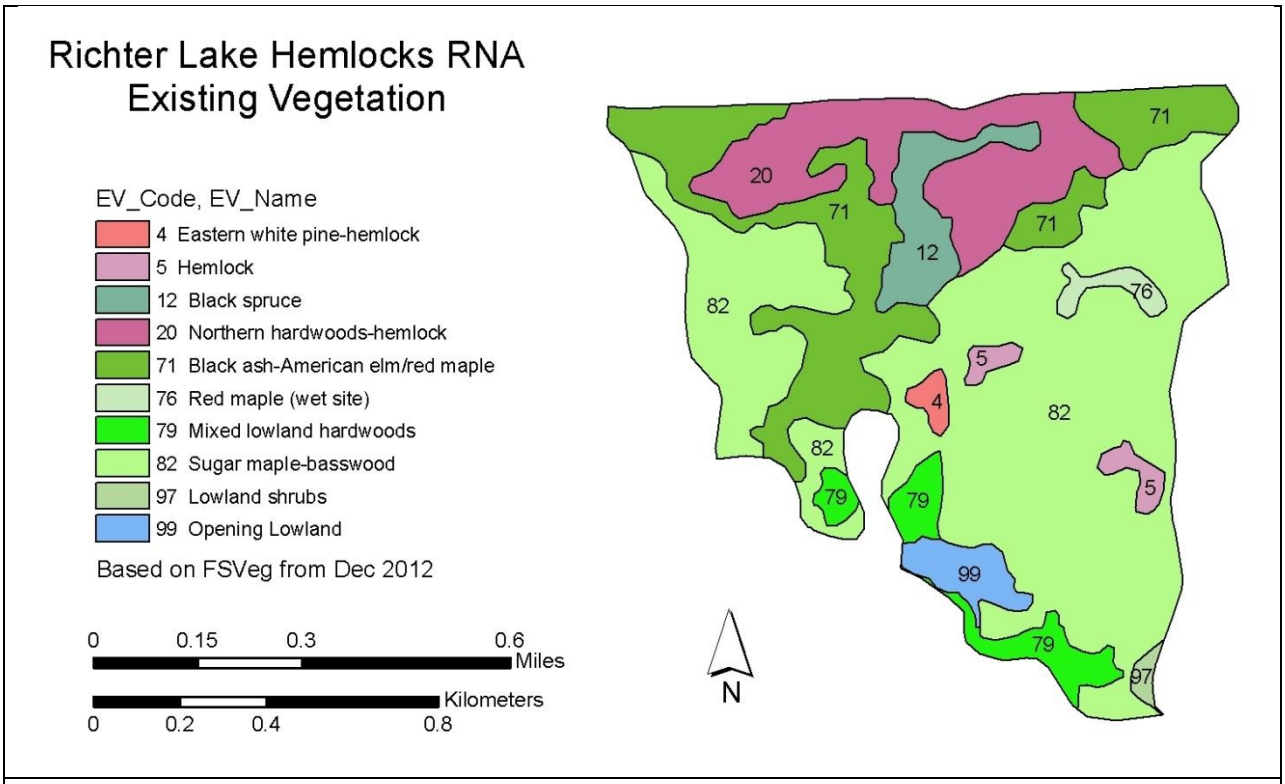


Figure 3. Existing Vegetation (formerly Forest Type) in Richter Lake Hemlocks RNA (CNNF data 2012)

Table 3. Existing Vegetation (as dominant tree cover) and area in Richter Lake Hemlocks RNA and key to Figure 3

EV Code	Existing Vegetation (EV)	Acres	Hectares
4	Eastern white pine-hemlock	2.2	0.9
5	Hemlock	4.7	1.9
12	Black spruce	14.1	5.7
20	Northern hardwoods-hemlock	45.2	18.3
71	Black ash-American elm/red maple	61.3	24.8
76	Red maple (wet site)	3.5	1.4
79	Mixed lowland hardwoods	14.5	5.8
82	Sugar maple-basswood	175.1	70.9
97	Lowland shrubs	1.4	0.6
99	Opening Lowland	7.6	3.1
Grand Total		329.6	133.5

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

(A) FLORA

There is currently no flora list for Richter Lake Hemlocks RNA. See the section B (2) above for discussion of some typical and uncommon plants found in the RNA. Designation will positively impact the habitat for the state-endangered little goblin moonwort and the special concern species autumn coralroot. Both these plants occur in northern mesic forest with a sugar maple and American basswood overstory (Figure 4).

