

10-0-2

DESIGNATION ORDER

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

Brush Creek

RESEARCH NATURAL AREA

Designation Order

By virtue of the authority vested in me by the Secretary of Agriculture in accordance with 7 CFR 2.42, 36 CFR 251.23, and 36 CFR Part 219, I hereby establish the Brush Creek Research Natural Area. It shall be comprised of 272 acres (110 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

3/11/14

Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Brush Creek 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: 11/21/2013
Marjory E. Brzeskiewicz, Botanist, Chequamegon-Nicolet National Forest

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

Recommended by: Robert Hennes Date: 1/8/14
Robert Hennes, District Ranger, Medford-Park Falls District

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

Concurrence of: Michael T. Rains Date: 2/6/14
Michael T. Rains, Station Director, Northern Research Station



TITLE PAGE

United States
Department of
Agriculture

Forest
Service

August 2013



Establishment Record for **Brush Creek** Research Natural Area

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



Cover photo: An old growth eastern hemlock/hardwood stand on hilly terrain in Brush Creek Research Natural Area. Photo by Linda Parker, 2010.

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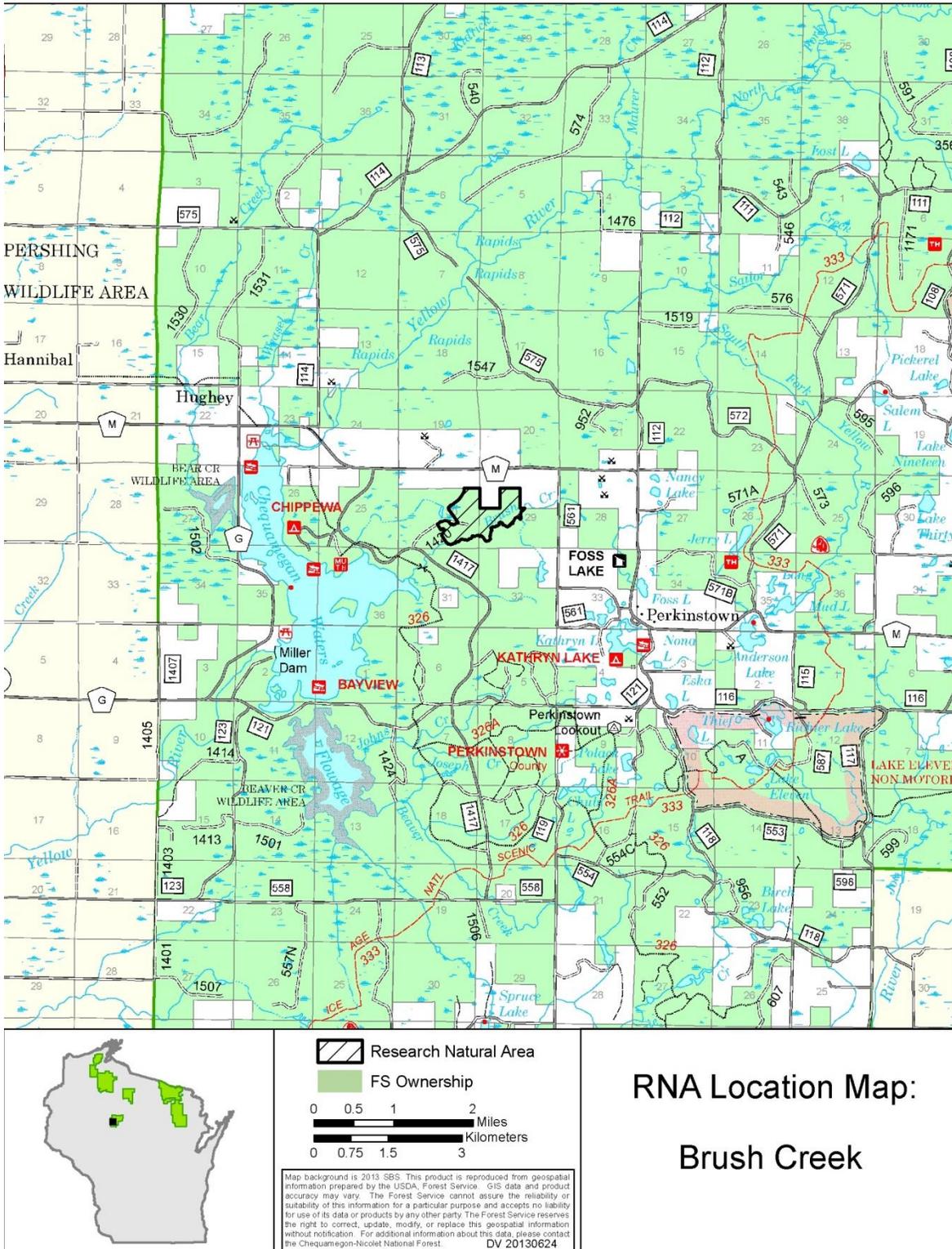
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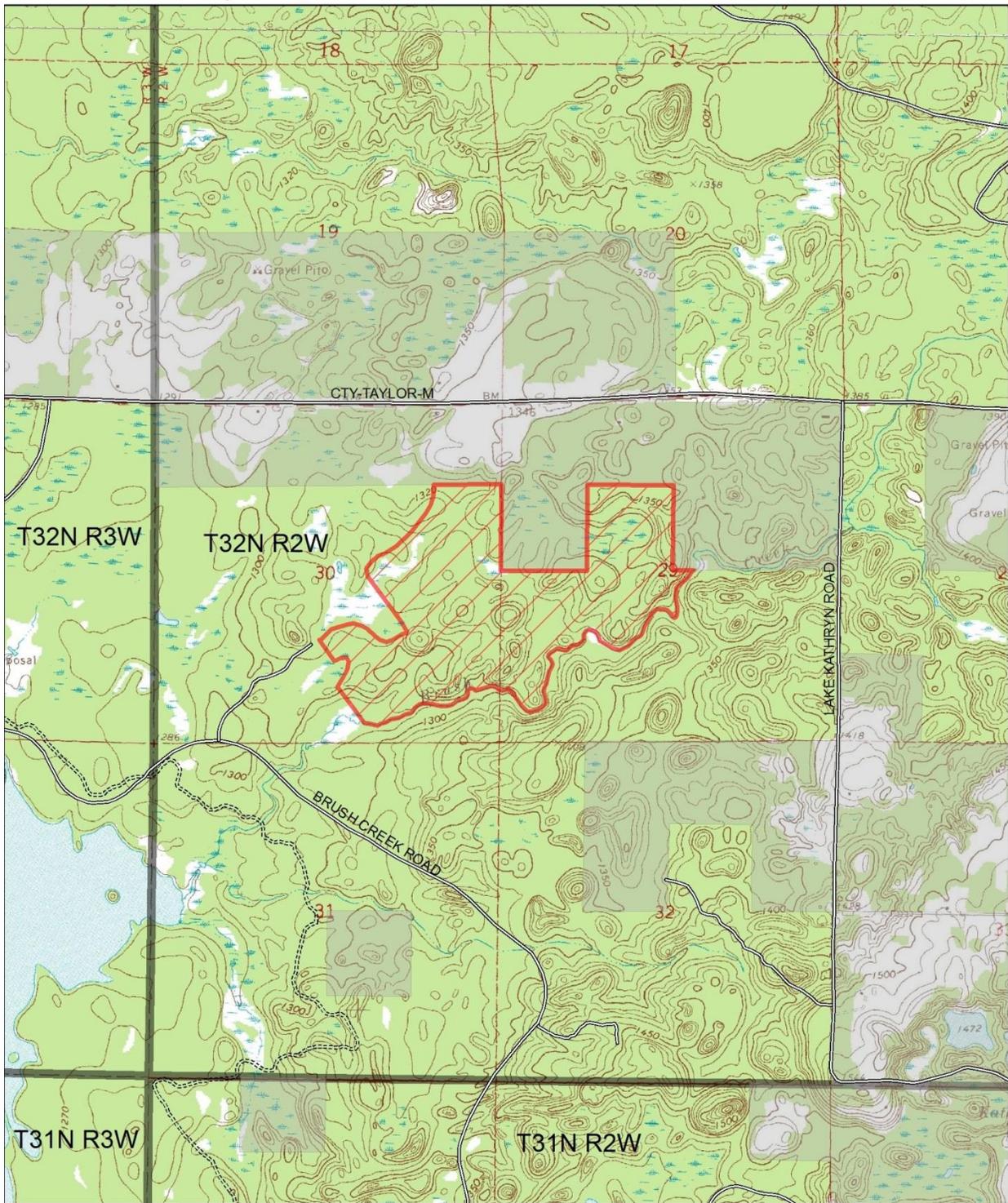
1. IDENTIFICATION SECTION

