

Appendix J

Biological Evaluations



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Appendix



Chequamegon-Nicolet National Forests



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Introduction

This biological evaluation analyzes the potential effects of the Alternatives considered as part of the Forest Plan Revision for the Chequamegon-Nicolet National Forests on species included on the Regional Forester's Sensitive Species (RFSS) and the Threatened and Endangered Species (TES) lists.

The USDA Forest Service developed policy regarding the designation of plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-2001-1). The RFSS list contains taxa only when they meet one or more of the following three criteria: 1) The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend; 2) The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline; and 3) The species' population or habitat is stable but limited.

Under FSM 2672.41, objectives for completing Biological Evaluations (BE) for proposed Forest Service programs and activities are: 1) To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species, 2) To ensure that Forest Service activities do not cause any species to move toward federal listing, and 3) To incorporate concerns for sensitive species throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation.

Species Listed as Threatened or Endangered by the US Fish and Wildlife Service: Explanation of Listing Procedures

Forest Service Manual 2600, Section 2671.44 provides direction on the review of actions and programs authorized, funded or implemented by the Forest Service relative to the requirements of the Endangered Species Act (ESA).

The following species are listed as Threatened or Endangered in Wisconsin by the Fish and Wildlife Service: Bald Eagle, Gray Wolf, Fassett's Locoweed, Canada Lynx, Kirtland's Warbler, Piping Plover, and Karner Blue Butterfly.

The Chequamegon-Nicolet National Forests has been consulting with the US Fish and Wildlife Service (USFWS) since April 26, 1996 (Troyer *in litt.*) about TES considered in the Forest Plan revision. All of these species occur in northern Wisconsin, but not all are documented on the Forests. Consultation has included providing the USFWS with habitat and other analyses. Consultation will continue.

Three of the species listed above occur on the Forests, namely, Bald Eagle, Gray Wolf, and Fassett's Locoweed. There is a Biological Evaluation (BE) for each of these species below, preliminary to providing a Biological Assessment (BA) for each, once the preferred Alternative has been chosen. There are no known documented individuals of Kirtland's Warbler on the Forests, and rare Canada Lynx in northern Wisconsin are considered transients. The Forests will consult on the management of Kirtland's Warbler habitat should breeding be documented on the Forests. The Forests will consult on coordinated monitoring for occurrences of Canada Lynx.

These two species are considered in the Final Environmental Impact Statement (FEIS) associated with the 2004 *Chequamegon-Nicolet National Forest Land and Resource*

Management Plan (2004 Forest Plan). Piping Plover and Karner Blue Butterfly have not been documented on the Forests. No appropriate habitat exists on the Forest for these species and they are not considered further.

Biological Evaluations (BE): Explanation of the BE Organization and Vocabulary

This BE is divided into two parts—evaluations of sensitive plants and evaluations of sensitive animals. Each part has species on the RFSS list and one or more Threatened or Endangered Species (TES). Each section includes the following variables defined here:

Key Factors: these are important ecological elements affecting species or a group of species that may be considered positive (such as habitat elements) that could be enhanced by the Plan, and negative (such as nest disturbances) that could be minimized by the Plan. Key Factors were in part summarized from SVE panelists' contributions (further discussed below in 'Ecological Judgments') and scientific literature. For example, a positive key element could be increased habitat quantity due to an increase in large block interior forest acres for species with that kind of preferred habitat. A negative example could be competition from non-native invasive species that would limit a particular species' ability to thrive.

Habitat Quality: is defined by assessing a variety of factors. These include: emphasis on ecosystem restoration, interior forest emphasis, amount of ecological reference area (i.e., RNAs, SMAs, and Old Growth), amount of non-motorized area (i.e., SPNM, Wilderness), amount of ATV and ORV trails and loops, acres suitable for harvesting, acres of aspen management, and road density goals. These factors are ranked relative to each other to create the determination of increased, decreased, or stable, 'habitat quality' depending on the habitat needs of the species in question.