Figure 4. Richter Lake Hemlocks RNA contains a matrix of upland and lowland forest types that provide high quality habitat to flora and fauna suited to this environment such as the white tailed deer (*Odocoileus virginianus*) in the photo above. Little goblin moonwort is found in the maple/basswood mesic forest depicted in the photo. (Photo: Linda Parker 2010)

(B) FAUNA

The RNA contains suitable red-shouldered hawk (*Buteo lineatus*) habitat and raptor nests have been found. A complete faunal survey is needed. The matrix of plant communities within Richter Lake Hemlocks RNA is likely to support a diversity of fauna. Mammals that occur in this part of Wisconsin include white tailed deer, black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), least weasel (*Mustela nivalis*), several rodents and snowshoe hare (*Lepus americanus*).

(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 (WGNHS 2011). A diagonal line through Taylor County marks the end of this last glacial advance. Where debris cover prevented melting of buried ice, areas of debris-covered ice became separated from the ice sheet as it wasted back. While permafrost persisted, ice-walled lakes melted through to the glacier bed. As permafrost ended, buried ice melted and hilly disintegration topography developed between ice-walled-lake plains (Attig 1993).

Bedrock of the Perkinstown End Moraine Land Type Association (LTA) includes igneous, metamorphic, and volcanic rock (WI DNR 2003). Bedrock is between 100 feet and 50 feet (30 - 15 m) of the land surface. Geomorphologic processes include till and lake deposition.

(D) SOILS

Soils of Richter Lake Hemlocks RNA are well to moderately well drained sandy loams and silt loams. Moisture regime is dry-mesic to mesic to wet-mesic. Nutrient status is medium to rich (USDA Forest Service 2003a). Sandy loam, loam, and fine sandy loam occur on 5-30% slopes. These are steep rolling soils over a loamy sand glacial till and outwash complex. These soils formed within glacial till areas but show evidence of outwash influence and occupy the backslope positions of well drained loamy pitted outwash hills.

On the shoulders and backslope of end moraine hills are steep, hummocky soils that are moderately well-drained. Surface textures are sandy loam, fine sandy loam, loam, and occasionally silt loam on top of ice-walled lake plain features. These soils are generally found on 10-30% slopes.

Sandy loam and loam over cobbly sandy loam glacial till can be found on the footslope and shoulder positions of end moraine hummocks. These rolling soils are on slopes of 5-15% with gravel and cobbles, a common occurrence in the substrata as well as the soil surface.

(E) TOPOGRAPHY

The landform is glacial end moraine that includes pothole depressions, lacustrine deposits, and a partially collapsed ice-walled lake plain (Krause 1997). An ice-walled lake plain glacial feature was formed as the glacier retreated. A wall of stagnant ice trapped the outwash sediments, creating a plateau of debris that was later covered with fine loess deposits. The soils that developed are rich in nutrients and support a diverse plant community. The terrain is mostly rolling to steep topography. Micro-topographies include a well-developed erosion channel with an intermittent stream channel which drains a *perched* mixed hardwood swamp dominated by black ash.

(F) AQUATIC/RIPARIAN

The wetlands provide habitat for plants and animals that thrive in more isolated pockets such as woodland frogs. For its relatively small size, the RNA contains numerous perennial and ephemeral woodland ponds (Figure 5). The forested areas occur as low islands within a matrix of mixed conifer-hardwood swamp drained by black ash-dominated drainages. An ephemeral stream drains a marshy wetland on the southern edge.

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

Table 4. Threatened, endangered, and unique species in Richter Lake Hemlocks RNA, State status and Natural Heritage rank

Common Name	Scientific Name	State Status, Heritage Rank[1]
flora		
Butternut	*Juglans cinerea*	special concern due to disease
Little goblin moonwort	*Botrychium mormo*	END, S3
Autumn coralroot	*Corallorhiza odontorhiza*	SC, S3S4
fauna		
Red-shouldered hawk (nest)	*Buteo lineatus*	THR, S3S4B,SN1

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

The last date of observation of the little goblin moonwort was when it was first discovered in 1994. No plants were seen during subsequent monitoring in 2006 although this fern ally can persist under the leaf litter for years. Richter Lake Hemlocks RNA is within a known red-shouldered hawk territory and nests have been documented within the RNA boundary.

(H) LIST OF RARE ELEMENTS AND RARE PLANT COMMUNITIES

There are no plant communities listed as rare within the RNA. It does include a unique glacial deposition feature known as an *ice-walled lake plain*. Most of these fertile plateaus in the state have been cleared and cultivated making forested representatives rare. Unlike other portions of the CNNF, eastern hemlock trees are regenerating well in this area despite high white tailed deer populations.

c. RESOURCE INFORMATION

This section discusses resources that occur in the RNA framed within the context of potentially conflicting uses - where future conflicts may arise. Richter Lake Hemlocks RNA is owned outright by the United States government and is administered by the USDA Forest Service, CNNF.