LOCATION MAP



BOUNDARY MAP

RNA Boundary Map: Brush Creek

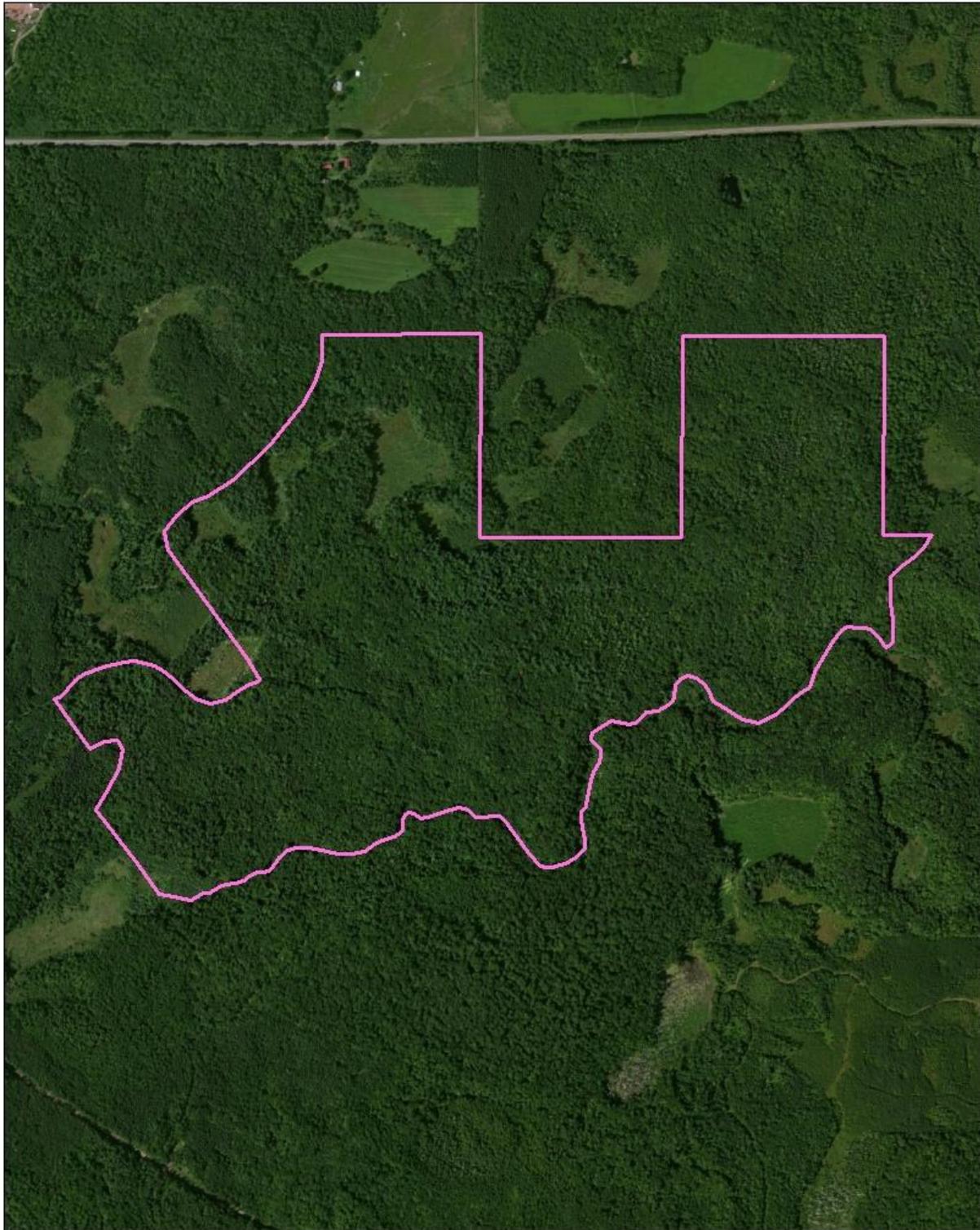


 Research Natural Area  Open Road
 NonFS ownership  Trail

0 0.25 0.5 1 Miles
0 0.25 0.5 1 Kilometers

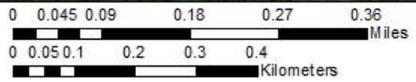
DV 20140417
Acres: 272

LANDSCAPE OVERVIEW BRUSH CREEK RNA



 RNA Boundary

ESRI Basemap World Imagery
MB 2013



LEGAL DESCRIPTION

Brush Creek Research Natural Area is Located on the Medford-Park Falls District of the Chequamegon-Nicolet National Forest in Taylor County, Wisconsin, Sections 29 and 30, Township 32 North, Range 2 West. The boundary is delineated as follows:

Beginning at the West ¼ corner of Section 29,

Thence east along the East -West ¼ line of Section 29, approximately 1320 feet to the Center West 1/16 corner of Section 29,

Thence north along the West 1/16 line of Section line of Section 29, approximately 1320 feet to the Northwest 1/16 corner of Section 29,

Thence east along the North 1/16 line of Section 29, approximately 1320 feet to the Center North 1/16 corner of Section 29,

Thence south along the North - South ¼ line of Section 29, approximately 1320 feet to the Center ¼ corner of Section 29,

Thence East along the East-West ¼ line of Section 29, approximately 320 feet to the center line of Brush Creek,

Thence southeasterly following the center line of Brush Creek, 7644.0 feet,

Thence Northwesterly the following courses:

Direction	Distance (feet)
N 36 W	243.7
N 37 W	450.5
N 32 E	139.5
N 28 E	170.0
N 12 E	131.1
N 29 W	67.0
S 87 W	91.1
S 65 W	112.5
N 35 W	399.5

to the south ROW of Forest Road #1420,

Thence Northeasterly along the South ROW of FR #1420, 1475.0 feet,

Thence Northerly the following courses:

Distance	Direction (feet)
N 13 E	19.9
N 31 W	168.0
N 36 W	880.7
N 10 W	124.9
N 38 E	129.6
N 48 E	136.4

2. ADMINISTRATIVE SECTION

This Establishment Record has been prepared pursuant to Forest Service Manual direction (FSM 4063). Establishment of the Brush Creek RNA is documented with a signature page to follow and a Designation Order which is a separate document accompanying this document (FSM 4063.41.2) (USDA Forest Service 2004c).