Habitat Quantity: is determined by the amount Management Areas with desirable ecosystem goals. For example, a species with a preferred habitat of interior hardwoods, would experience an increase in 'habitat quantity' if the alternative chosen showed an increase in Management Area 2B. This Management Area's prescription emphasizes interior hardwood habitat.

Ecological Judgments: Ecological Judgments are listed for most but not all species. These judgments are a result of a Species Viability Evaluation (SVE) Process conducted during 2000 to 2002. Most recently, a panel of species experts was convened at the end of April 2002. Experts reviewed a list of Forest Service-identified sensitive species (i.e., RFSS and TES); reviewed Proposed Plan alternatives, Standards, and Guidelines; and selected ecological outcomes for each species based on descriptions of outcome choices and potential results of Proposed Plan alternatives. In some instances, the ecological outcomes given by the SVE panel differed among alternatives with no documented rationale behind the difference. Not all species were considered by the 2002 expert panels and some plant species could not be considered due to time restrictions. One animal species was added to the RFSS list after the panel was convened.

Ecological Judgments on ecological conditions to support species *on the Forests* were made by panelists within the choice of five outcomes given below. For a complete description of the Species Viability Evaluation Process, see USDA Forest Service, "Expert Panels for Species Viability Evaluation for Preliminary Draft EIS Alternatives; National Forests in Wisconsin and Minnesota; Process used by Chequamegon-Nicolet National Forest." (Schenck *et al.* 2004), available at the Supervisor's Office, USDA Forest Service, Rhinelander, WI 54501.

Outcome A: Suitable ecological conditions are broadly distributed and of high abundance across the historical range of the species within the planning area. The combination of distribution and abundance of ecological conditions provides opportunity for continuous or nearly continuous intraspecific interactions for the species.

Outcome B: Suitable ecological conditions are either broadly distributed or of high abundance across the historical range of the species within the planning area, but there are gaps where suitable ecological conditions are absent or only present in low abundance. However, the disjunct areas of suitable ecological conditions are typically large enough and close enough to permit dispersal among subpopulations and potentially to allow the species to interact as a metapopulation across its historical range within the planning area.

Outcome C: Suitable ecological conditions are distributed frequently as patches and/or exist at low abundance. Gaps where suitable ecological conditions are either absent, or present in low abundance, are large enough that some subpopulations are isolated, limiting opportunity for species interactions. There are opportunities for subpopulations in most of the species range to interact as a metapopulations, but some subpopulations are so disjunct or of such low density that they are effectively isolated from other populations. For species for which this is not the historical condition, reduction in overall species range from historical within the planning area may have resulted from this isolation.

Outcome D: Suitable ecological conditions are frequently isolated and/or exist at very low abundance. While some of the subpopulations associated with these ecological conditions may be self-sustaining, there is limited opportunity for population interactions among many of the suitable environmental patches. For species for which this is not the historical condition within the planning area, reduction in overall species range from its historical range within the planning area may have resulted from this isolation.

Outcome E: Suitable ecological conditions are highly isolated and exist at very low abundance, with little or no possibility of population interactions among suitable environmental patches, resulting in strong potential for extirpations within many of the patches and little likelihood of re-colonization of such patches. There has likely been a reduction in overall species range from historical within the planning area, except for some rare, local endemics that may have persisted in this condition since the historical period.

Next, panelists gave Ecological Judgments on the projected ecological conditions to support species on a broader regional scale, the *Cumulative Effects Area (CEA)* being northern Wisconsin and including conditions not in the control of the Forest Service. The CEA for terrestrial species is essentially Ecological Province 212 within Wisconsin and Western Michigan (McNab and Avers 1994) (Fig. J-1). Again, panelists worked in a framework of five possible outcomes based on estimates 100 years into the future:

Outcome A: The combination of environmental and population conditions provides opportunity for the species to be broadly distributed and of high abundance across its historical range within the cumulative effects analysis area. There is potential for continuous or nearly continuous intraspecific interactions at high population size.