(1) MINERALS

The entire mineral estate of 330 acres (135 ha) within Richer Lake Hemlocks is federally owned. Federal minerals are administered by the Bureau of Land Management and are open to hardrock prospecting within the Research Natural Area. There is some potential for hardrock prospecting activity within the RNA based on geology and recent hardrock prospecting permit activity in Taylor County. 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 assign relative probability of

prospecting activity 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 within Richter Lake Hemlocks RNA.

(2) GRAZING

There is no grazing on the Chequamegon-Nicolet National Forest. The 2004 CNNF Forest Plan includes 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 320 (130 hectares). This includes upland types (70%) as well as lowland hardwood and conifer swamps (30%). According to the 2004 CNNF Forest Plan, eastern hemlock is reserved in all hardwood stands or is infrequently managed on the Medford land base due to regeneration concerns (USDA Forest Service 2004a pg 2-8). In other situations on the CNNF, eastern hemlock is only harvested to benefit or maintain habitat for species of viability concern (USDA Forest Service 2004a pg 2-13). Lowland forest types such as mixed swamp conifer and black ash-American elm/red maple are not typically harvested on the CNNF.

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.

Richter Lake Hemlocks RNA at the time of establishment is not designated as an Ojibwe 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

Richter Lake Hemlocks RNA is within the Black and Little Black River Watershed which drains eventually to the Mississippi River (WI DNR 2014). The RNA has numerous perennial and ephemeral woodland ponds (Figure 5) and ephemeral streams. RNA status will ensure a canopy over these fragile communities as the climate warms.

Figure 5. Small ephemeral ponds occur in the low areas in the undulating topography of Richter Lake Hemlocks RNA. These types of wetlands are important sources of water for wildlife and essential for survival of woodland frog species. They also attract woodland raptors such as broad-winged hawks and red-shouldered hawks. (Photo: Linda Parker 2010)

(5) RECREATION USE

Richter Lake Hemlocks RNA is used mainly by hunters and hikers. The Ice-Age National Scenic hiking trail traverses the northwest corner of the site (see Identification Section - *Location Map*). Birders may be drawn to the RNA. These activities are consistent with RNA management on the CNNF. The RNA is situated within a larger area designated in the 2004 CNNF Forest Plan as semi-primitive, non-motorized, minimizing potential conflict with motorized use.

(6) WILDLIFE

Richter Lake Hemlocks RNA is within a known red-shouldered hawk territory and nests have been documented within the RNA boundary. The RNA is within the *Perkinstown Important Bird Area* which by definition provides essential habitat to one or more species of breeding or non-breeding birds (Steele 2007). Fairly heavy deer browse was noted on shrubs and saplings during initial site survey (Krause 1997).

The CNNF is concerned about maintaining bat habitat. Seven species of bats occur on the CNNF and all (even cave-dwellers) rely at one time or another on a matrix of older forests and water such as Richter Lake Hemlocks RNA provides. Large trees in older forests with open understory are more often selected, and bats especially rely on deep tree cavities, loose bark, and lightning strike crevices for roosts. Because of the ephemeral nature of such structures, the successional changes within the RNA could provide these essential habitat characteristic over time.

Figure 6. A game trail through eastern hemlock forest. Note the lack of ground vegetation that is typical with a dense hemlock canopy. (Photo: Linda Parker 2010)

Wisconsin pro-actively listed four cave bat species in 2010 as *threatened* due to the invasive fungus that causes death from *white nose syndrome* and all of these occur on the CNNF. Three of these bats were listed as Regional Forester Sensitive species for the CNNF in 2011: Little Brown myotis (*Myotis lucifugus*); Northern long-eared myotis (*Myotis septentrionalis*); and tri-color (*Perimyotis subflavus*). Bat acoustic monitoring surveys have been conducted since 2009 along the northern and eastern boundaries of Richter Lake Hemlocks RNA. This data has not been analyzed to determine the species present as of 2014 (Heeringa 2014).

(7) TRANSPORTATION/ROAD SYSTEM

CNNF Standards and guidelines do not allow the use of motorized vehicles, bicycles, and horses within the RNA. Conflict is not anticipated because the RNA is within a larger non-motorized area. Any illegal motorized use and damage is the responsibility of the Medford-Park Falls district ranger. The current rule guiding motorized access is contained in the Travel Management Project Decision Notice via a Motorized Vehicle Use Map for 2014 (USDA Forest Service 2014). This map shows roads available for motorized use. No new roads or trails are planned. The narrow *Ice Age Trail* hiking trail segment that traverses the northwest corner will be maintained at its current location and no conflicts are expected.