The Station Director of the Northern Research Station (NRS) in consultation with the Chequamegon-Nicolet Forest (CENN) 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
Rhineland, WI 54501

3. BODY OF ESTABLISHMENT RECORD

a. INTRODUCTION

The 272-acre (110 hectares) Brush Creek Research Natural Area (RNA) is located on the Chequamegon-Nicolet National Forest (CNNF), Taylor County on the Medford-Park Falls Ranger District. The RNA is located entirely on national forest system land and is approximately 3 miles (5 km) northwest of Perkinstown, Wisconsin (see Identification Section-*Location and Boundary Maps*). The site receives only light recreational use including hiking, wildlife watching, and hunting.

Brush Creek RNA features northern mesic forest comprised of second-growth eastern hemlock (*Tsuga canadensis*) and hardwoods with a white pine (*Pinus strobus*) super-canopy component. A forested segment of Brush Creek, a headwater stream of the Yellow River, runs through the site. Two rare forest interior birds (Table 5) have been located in this area.

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. 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.

Of historic interest are the General Land Survey notes (BCPL 2004): For T32N R2W, "*This township contains numerous small tamarack and cedar swamps. There are some fen? (sic) marshes that are very good for hay. The soil is mostly second rate except on some of the birch and maple ridges it is first rate. Timber is chiefly hemlock, birch, maple, pine, tamarack and cedar.*"

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 and there has been no timber harvesting since. The older eastern hemlock trees within Brush Creek RNA are approximately one hundred years old.

Ownership & Administration - Brush Creek RNA is owned outright by the USDA Forest Service and is administered by Chequamegon-Nicolet National Forest, Park Falls-Medford Ranger District. The 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

The Brush Creek RNA plant communities include good quality eastern hemlock hardwood forests with an impressive white pine super-canopy located on terminal moraine topography (Krause and Fields 1997; see Geology Section) with significant old growth features. The year of origin of many

stands dates back to the 1930s and is mostly second-growth; but frequent snags, large diameter trees, den trees, and coarse woody debris contribute to a developing old-growth structure. Two rare bird species have been identified here (Table 5). It is co-designated as a Wisconsin State Natural Area and contributes toward the network's ecosystem representation goals. This site is embedded within an area recognized by the Wisconsin Bird Conservation Initiative as an *Important Bird Area* (IBA) 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 IBA carries no legal status or regulatory requirements.

(2) PRINCIPAL DISTINGUISHING FEATURES

Brush Creek RNA centers around a northern mesic forest of second-growth eastern hemlock-hardwood forest containing an exceptional super-canopy white pine component on rugged terminal moraine topography. Interspersed throughout the area are numerous forested stands of mixed conifer and hardwood swamps in kettle depressions and along riparian drainages (Krause and Fields 1997). Also included is a forested reach of Brush Creek, a headwater, morainal stream with rocky, cascading segments alternating with black ash bottomland forest. The site borders a large glacially formed *ice-walled lake plain* (see Geology Section) to the south, which is collapsed down into Brush Creek creating a steep sided ravine (Figure 4). A small, but well preserved ice-walled-lake plain also occurs within the site toward the eastern boundary. The habitat supports the rare red-shouldered hawk (*Buteo lineatus*) and northern goshawk (*Accipiter gentilis*).

(3) OBJECTIVES

Brush Creek RNA will be managed to meet the education and research objectives of the national RNA program and contains representative plant communities for the Eastern Region's RNA Framework. It will preserve and maintain the biological diversity of natural landscapes, ecosystems, and species, and serve as baselines for comparison to manipulated ecosystems. It protects habitat for rare birds, plants, and plant communities of special concern. The plant communities are of sufficient quality to contain typical species and processes of the community type and will likely remain in good condition into the future. A site-specific plan will be developed, designed to protect natural processes that drive the structure and function of the ecosystem.

c. LAND MANAGEMENT PLANNING

Brush Creek RNA was recommended for RNA designation in the 2004 Chequamegon and Nicolet National Forest's Land and Resource Management Plan (hereinafter "2004 CNNF Forest Plan"; USDA Forest Service 2004a pg 3-50) and is incorporated by reference per the page citations that occur in this Establishment Record. The alternative effects on RNA establishment were analyzed and disclosed in the Final Environmental Impact Statement (USDA Forest Service 2004b pg 3-110) and Record of Decision (USDA Forest Service 2004c pg 9). Brush Creek RNA "is part of a national network of ecological areas designated in perpetuity for research and education, and to provide important components of biological diversity for the Forests". The RNAs and candidate RNAs on the Forest 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*; USDA Forest Service 2004a pg 3-50).

d. MANAGEMENT PRESCRIPTION

The management prescription for Brush Creek 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*). Natural processes will prevail.

The CNNF has not developed an individual site management plan for Brush Creek RNA. When developed, such a plan will provide more specific detail of management needs and ensure that the objectives for which the RNA was created are met. 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 conifer/hardwood forest community types. Fire is allowed if needed for specific objectives but 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. Wildfire suppression within the RNA would employ those methods that cause the least disturbance. Fire Management Guidelines in 2004 CNNF Forest Plan are listed in Appendix 3- *Forest Management Area Direction*.

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

F. APPENDICES

4. APPENDIX 1 ECOLOGICAL EVALUATION

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

a. PHYSICAL SITE DESCRIPTION AND CLIMATIC CONDITIONS

(1) LOCATION

Brush Creek RNA is located on the Medford-Park Falls Ranger District of the Chequamegon-Nicolet National Forest, Taylor County, in the state of Wisconsin. The RNA's Mercator coordinates are 45° 13' N latitude and 90° 39' 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 272 acres (110 hectares).

(3) ELEVATION RANGE

Elevations range from 1,300 feet (396 m) to 1,370 feet (418 m) above sea level. As a comparison, the highest elevation in Wisconsin at Timm's Hill in Price County about 25 miles (40 km) to the northeast is 1,951 feet (595 m) above sea level.

(4) ACCESS TO THE SITE

From Medford, WI drive 15 miles (24 km) west on State Highway 64. Turn right on Forest road 119 (Winter Sports Road) and head north 2.6 miles (4.2 km); turn left on FR 558 (Trucker Lane) for about 1 mile (1.6 km) then right on FR 1417 (Chippewa Road). Drive north approximately 5 miles (8 km) to the intersection of FR 1420. Go northeast about 0.5 miles (0.8 km) on FR 1420. Motorized access ends at an earthen berm where the RNA begins. See Establishment Record Identification Section for *Boundary Certification*, *Location Map* and *Boundary Map*.

(5) CLIMATIC DATA

The weather station nearest to Brush Creek RNA is Medford 1 SW (station no. 475255, latitude 45° 7' N, longitude 90° 20' W). The station is about 20 mi (32 km) to the southeast of the RNA and experiences the same climate conditions. This station recorded temperature and precipitation data since 1896 (Midwestern Regional Climate Center 2003).

Table 1. Temperature and Precipitation data for Brush Creek RNA from 1896 to 2000 (Midwestern Regional Climate Center 2003)

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	-42.8
Precipitation	in	cm
Mean annual rainfall	33.2	84.3
Mean April through September	3.8	9.6
Mean October through March	1.7	4.3
Mean annual snowfall	40.3	102.3

b. ECOLOGICAL DESCRIPTION

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

Brush Creek RNA is located in the Laurentian Mixed Forest Province (212), Northern Highlands Section (212X). The majority of the site is located in the Subsection Perkinstown End Moraines (212Xe), of the Ecological Units of the Eastern United States (Cleland et al. 2007). It includes Land Type Association (LTA) Perkinstown Moraines (Xe05). A very small portion of the site (northwestern corner) lies within the Subsection Central/Northwest Wisconsin Loess Plains (212Xd), and includes LTA Jump River Ground Moraine (Xd05).