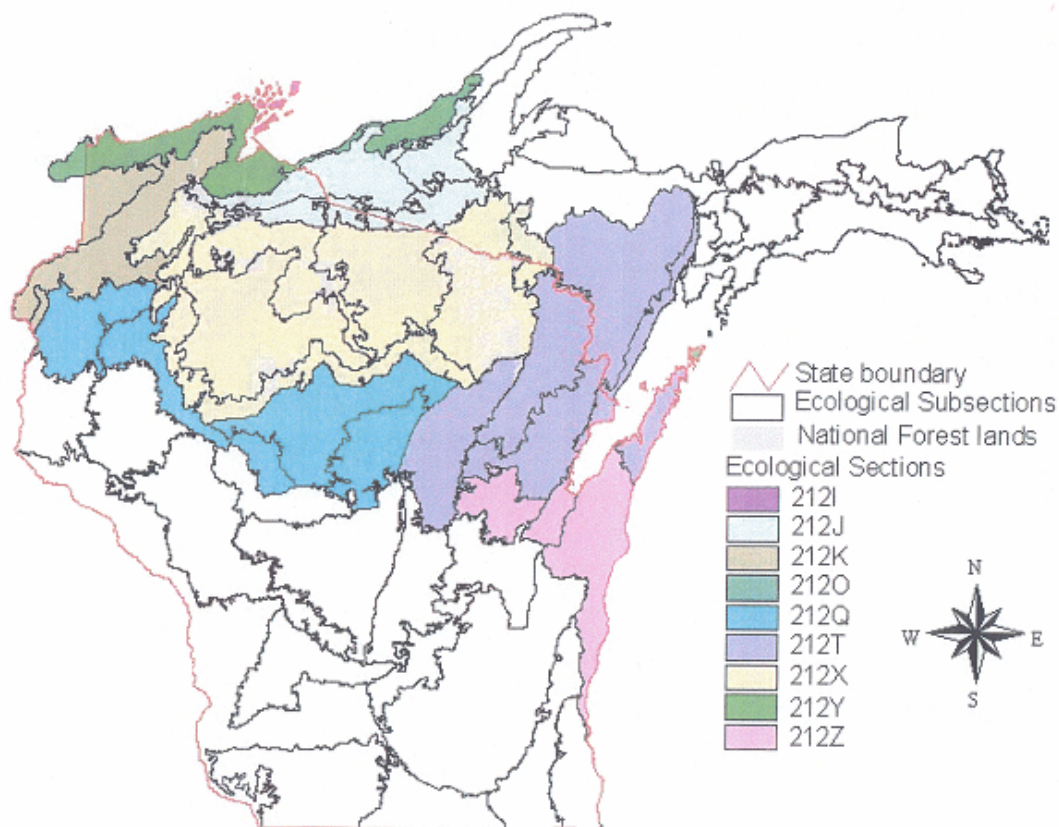


Figure J-1. Cumulative Effects Area for terrestrial species

Outcome B: The combination of environmental and population conditions provide opportunity for the species to be broadly distributed an/or of high abundance across its historical range within the cumulative effects analysis area, but there are gaps where populations are potentially absent or present only in low density as a result of environmental or population conditions. However, the disjunct areas of higher potential populations density are typically large enough and close enough to other subpopulations to permit dispersal among subpopulations and potentially to allow the species to interact as a metapopulation across its historical range within the cumulative effects analysis area.

Outcome C: The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by patchiness and/or areas of low abundance. Gaps where the likelihood of population occurrence is low or zero are large enough that some subpopulations are isolated, limiting opportunity for species interactions. There is opportunity for subpopulations in most of the species range to interact as a metapopulation but some subpopulations are so disjunct or of such low density that they are essentially isolated from other populations. For species in which this is not the historical condition within the planning area, reduction in overall species range from historical condition may have resulted from this isolation.