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

The Natural Heritage Inventory Section of the Bureau of Endangered Resources of the Wisconsin DNR worked closely with Forest ecologists in evaluating this site (Krause 1997), making numerous field visits and assisting with ecological inventory and evaluation. They completed a *Site Evaluation* (Hoffman 1999) and recommended Richter Lake Hemlocks 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 CNNF Special Management Areas (SMAs) as State Natural Areas (WI DNR 2011). This designation does not restrict the goals of research and education for the site.

Richter Lake Hemlocks 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 USDA FS Northern Research Station to evaluate all candidate RNAs in the Eastern Region. Based on this analysis, the Eastern Regional Office recommended Richter Lake Hemlocks for establishment.

(2) CULTURAL/HERITAGE

There are no known cultural sites within Richter Lake Hemlocks RNA (USDA Forest Service 2003b).

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.

At the time of establishment Richter Lake Hemlocks RNA has not been adopted as an Ojibwe Tribal RNA which would require that tribal members follow the gathering regulation in the MOU. 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"

(3) DISTURBANCE HISTORY

This land likely escaped the widespread clearcutting in the late 1800s as vegetation maps from 1938 show large trees on the site (UWDC 2011). The CNNF did manage timber on the site with light selective cutting in the late 1970s. Some of the American elm that died was salvaged along FR 117 in the early 1980s. The presence of paper birch with eastern hemlock, white pine, and red pine suggest a past fire history. Fairly heavy deer browse was noted on shrubs and saplings during initial site survey (Krause 1997).

(4) OCCURRENCE OF EXOTIC SPECIES

No invasive plants were noted within the RNA (CNNF data 2012). 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. RNAs are high priority areas to monitor for invasive species. If found, invasive plants 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 or photo points in Richter Lake Hemlocks RNA.

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 a 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

More ecological information is needed on this RNA including a systematic flora and fauna survey. A study of bats is appropriate as well as reptiles and amphibians that require woodland ponds and wetlands. The ice-walled lake plain glacial feature is worth studying because most of these features elsewhere in the state have been cleared and farmed.

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. Researchers can take advantage of the Natural Areas Program in the state to find suitable areas for study (WI DNR 2011).

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

A specific management plan for Richter Lake Hemlocks has not been written. Such a document, when developed, will provide any needed specific guidance for the area within the 2004 CNNF Forest Plan standards and guidelines: "Natural ecological processes and natural disturbances shape the… 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".

(1) POTENTIAL OR EXISTING CONFLICTS; PRINCIPAL MANAGEMENT ISSUES

Principle management issues include compatibility of timber management on lands surrounding the RNA, recreation impacts, and continuing monitoring for invasive species such as hemlock wooly adelgid (*Adelges tsugae)* and emerald ash borer (*Agrilus planipennis*). There are no outstanding timber rights on any of the tracts in the RNA, nor are there any special use permits outstanding.

The RNA is within a non-motorized area with full vegetation management outside the boundaries. The lands surrounding Richter Lake Hemlocks RNA are in Management Area (MA) 2A - *Uneven-aged Northern Hardwoods* in the 2004 CNNF Forest Plan. MA 2A will be managed for a relatively continuous mid to late-successional uneven age forest of northern hardwoods with patch sizes in the thousands of acres. Edge habitat is uncommon and temporary patches are small [under 40 acres (16 ha)]. Timber harvest adjacent to the RNA boundary could employ selection cutting to form a transition zone and be compatible with RNA objectives.

Illegal all-terrain vehicles use has occurred on this district nearby and needs to be monitored to protect the integrity of the RNA.

Hemlock wooly adelgid a non-native genotype from southern Japan has not yet infested hemlocks in Wisconsin as of 2010 (WI DNR 2013b) but is an imminent management concern. Hemlock woolly adelgid is classified a "prohibited species" in Wisconsin under Chapter NR40 and as such must be controlled by the landowner if/when it is encountered (WI DNR 2010). Emerald ash borer will affect the RNA since it has substantial populations of both black ash and white ash. The science of forest pest management is rapidly changing. Information on the current management recommendations for minimizing effects of insect as well as pathogen pests can be obtained from the CNNF Silviculturist. Monitoring for these and other non-native invasive species will be part of scheduled RNA check-ups.

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

The Richter Lake Hemlocks RNA is does not include any lands designated by congress in any special management category.

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.

APPENDIX 2 BIBLIOGRAPHY

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

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APPENDIX 3 FOREST MANAGEMENT AREA DIRECTION

The management prescription for the Richter Lake Hemlocks 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/org/land/er/wlist/06_2011_Working_List.pdf Last Revised: May 31, 2012

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