(2) PLANT COMMUNITY TYPES

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).

Brush Creek features a good quality eastern hemlock-hardwood forest with impressive super-canopy white pine (*Pinus strobus*) on rugged, hummocky end moraine topography (Fields 1997). Interspersed throughout the area are numerous forests of mixed conifer and hardwood swamps in kettle depressions and along riparian drainages. To the east is a semi-open tamarack (*Larix laricina*) and black spruce (*Picea mariana*) bog containing a diverse mix of species including pitcher plant (*Sarracenia purpurea*), arrow-grass (*Scheuchzeria palustris*), royal fern (*Osmunda regalis*), and

moccasin flower (*Cypripedium acaule*). Other relatively rare species include dwarf scouring rush (*Equisetum scirpoides*) and lung lichen (*Lobaria pulmonaria*).

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

Community Type (Curtis 1959): Dominant Species	Habitat types (Kotar et al. 2002)	NVCA Associations (NGDC 2012)	Approx. size
Northern mesic forest: eastern hemlock sugar maple	ATM	CEGL002598 <i>Tsuga canadensis</i> - (<i>Betula alleghaniensis</i>) Forest	200 acres (80 ha)
Northern mesic forest: (sugar maple, basswood, hickory bitternut)	AH	CEGL005008 <i>Acer saccharum</i> - <i>Fraxinus americana</i> - <i>Tilia americana</i> / <i>Acer spicatum</i> / <i>Caulophyllum thalictroides</i>	40 acres (16 ha)
Northern wet-mesic forest - black ash	N/A	CEGL002105 <i>Fraxinus nigra</i> - Mixed Hardwoods - Conifers	7 acres (3 ha)
Northern wet forest - black spruce and tamarack	N/A	CEGL005271 <i>Picea mariana</i> - (<i>Larix laricina</i>) / <i>Ledum groenlandicum</i> / <i>Sphagnum</i>	13 acres (5 ha)
Northern sedge meadow	N/A	several possible*	20 acres (8 ha)
Alder thicket: speckled alder	N/A	CEGL002381 <i>Alnus incana</i> Swamp Shrubland	8 acres (3.2 ha)
Stream – fast, soft, warm	N/A	N/A	N/A
Ephemeral pond	N/A	N/A	small

* These National Vegetation Classification System (NVCS) communities are initial approximations.

Eastern hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), and sugar maple (*Acer saccharum*) are the canopy dominants with red maple (*Acer rubrum*), basswood (*Tilia americana*), and paper birch (*Betula papyrifera*) common. Other associates include red oak (*Quercus rubra*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), and bitternut hickory (*Carya cordiformis*). Tree sizes reach up to 24 inches (60 cm) in diameter for eastern hemlock and hardwoods and 32 inches (81 cm) for white pine.

Although the forest was cut in the late 1800s and regrown, there are remnant old growth elements including frequent snags, den trees, coarse woody debris, and small canopy gaps that contribute to a developing old-growth structure. One of the largest den trees is a very large yellow birch, about 36 inches (91 cm) in diameter, which may be one of the largest yellow birch on the District (Fields 1997). The understory is generally open, though yellow birch and sugar maple saplings are common and ironwood (*Carpinus virginiana*) and eastern hop-hornbeam (*Ostrya virginiana*) are frequent.

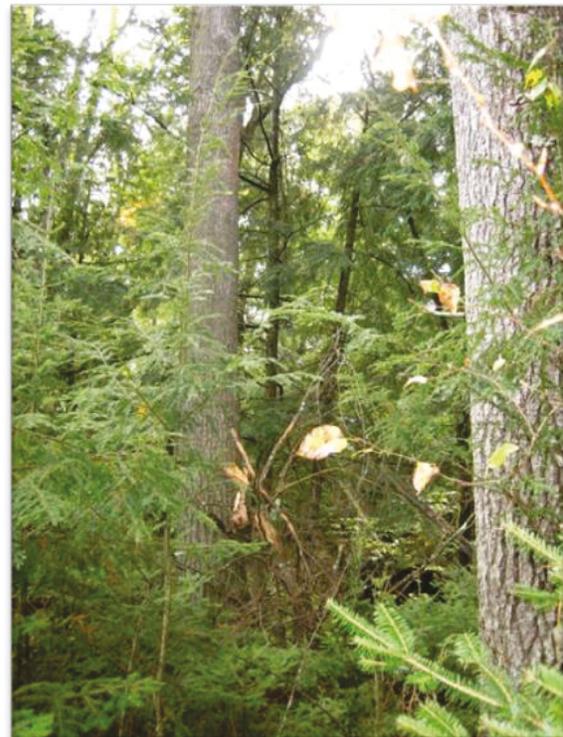


Figure 1. An older forest in Brush Creek RNA showing eastern hemlock regeneration in the understory. Photo by Doug Fields 1997