Outcome D: The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by areas with high potential for population isolation and/or very low potential abundance. While some of these subpopulations may be self-sustaining, gaps where the likelihood of population

occurrence is low or zero are large enough that there is limited opportunity for interactions among them. For species for which this is not the historical condition within the planning area, reduction in overall species range from historical has likely resulted from this isolation.

Outcome E: The combination of environmental and population conditions restricts the potential distribution of the species, which is characterized by high levels of isolation and very low potential abundance. Gaps where the likelihood of population occurrence is low or zero are large enough there is little or no possibility of interactions, strong potential for extirpations, and little likelihood of recolonization. There has likely been a reduction in overall species range from historical within the planning area, except for some rare, local endemics that may have persisted in this condition since the historical period.

Because not every plant in each grouping was considered during the species viability evaluation expert panel process, those that were considered are listed and Ecological Judgment outcomes are displayed for each alternative. Plants were grouped by habitat affinities and Determinations (introduced below) were made for groups, not individuals. Animal species are listed separately and Determinations are displayed for each individual species.

Population Trends: are documented increases or decreases in a species' population over an extended period of time. These trends were only considered in the animal section due to the lack of data for population trends of many of the sensitive plants.

Determinations: these are figured by assessing the ecological judgments, habitat quality, habitat quantity, and population trends of the species or group of species discussed. The four possible Determination statements are listed below with the respective codes appearing in tables:

- No Impact (NI)
- Beneficial Impact (BI)
- May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability (MINT)
- May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability (MILT)

There are some differences in format between the plant and animal biological evaluations. For the most part, plants have been grouped by habitat affinity, such as mesic forest, dry forest, or upland open areas, whereas the animals are discussed individually.

To identify Key Factors, make habitat quality and quantity assessments, and assess future abundance and distribution of species, Forest Service staff used several tools. These tools included: scientific literature, Ecological Judgments, suggestions from other professionals in the biological community, and professional judgment from the FS staff itself. The FS resource staff then concluded a Determination for each species or species group on the Chequamegon-Nicolet National Forests. A table is included for each species or group of species that summarizes the information presented and shows the Determination outcome for each species or group by alternative.

In all tables and figures, the Selected Alternative is abbreviated **Sel. Alt.** or **S. A.**

Table J-1. Regional Forester's Sensitive Species Habitat Associations

Species	Interior Hardwoods	Brushland and Barrens	Riparian and Aquatic	Upland and Lowland Conifer	Considered Individually
Northern goshawk	X				
LeConte's sparrow		X			
Red-shouldered hawk	X				
Black tern			X		
Trumpeter swan			X		
Spruce grouse				X	
Connecticut warbler				X	
Black-backed woodpecker				X	
Sharp-tailed grouse		X			
Upland sandpiper		X			
Swainson's thrush					X
Cerulean warbler	X				
American marten	X				
Wood turtle			X		
Lake sturgeon			X		
Greater redhorse			X		
Pugnose shiner			X		
Ellipse mussel			X		
Henry's elfin butterfly		X			
Northern blue butterfly		X			
Chryxus arctic butterfly		X			
Tawny crescent butterfly		X			
West Virginia white butterfly	X				
Extra-striped snaketail dragonfly			X		
Pygmy snaketail dragonfly			X		
Zebra clubtail dragonfly			X		
Green-faced clubtail dragonfly			X		
Northern myotis bat	X				
Eastern pipistrelle bat	X				
Bullhead mussel			X		
Forcipate emerald dragonfly					X
Total	7	7	12	3	2

Management Area Summary and Possible Effects on TES and RFSS

The following are summaries of Management Areas (MAs) allowing timber-harvesting activities and their possible effect on occurrences of RFSS and TES. For more detailed descriptions of MAs refer to chapter 3 of the *2004 Forest Plan*.