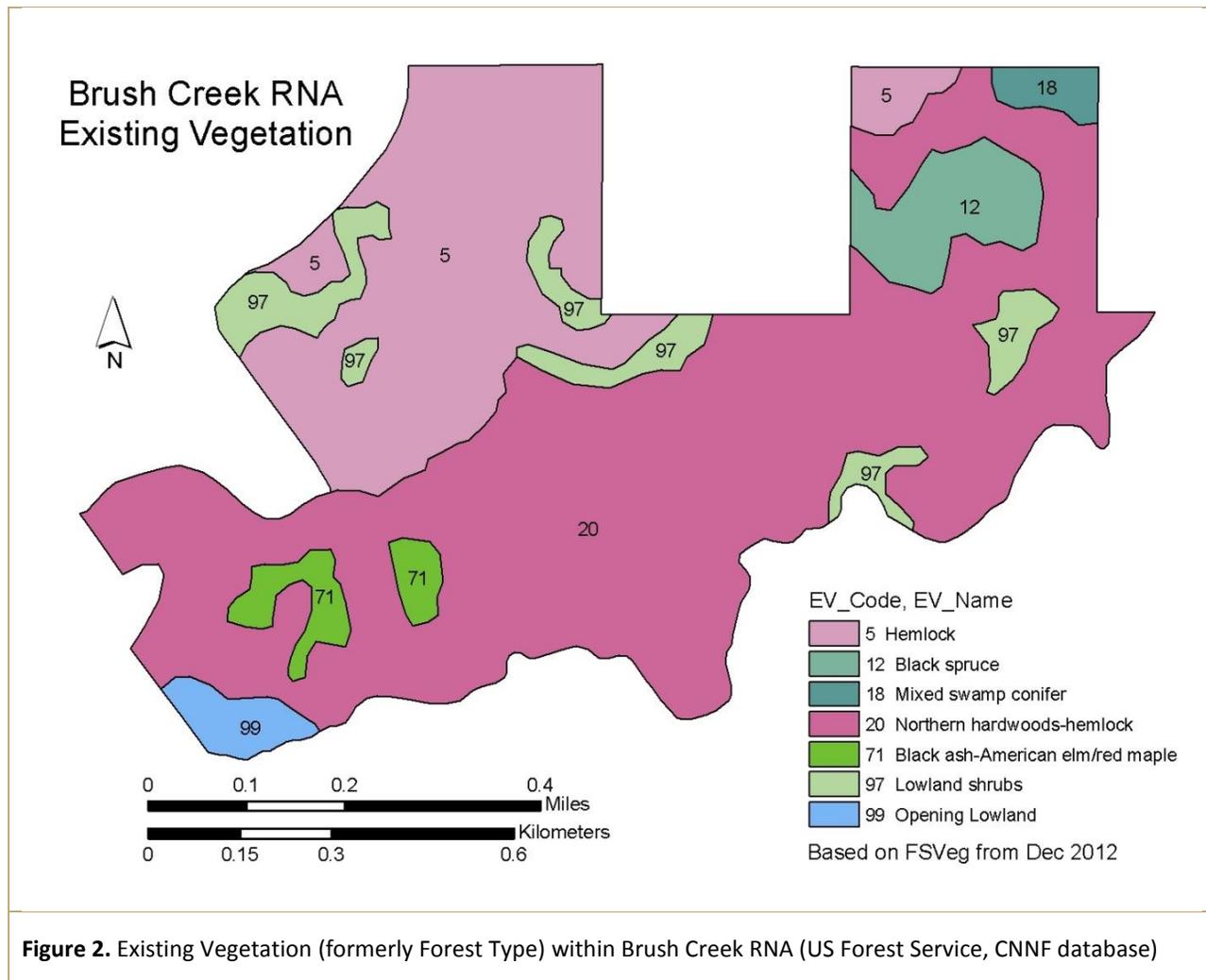


Figure 2. Existing Vegetation (formerly Forest Type) within Brush Creek RNA (US Forest Service, CNNF database)

Table 3. Existing Vegetation (EV) types in Brush Creek RNA and key to Figure 2 (acres based on GIS data)

EV Code	Existing Vegetation Type (based on tree cover)	Acres	Hectares
5	Eastern hemlock	67.1	27.1
12	Black spruce	11.9	4.8
18	Mixed swamp conifer	3.1	1.3
20	Northern hardwoods-eastern hemlock	160.7	65
71	Black ash-American elm/red maple	6.8	2.7
97	Lowland shrubs	17.6	7.1
99	Opening Lowland	4.7	1.9
Grand Total		271.9	109.9

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

(A) FLORA LIST

A thorough plant inventory was completed in Brush Creek RNA in 1997 by botanist Douglas Fields who also wrote the flora of Taylor County as part of his Masters thesis (Fields 2003. See Appendix 6 - *Flora List*).

(B) FAUNA LIST

Brush Creek RNA has not had a detailed faunal inventory. Surveys are needed within the RNA to determine the diversity of animal species. Some of the animals seen or heard during initial surveys in 1997 include: black bear (*Ursus americanus*), white tail deer (*Odocoileus virginianus*), red squirrel (*Tamiasciurus hudsonicus*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), migrant and resident and migratory birds (see table 5), green frog (*Rana clamitans*), and spring peeper (*Pseudacris crucifer*). Randy Hoffman of Wisconsin DNR completed a bird survey in 1997 (Table 4).

Brush creek drains into the large Chequamegon Waters impoundment and supports northern pike (*Esox lucius*) and unidentified minnow species.



Figure 3. Tracks of a small black bear in Brush Creek RNA. Photo by Linda Parker 2011

Table 4. Bird List for Brush Creek RNA (Hoffman 1997)

Brush Creek RNA Bird List	
Common Name	Scientific Name
Broad-winged hawk	<i>Buteo platypterus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Barred owl	<i>Strix varia</i>
Sandhill crane	<i>Grus canadensis</i>
Great blue heron	<i>Ardea herodias</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Eastern wood pewee	<i>Contopus virens</i>
Blue jay	<i>Cyanocitta cristata</i>
American crow	<i>Corvus brachyrhynchos</i>
Raven	<i>Corvus corax</i>
Black-capped chickadee	<i>Parus atricapillus</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>

Brush Creek RNA Bird List	
Common Name	Scientific Name
Brown creeper	<i>Certhia americana</i>
Winter wren	<i>Troglodytes troglodytes</i>
Hermit thrush	<i>Catharus guttatus</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Nashville warbler	<i>Vermivora ruficapilla</i>
Northern parula	<i>Parula americana</i>
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>
Black-throated green warbler	<i>Dendroica virens</i>
Blackburnian warbler	<i>Dendroica fusca</i>
Black and white warbler	<i>Mniotilta varia</i>
Canada warbler	<i>Wilsonia canadensis</i>
Scarlet tanager	<i>Piranga olivacea</i>
Purple finch	<i>Carpodacus purpureus</i>
American goldfinch	<i>Carduelis tristis</i>

(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).

Landform is terminal end moraine of the Chippewa Lobe (Krause and Fields 1997). The terrain tends to be hummocky, with steep slopes and wet kettle depressions common. Upland soils are generally well-drained sandy loam. Moisture regime ranges from mesic to wet and nutrient status from medium to medium-rich.

Drainage is either south to Brush Creek or north to an unnamed creek: both flow westerly to the Chequamegon Waters Flowage, an impoundment of the Yellow River. A small but well-preserved ice-walled lake plain occurs within the site toward the eastern boundary. On its south bank, Brush Creek has cut into the base of a larger ice-walled lake plain exposing *varved* (layered) sediments about 30 feet (9 m) below the plain's surface (Figure 4).

Bedrock includes igneous, metamorphic, and volcanic rock that is generally between 100 feet and 50 feet from the land surface. Geomorphologic processes include till and lake deposition (WGNHS 2011).



Figure 4. A view from the base of the *Ice-walled Lake Plain* glacial feature showing the steep sides where the ice wall held back glacial debris. Photo by Doug Fields 1996

(D) SOILS

Soils include deep peat and Iron River-Milaca-Pence association (US Soil Conservation Service 1966).

Peat soils occupy nearly level, broad peat basins. They are formed from sedges, grasses and woody peats more than 42 inches (107 cm) deep. These acidic soils often support scattered to dense

stands of black spruce with tamarack and cedar common on sites with internal water movement (US Soil Conservation Service 1966).

Soils of the Iron River-Milaca-Pence series occupy rolling to steep glacial uplands. They formed in shallow loamy deposits over sandy loam to loam glacial till or sandy, gravelly and cobbly outwash.

(E) TOPOGRAPHY

The site borders a large glacial ice-walled-lake plain to the south, which collapsed down into Brush Creek creating a steep sided ravine. A small but intact ice-walled-lake plain also occurs within the site and contains a very rich groundlayer. Also included is a forested reach of Brush Creek, a headwater, morainal stream with rocky, cascading segments alternating with black ash (*Fraxinus nigra*) bottomland forest.

(F) AQUATIC/RIPARIAN

Brush Creek is a warm water minnow stream originating as the intermittent outlet from wetlands in sections 21 and 28 (T32N-R2W) and flows westerly into Chequamegon Waters Reservoir which drains into the Yellow River. Principle fish species present are forage minnows and a few northern pike (*Esox lucius*). Waterfowl use is limited to a few puddle ducks during migration (Haanpaa et al. 1970). Total length is 5 miles with 4.2 surface acres (1.7 ha).

Interspersed throughout the site are small ephemeral woodland ponds that occur in some of the glacial depressions. Ephemeral ponds are necessary for woodland frogs to reproduce in the absence predator fish.

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

Canada yew (*Taxus canadensis*) is a forest management indicator species. Populations of yew dropped markedly in Wisconsin following catastrophic wildfires in the late nineteenth century followed by a large increase in the white-tailed deer population that browses this shrub. Two rare birds have been located within Brush Creek – the state-threatened red-shouldered hawk and northern goshawk. Both birds are forest interior specialists and require unfragmented forested habitat for nesting and are also sensitive to human disturbance.

Table 5. Threatened, endangered, and unique species in Brush Creek RNA

Common Name	Scientific Name	State Status, Heritage Rank ¹
Plants		
Canada yew	<i>Taxus canadensis</i>	SC, S4 (“watch” species)
Animals		
red-shouldered hawk	<i>Buteo lineatus</i>	THR, S3S4, S1N
northern goshawk	<i>Accipiter gentilis</i>	SC/M, S3S4B,S1N

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

(H) LIST OF RARE ELEMENTS AND RARE PLANT COMMUNITIES

None of the plant communities within Brush Creek RNA are particularly rare, but high quality and protected examples of northern mesic forest are unique on the CNNF.

Table 6. Communities within Brush Creek RNA, State status and Natural Heritage Inventory Rank

Community	Global Rank , State Rank ¹
Northern sedge meadow	G4, S3
Hardwood swamp	G4, S3
Northern wet-mesic forest	G3?, S3S4

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

This site is embedded within the Perkinstown *Important Bird Area* recognized by the Wisconsin Bird Conservation Initiative. It 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*. Brush Creek RNA is owned outright by the United States government and is administered by the USDA Forest Service, Chequamegon-Nicolet National Forest.

(1) MINERALS

Outstanding, and Federal-owned 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 any particular area is “high” or “low” potential in Taylor county (Knight pers comm 2013). There are currently no active prospecting permits within Brush Creek RNA. Mineral ownership does not preclude use of the site for research but if prospecting took place, disturbance to localized areas could occur.

Table 7 Mineral resources within Brush Creek RNA (CNNF Forest Data)

Township-Range	Section	Acres*	Hectares	Mineral ownership	Comments
32N 2W	29	120	49	Outstanding	Balance in Sec 29 is Federally owned
	30	all	all	Federally owned	

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.

Federally owned: Mineral estate is administered by Bureau of Land Management and are open for prospecting.

All: Means the total acreage within the RNA boundary in that section.

Balance: Means the remaining acreage minus the listed acres 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 currently no grazing on the Chequamegon-Nicolet National Forest, and is not permitted in Research Management Areas per the 2004 CNNF Forest Plan (USDA Forest Service 2004a).

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

The total forested acreage in the RNA is 253 (102 hectares); 90 percent of which is upland and 10 percent is lowland forest (Table 3). According to the 2004 CNNF Forest Plan, eastern hemlock is reserved in all hardwood stands or is infrequently managed on the Medford landbase due to regeneration concerns (USDA Forest Service 2004a pg 2-8). In other situations, 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 are not typically harvested on the CNNF (mixed swamp conifer and black ash-American elm/red maple).

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.

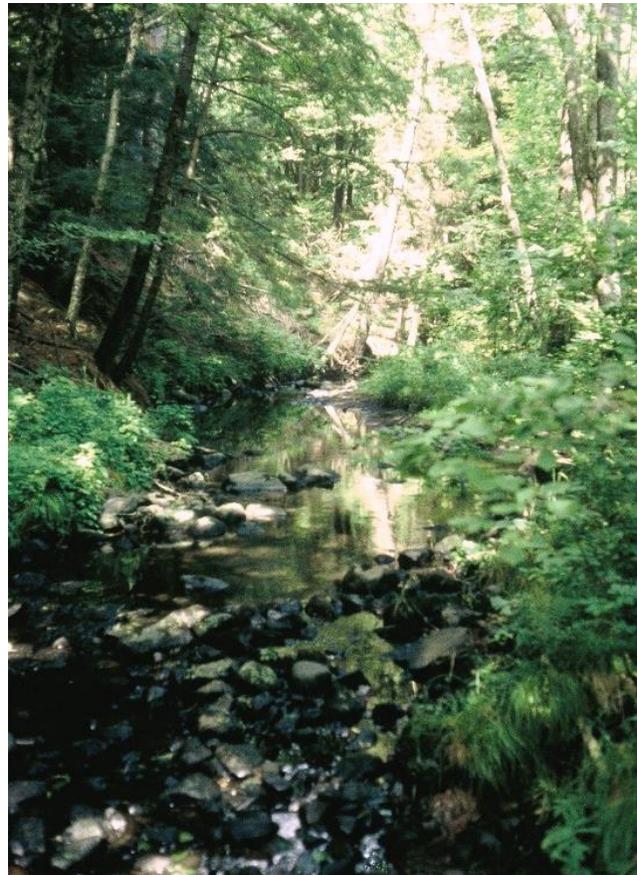


Figure 5. Brush Creek is a narrow, rocky stream that forms the southern boundary of the RNA. Photo by D Fields 1996.

(4) WATERSHED VALUES

Brush Creek RNA lies within the Upper Yellow River Watershed (WI DNR 2013).

Flowing through the site is a forested reach of Brush Creek. This is a headwater stream flowing through glacial moraine topography with rocky, cascading segments (Figure 5) alternating with black ash bottomland forest.

Drainage within the RNA is either south to Brush Creek or north to an unnamed creek. Both flow southwest to the nearby Chequamegon Waters Flowage, an impoundment of the Yellow River. The RNA designation positively affects the watershed by protecting the water quality of Brush Creek.

(5) RECREATION USE

The RNA receives light recreational use, primarily hunting during the fall for ruffed grouse and white-tailed deer. In the recent past, hunters have set up a bear bait station (a legal activity in Wisconsin) near the circular turnaround at the end of FR 1420 (illegal since the road is only open to an earthen berm at the edge of the RNA). The recent restriction of motorized use since 2011 on this road (MVUM 2012) as well as treating the old road bed to restore native flora should reduce this activity [see Section F (1)-*Specific Management Recommendations*].

(6) WILDLIFE

Although second-growth forest, the RNA is developing old-growth structure and provides habitat for two rare forest-interior hawks (goshawk and red-shouldered hawk). Large den trees also provide habitat for many animals. Seven species of bats occur on the CNNF although no surveys have been done in the RNA to date. All bats rely at one time or another on a matrix of older forests and water that this RNA provides (Heeringa 2012). RNA designation will positively affect the continuation of old-growth development and will protect the large trees that are used by goshawks, red-shouldered hawks, bats, and many other wildlife species.

(7) TRANSPORTATION/ROAD SYSTEM

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 roads or trails are identified within the RNA. FR 1420 is not available for motorized use past the boundary of the RNA and will be gated or the berm made more effective to discourage illegal motorized use into the RNA. The last one half mile of FR 1420 left over from past management needs will be treated if necessary to restore hydrologic, geomorphic, and ecological processes and properties. No new roads or trails are allowed in RNAs per the 2004 CNNF Forest Plan.

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 1990s (Parker 1999). Brush Creek 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 three cells in that gap analysis.

The Natural Heritage Inventory Section of the Bureau of Endangered Resources, Wisconsin DNR worked closely with CNNF ecologists in evaluating this site, making numerous field visits and assisting with ecological inventory and evaluation (Hoffman 1997). They recommended Brush Creek area for protection.

The Wisconsin Department of Natural Resources is also interested in achieving ecosystem representation within the State Natural Area Network (WI DNR 2011). They signed a Memorandum of Understanding (MOU) in 2008 with the CNNF to co-designate all current and future RNAs and CNNF Special Management Areas (SMAs) as State Natural Areas. This designation does not restrict the goals of research and education for the site.

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

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

(2) CULTURAL/HERITAGE

USDA Forest Service cultural resource information indicates there are no known cultural sites recorded in Brush Creek RNA (USDA Forest Service 2003b).

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 Brush Creek 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

A gravel-surfaced road was developed into the interior of the site decades ago and a small clearcut was made in the 1970s near the circular turn-around (Krause and Fields 1997). An earthen berm was constructed on this road to prevent traffic but it has been breached as of 2011 (see Section C(5)-*Recreation Use*). This road was listed in the 2012 Motor Vehicle Use Map (USDA Forest Service 2012) as open to highway legal traffic up to the point where the RNA starts. The district ranger is responsible for any action regarding this road.