MAs can affect the distribution of deer herbivory, which in turn can affect some TES and RFSS populations, particularly plants. The deer population is strongly influenced by such factors as hunter success and the severity of winter. However, MA practices may influence local population distributions by creating preferred deer habitat. The following are assumptions about deer herbivory used in MA summaries below (see Alverson *et al.* 1988, Miller *et al.* 1992, Balgooyen and Waller 1995, Augustine and Frelich 1998, Rooney 2001). 1) Where MAs emphasize aspen there will be an increase in clear cutting, which will create more preferred deer habitat, and result in more deer herbivory. 2) Even-aged management can create better deer habitat, and therefore increase the likelihood of deer herbivory. 3) Where there is more interior forest and continuous canopy, there exists less desirable deer habitat and thus less potential for deer herbivory. 4) Areas that emphasize uneven-aged timber management should result in less preferred habitat and less potential for deer herbivory.

Although measures to avoid or minimize impacts on animal RFSS populations and/or habitats apply in all management areas, indirect effects may vary depending on the activities occurring on adjacent lands, i.e. elsewhere in the same Management Area polygon or in adjacent MA polygons. However, suitable habitat for 39% (12 species) of the animal RFSS are aquatic or riparian areas (see Table J-1) and a discussion of MA-specific effects to these species is not appropriate because these areas are found throughout all Management Areas (recall also that watershed boundaries are not the base unit for Management Areas). Another 26% (8 species) are associated with open habitat such as brushlands, barrens, or non-forested lowlands such as bogs or peatlands, which are areas where timber-harvesting activities may be essential to creating or maintaining open conditions. The remaining 35% (11 species) may be considered more likely to be found in Management Areas where timber-harvesting activities are allowed and some remarks for those species are made in the following summaries.

Management Area 1

Early successional forests dominate MA 1A, and as much as 75% of the desired composition could be aspen. These areas are heavily managed and pose hazards to plant populations through a higher amount of deer herbivory.

MA 1B landscape composition and structure consists of aspen (up to 55% in the desired composition) and conifer forests (up to 30% in the desired composition) and mixed aspen-conifer stands. Human-caused disturbance such as clearcutting and shelterwood harvests that maintain early successional communities is evident and intensive and, consequently, the risk of deer herbivory is high.

MA 1C composition consists of early successional forest communities dominated by aspen (up to 55% in desired composition). Northern hardwood types contribute significantly to the total composition in this area. This MA is intensely managed to maintain the early successional aspen (primarily by clearcutting) and the likelihood of deer herbivory is high due to the presence of their preferred habitat.

In all MA 1 subcategories, emphasis on early successional forest with numerous small patches and a high degree of edges limit the likelihood of occurrence of animal RFSS

associated with interior hardwoods (see Table J-1). In addition, animals RFSS that require mature forests and/or coarse wood debris like Connecticut warbler, black-backed woodpecker, and American marten are not likely to persist in this MA.

Management Area 2

MA 2A is labeled as uneven-aged northern hardwoods. The landscape composition and structure is relatively continuous mid to late-successional uneven-aged northern hardwood and northern hardwood-hemlock forest communities. Presence of aspen is limited to 5-20% of the desired composition. The primary silvicultural system is uneven-aged management which is less intensive but normally larger in scale. Some shade intolerant and mid-tolerant forest types are maintained with even-aged silviculture systems (shelterwood, overstory removal and clearcut harvests) or uneven-aged silviculture with a variety of canopy gap sizes. Since the intensity of harvesting activities is less in this MA compared to MA 1, the scale in the harvesting is larger and, due to the uneven aged composition, deer herbivory would be less of a threat to RFSS. Emphasis on northern hardwoods in this MA favors the occurrence of West Virginia white butterfly in this MA and other MA 2 classes, provided that its host plant is present.