Figure 6. Past beaver activity creates habitat for numerous plant and animal species in Brush Creek RNA. Photo by Linda Parker 2010.

The west end of the site has had some select cut harvest that occurred in the 1970s. Much of the remainder of the site was marked but never harvested due to operability problems caused by steep terrain. Numerous charred stumps and scattered paper birch in the canopy indicate a past fire history associated with stand origin, likely in the 1930s. The entire complex is comprised of second growth forest. Beaver have impounded several of the mixed conifer and lowland hardwood swamps (Figure 6).

(4) OCCURRENCE OF EXOTIC SPECIES

RNAs are high priority areas to monitor and control invasive species. The CNNF has developed an invasive plant strategy that utilizes adaptive pest management to discover, prioritize, and control non-native invasive plants wherever they occur. No exotic species of high concern were noted as recently as the 2010 check-up in Brush Creek RNA. If monitoring detects invasive plants they 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 research plots or photo points established. Botanist Douglas Fields collected voucher specimens from this site for his Masters thesis that are housed in the University of Wisconsin Herbarium in Madison, WI (Fields 2003).

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

In addition to acting as a reference area for forest management treatments, topics to investigate at Brush Creek include:

- Forested ice-walled lake plain glacial features and the rich vegetation found there
- Glacial geology of ice-walled lake plain feature where Brush Creek has cut into the base exposing *varved* sediments 25-30 feet below the plain's surface
- Developing old-growth forest
- Neotropical migrant birds
- Canada yew near the southwestern edge of its range
- Northern goshawk and red shouldered hawk
- Bats of northern Wisconsin

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

Private land borders the RNA to the north but there are no known conflicts as of 2010.

Forest Road 1420 penetrating the RNA appears on some older maps but motorized travel was disallowed per the 2011 and later versions of the Motor Vehicle Use Map (USDA Forest Service 2012). An earthen berm on this road at the border of the RNA designed to keep motorized vehicles out has been breached. The road is receiving traffic as of 2012 and will be gated or the berm secured.

According to the 2004 CNNF Forest Plan the lands surrounding Brush Creek RNA to the south are in Management Area (MA) 2A - *Uneven-aged Northern Hardwoods*. This 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 will be uncommon and temporary patches small [under 40 acres (16 ha)]. Within this MA and only about 1,500 feet (500 m) to the south, is a large

area designated as Chequamegon Waters Old Growth and Special Features Complex, a matrix of older-growth forest similar to Brush Creek RNA. Together these two sites protect large patches of closed canopy forest.

The western boundary of the RNA is in Management Area 2C - *Uneven-aged Northern Hardwoods: Early Successional*. While similar to MA 2A, the forest here contains more patches of aspen white spruce and red/white pine types and patches are in the hundreds of acres (USDA Forest Service 2004a pg 3-7).

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

Brush Creek is not within a special management 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 7. A character of developing old growth forest, such as in Brush Creek RNA, is coarse woody debris. These dead trees can be an eco-community unto themselves. Photo by Linda Parker 2010



Figure 8. A young poke milkweed (*Asclepias exaltata*) grows in the shade of a hardwood forest in Brush Creek RNA. Photo by Linda Parker 2010

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

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

Theme

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

Landscape Description

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

Desired Future Condition

Landscape Composition and Structure

RNAs are chosen as high quality representatives of ecological communities found on the Forest. In general, they exhibit minimal evidence of past human disturbance, and contain all or most species characteristic of that community in the region. They may range in size from less than 100 acres to thousands of acres. They are generally well buffered from incompatible activities on nearby lands. RNAs are meant to include a representation of ecological types and vegetative cover across the Forest. However, composition results primarily from natural ecological processes rather than human-caused activities. As a result, late-successional upland types such as northern hardwoods, northern hardwood/eastern 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, eastern 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 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)

APPENDIX 5 CONTRIBUTORS

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APPENDIX 6 FLORA LIST

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>Abies balsamea</i>	balsam fir
<i>Acer rubra</i>	red maple
<i>Acer saccharum</i>	sugar maple
<i>Acer spicata</i>	mountain maple
<i>Actaea pachypoda</i>	white baneberry
<i>Actaea rubra</i>	red baneberry
<i>Adiantum pedatum</i>	maidenhair fern
<i>Agrimonia gryposepala</i>	Tall hairy agrimony
<i>Alnus incana</i>	Speckled alder
<i>Amphicarpaea bracteata</i>	hog peanut
<i>Anaphalis margaritacea</i>	cudweed
<i>Anemone quinquefolium</i>	Canada anemone
<i>Anemone virginiana</i>	tall thimbleweed
<i>Aralia nudicaulis</i>	wild sarsaparilla
<i>Aralia racemosa</i>	spikenard
<i>Arisaema triphyllum</i>	jack-in-the-pulpit
<i>Asclepias exaltata</i>	poke milkweed
<i>Asclepias incarnata</i>	swamp milkweed
<i>Aster lateriflorus</i>	calico aster
<i>Aster macrophyllus</i>	big-leaved aster
<i>Betula alleghaniensis</i>	yellow birch
<i>Betula papyrifera</i>	paper birch
<i>Bidens connata</i>	purplestem beggarticks
<i>Bidens frondosa</i>	devil's beggarticks
<i>Brachyelytrum erectum</i>	bearded shorthusk
<i>Bromus pubescens</i>	hairy woodland brome
<i>Calamagrostis canadensis</i>	bluejoint grass
<i>Calla palustris</i>	wild calla
<i>Caltha palustris</i>	marsh marigold
<i>Campanula aparinoides</i>	marsh bellflower
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress
<i>Carex gynandra</i>	nodding sedge
<i>Carex intumescens</i>	greater bladder sedge
<i>Carex limosa</i>	mud sedge
<i>Carex retrorsa</i>	knot-sheath sedge
<i>Carex trisperma</i>	three-seeded sedge
<i>Carpinus caroliniana</i>	American hornbeam
<i>Carya cordiformis</i>	bitter-nut hickory
<i>Caulophyllum thalictroides</i>	blue cohosh
<i>Chamaedaphne calyculata</i>	leatherleaf
<i>Chelone glabra</i>	turtle-head
<i>Chrysosplenium</i>	American golden