In MA 2B, relatively continuous mid to late-successional, uneven-aged northern hardwood and northern hardwood-hemlock forest communities dominate landscape composition. Aspen is limited to 0-10% of the desired composition. The disturbance regime in this MA consists of improvement harvests and individual-tree selection, which are designed to mimic natural wind disturbance mortality. In addition, timber harvests are restricted to frozen ground conditions. The likelihood of deer herbivory is expected to be lower in this MA compared to MA 2A due to the designation of interior forest, no aspen management, frozen ground timber harvesting and harvest prescriptions designed to mimic natural occurrences. Maintenance of a high degree of canopy closure in this MA may favor interior hardwood species such as Northern goshawk, red-shouldered hawk and cerulean warbler and maintenance of or increases in the conifer components in the understory may favor spruce grouse and Swainson's thrush.

MA 2C landscape composition and structure is comprised of relatively continuous mid to late-successional uneven-aged northern hardwood and northern hardwood-hemlock forest. In addition, aspen (15-30% desired composition), spruce and red/white pine types are strong species components maintained in most cases. 2C areas incorporate snags, den trees, coarse woody debris, super canopy trees and canopy gaps into management activities that enhance structural diversity. Any plant site in this area will be less likely to be affected by deer herbivory, although some might still be present.

Management Area 3

MA 3A landscape composition and structure consists of mixed northern hardwoods such as white ash, basswood, red maple, red oak and yellow birch. These species dominate a mosaic of mid to late-successional forest communities. Mid-tolerant hardwood species and in some cases sugar maple stands are encouraged through thinning and are regenerated through even-aged management including shelterwood and over story removals. Uneven-aged management is practiced where sugar maple dominates and opportunities to regenerate mid-tolerant hardwood species are limited. The mix of even and uneven aged management practices lessens the threat of deer herbivory to RFSS.

Even-aged Hardwood: Oak-Pine summarizes MA 3B. Red oak, and oak mixed with pine or other hardwood species are the dominant types. Early successional forests, such as

aspen and paper birch, represent a relatively small portion of the landscape. Mid-tolerant species such as oak and white pine are encouraged through thinning and are regenerated through even-aged management primarily shelterwood harvest. Since the primary timber management activity is shelterwood harvesting, the threat of intense deer herbivory that is associated with other even-aged management (i.e. clearcutting) is moderate.

MA 3C is labeled as ‘Even-Aged Hardwood: Oak-Aspen’. The landscape composition and structure is a mosaic of early to mid-successional forest communities. Red oak is the dominant forest type with a relatively high portion of early successional forest types like aspen and paper birch. The primary silvicultural system is even-aged management (shelterwood, overstory removal and clearcut) and is prescribed to maintain relatively shade-intolerant trees species such as red oak, aspen, paper birch, white ash, yellow birch and basswood. Uneven-aged silviculture is somewhat less intensive and occurs on a small scale. With vast amount of different types of even aged management, the deer herbivory threat is higher than MA 3B.

Management Area 4

Red, white, and jack pine are the dominant overstory in MA 4A. The landscape composition is defined as coniferous, mixed coniferous-hardwood and aspen forest with natural and plantation conifer stands that are most prevalent, but both hardwood and aspen are well represented in this landscape. Even-aged management practices that maintain early to mid-successional communities are evident and intensive. Given the intensive even-aged management that occurs in this area, the risk is higher for plants to experience damage from these activities, while deer herbivory might be less of a problem. Large blocks of mature jack pine maintained in this MA provide habitat for the Connecticut warbler and black-backed woodpecker.

MA 4B is designated as conifer: natural pine and oak. This area is dominated by natural origin red and white pine often mixed with oak. Early successional forest, such as aspen, is a minor component of the area. Timber harvest along with fire is used to regenerate pine and oak. Low intensity intermediate treatments such as thinning and prescribed fire are scheduled on a return interval of 10-20 years. The management of this area is not as intense as 4A and when it does occur it is focused on the regeneration of the natural state of the natural pine and oak, thereby not producing as much of a threat to RFSS. The absence of aspen decreases the risk from deer herbivory somewhat.