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>americanum</i>	saxifrage
<i>Cicuta bulbifera</i>	bulblet-bearing water hemlock
<i>Cinna latifolia</i>	drooping wood-reed
<i>Circaea alpina</i>	dwarf enchanter's nightshade
<i>Circaea lutetiana</i>	Enchanter's night-shade
<i>Cirsium muticum</i>	swamp thistle
<i>Claytonia virginiana</i>	spring beauty
<i>Clintonia borealis</i>	blue-bead lily
<i>Coptis trifolia</i>	goldthread
<i>Cornus canadensis</i>	bunchberry
<i>Cornus stolonifera</i>	red osier dogwood
<i>Crataegus punctata</i>	dotted hawthorn
<i>Cypripedium acaule</i>	pink lady's-slipper
<i>Dicentra cucullata</i>	Dutchman's breeches
<i>Dirca palustris</i>	leatherwood
<i>Dryopteris carthusiana</i>	woodfern
<i>Dryopteris cristata</i>	crested woodfern
<i>Dryopteris intermedia</i>	intermediate woodfern
<i>Echinocystis lobata</i>	wild cucumber
<i>Elymus hystrix</i>	bottle-brush grass
<i>Epilobium coloratum</i>	purple-leaf willow-herb
<i>Equisetum arvense</i>	field horsetail
<i>Equisetum scirpoides</i>	wiry scouring rush
<i>Equisetum sylvaticum</i>	woods horsetail
<i>Erechtites hieracifolia</i>	American burnweed
<i>Eriophorum virginicum</i>	tawny cottongrass
<i>Eupatorium maculatum</i>	spotted joe-pye weed
<i>Eupatorium perfoliatum</i>	boneset
<i>Fraxinus americana</i>	white ash
<i>Fraxinus nigra</i>	black ash
<i>Galium asprellum</i>	rough bedstraw
<i>Galium palustre</i>	common marsh bedstraw
<i>Galium trifidum</i>	threepetal bedstraw
<i>Galium triflorum</i>	Sweet-scented bedstraw
<i>Gaultheria hispidula</i>	creeping snowberry
<i>Gaultheria procumbens</i>	wintergreen
<i>Geum canadense</i>	white avens
<i>Glyceria canadensis</i>	rattlesnake manna grass
<i>Glyceria striata</i>	fowl manna grass
<i>Gymnocarpium dryopteris</i>	oak fern
<i>Helenium autumnale</i>	common sneezeweed
<i>Helianthus decapetalus</i>	thinleaf sunflower

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>Hepatica nobilis v. americana</i>	round-lobed hepatica
<i>Hepatica nobilis var acuta</i>	sharp-lobe hepatica
<i>Huperzia lucidula</i>	shining clubmoss
<i>Hydrophyllum virginianum</i>	Virginia water-leaf
<i>Ilex mucronata</i>	catberry
<i>Ilex verticillata</i>	common winterberry
<i>Iris versicolor</i>	blue-flag iris
<i>Kalmia polifolia</i>	bog laurel
<i>Laportea canadensis</i>	woods nettle
<i>Larix laricina</i>	tamarack
<i>Ledum groenlandicum</i>	Labrador tea
<i>Leersia oryzoides</i>	rice cut-grass
<i>Lemna minor</i>	small duckweed
<i>Lobaria pulmonaria (lichen)</i>	lung lichen
<i>Lobelia siphilitica</i>	great blue lobelia
<i>Lonicera canadensis</i>	American fly honeysuckle
<i>Lonicera oblongifolia</i>	swamp fly honeysuckle
<i>Lycopodium annotinum</i>	stiff clubmoss
<i>Lycopodium clavatum</i>	running clubmoss
<i>Lycopodium complanatum</i>	ground-cedar
<i>Lycopodium dendroideum</i>	northern tree clubmoss
<i>Lycopodium obscurum</i>	rare clubmoss
<i>Lycopus americanus</i>	American water-horehound
<i>Lycopus uniflorus</i>	northern bugleweed
<i>Maianthemum canadense</i>	Canada mayflower
<i>Matteuccia struthiopteris</i>	ostrich fern
<i>Menyanthes trifoliata</i>	buckbean
<i>Mimulus ringens</i>	Allegheny monkeyflower
<i>Mitchella repens</i>	partridgeberry
<i>Mitella diphylla</i>	two-leaf miterwort
<i>Mitella nuda</i>	naked miterwort
<i>Monotropa uniflora</i>	indian pipe
<i>Onoclea sensibilis</i>	sensitive fern
<i>Oryzopsis asperifolia</i>	ricegrass
<i>Osmorhiza claytonii</i>	sweet cicely
<i>Osmunda cinnamomea</i>	cinnamon fern
<i>Osmunda claytoniana</i>	interrupted fern
<i>Osmunda regalis</i>	royal fern
<i>Oxalis montana</i>	mountain wood sorrel
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Penthorum sedoides</i>	ditch stonecrop

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>Phegopteris connectilis</i>	northern beech fern
<i>Photinia melanocarpa</i>	black chokeberry
<i>Phryma leptostachya</i>	lop-seed
<i>Picea glauca</i>	white spruce
<i>Picea mariana</i>	black spruce
<i>Pilea sp.</i>	clearweed
<i>Pinus strobus</i>	white pine
<i>Platanthera hyperborea</i>	northern bog orchid
<i>Polygonatum pubescens</i>	hairy solomon's-seal
<i>Polygonum amphibium</i>	water knotweed
<i>Polygonum arifolium</i>	halberd-leaf tearthumb
<i>Polygonum cilinode</i>	fringed black bindweed
<i>Polygonum hydropiper</i>	marsh knotweed
<i>Polygonum punctatum</i>	dotted smartweed
<i>Polygonum sagittatum</i>	arrowleaf trea-thumb
<i>Polygonum virginianum</i>	polypody
<i>Populus grandidentata</i>	big-tooth aspen
<i>Populus tremuloides</i>	trembling aspen
<i>Potentilla palustris</i>	swamp cinquefoil
<i>Prunella vulgaris</i>	self-heal
<i>Prunus serotina</i>	black cherry
<i>Pteridium aquilinum</i>	bracken fern
<i>Pyrola elliptica</i>	elliptic shinleaf
<i>Ranunculus abortivus</i>	aborted buttercup
<i>Ranunculus hispidus</i>	bristly buttercup
<i>Ribes americanum</i>	eastern black currant
<i>Ribes glandulosum</i>	skunk currant
<i>Ribes triste</i>	swamp red currant
<i>Rubus idaeus</i>	red raspberry
<i>Rubus pubescens</i>	dwarf red blackberry
<i>Rubus sp.</i>	blackberry
<i>Rudbeckia laciniata</i>	cutleaf coneflower
<i>Rumex orbiculatus</i>	great water dock
<i>Sagittaria latifolia</i>	broadleaf arrowhead
<i>Salix spp.</i>	willow
<i>Sambucus pubens</i>	red-berried elder
<i>Sarracenia purpurea</i>	pitcher plant
<i>Saxifraga pensylvanica</i>	Pennsylvania saxifrage
<i>Scheuchzeria palustris</i>	pod-grass
<i>Schizachne purpurascens</i>	false melic
<i>Scutellaria galericulata</i>	marsh skullcap
<i>Scutellaria lateriflora</i>	blue skullcap
<i>Sium sauve</i>	hemlock water-parsnip
<i>Smilacina trifolia</i>	threeleaf false lily of the valley
<i>Solidago flexicaulis</i>	zig-zag goldenrod
<i>Sorbus sp.</i>	mountain ash

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>Spiraea alba</i>	steeple-bush
<i>Spiraea tomentosa</i>	hardhack
<i>Streptopus roseus</i>	rosy twisted-stalk
<i>Thalictrum dioica</i>	early meadow rue
<i>Thelypteris palustris</i>	marsh fern
<i>Tilia americana</i>	basswood
<i>Triadenum virginicum</i>	marsh St. Johnswort
<i>Trientalis borealis</i>	starflower
<i>Trillium cernuum</i>	nodding trillium
<i>Trillium grandiflorum</i>	large-flowered trillium
<i>Tsuga canadensis</i>	eastern hemlock

Flora of Brush Creek RNA*	
Scientific name	Common name
<i>Typha latifolia</i>	cat-tail
<i>Ulmus americana</i>	American elm
<i>Urtica dioica</i>	stinging nettle
<i>Vaccinium macrocarpon</i>	cranberry
<i>Vaccinium myrtilloides</i>	velvetleaf blueberry
<i>Vaccinium oxycoccos</i>	small cranberry
<i>Verbena hastata</i>	blue vervain
<i>Viola blanda</i>	sweet white violet
<i>Viola pubescens</i> <i>scabriuscula</i>	downy yellow violet

* Douglas Fields, contract botanist, CNNF 1997