For MA 4C natural and plantation jack pine mixed with large temporary openings (up to 1,000 acres) providing conditions similar to pine barrens gives this area its categorization as Conifer: Surrogate Pine Barrens. These surrogate barren conditions are maintained through clearcutting as the principle disturbance, occurring every 35-70 years. Prescribed fire may be used as a site preparation or restoration tool. Large blocks of mature jack pine maintained in this MA provide habitat for the Connecticut warbler and black-backed woodpecker.

Management Areas 8A and 8D

MA 8A is the Argonne Experimental Forest. The purpose of 8A is for research and development of silvicultural techniques used in the development, maintenance and harvest of quality northern hardwoods. The disturbance regime in this area varies widely to accommodate the diverse landscape and the desired experiments that occur. Due to this mix of even-aged and uneven-aged treatment, the possibility of deer herbivory is not as

high as other even-aged focused areas, but not as low as an area that only has uneven-aged management.

MA 8D is the wild, scenic and recreational rivers MA. It is characterized by free-flowing rivers and associated corridors in a natural condition, which has been identified for special management on a federal or state level. The predominate disturbances within the riverine environment is the natural range of flood and drought flows. However, uneven-aged management such as improvement and selection harvest is the primary management activity within scenic and recreation corridors to create a large tree character and visually pleasing scenes. Due to the relatively low amount of harvest and the nature of the treatment that does occur, deer herbivory is expected to be low in this area.

General Summary of the Effects of Wilderness and Non-Motorized Area Designation and All-Terrain and Off-Road Vehicle Use on TES and RFSS

All-terrain and off-road vehicle use on the Forest poses a threat to TES and RFSS populations in several ways. First, off-trail use, although it will not be allowed under Alternatives 2-9 or the Selected Alternative, can cause mechanical damage to plant populations. The placement of new trails will avoid RFSS plant populations and should limit the impact of illegal ATV use. Second, ATVs can act as vectors for non-native invasive species (NNIS) which can have negative impacts on RFSS plants or other plants species and the animals that depend on them. For example, the West Virginia White Butterfly is dependent on toothwort as a larval host plant but toothwort is vulnerable to being replaced in rich woodlands by the invasive species, garlic mustard. Third, animal RFSS and TES may be negatively impacted by ATV use because some species may be caused to alter nesting or foraging behavior due to repeated encounters with ATVs in habitats they use. These impacts are also expected to occur within non-motorized areas with intensively used trails.

An increased emphasis on Wilderness and other Non-motorized areas under Alternatives 2-9 and the Selected Alternative is expected to reduce the impacts of ATV use on plant and animal TES and RFSS. Some wildlife species, such as the gray wolf, prefer areas with low open road density and are expected to benefit from the increased emphasis on non-motorized areas. Non-motorized areas have fewer active stream crossings which will eliminate the potential for negative impacts on aquatic habitats from increased sedimentation and stream channel degradation. Lakes and impoundments in non-motorized areas are less likely to be invaded by NNIS due to the exclusion of motorized boats and personal watercrafts. Furthermore, animal species that are vulnerable to wave action, such as the black tern, are likely to find aquatic habitats in non-motorized areas more suitable than similar habitats in areas with no restrictions on motorized use.

General Summary of the Impacts of Increased Emphasis on Biological Diversity to TES and RFSS

A recognized limitation of the current Forest Plans was the lack of a desired future condition for aquatic resources (aquatic, riparian and wetland ecosystems). Under Alternatives 2-9 and the Selected Alternative, goals, objectives, standards and guidelines provide clear direction for the management of aquatic ecosystems. This management direction focuses on protecting or restoring the ecological integrity of the system. changes such as reducing the number of stream crossings by motorized vehicles, increasing the heterogeneity of substrate within streams, and aggressive control of aquatic NNIS will improve habitat quality for TES, RFSS and other aquatic species.

Ecosystem restoration to conditions more closely approximating historic conditions in terms of age class distribution, species composition, and structural characteristics is a priority under Alternatives 2-9 and the Selected Alternative. The proposed Plan provides further direction towards historic conditions in terms of patch size and connectivity of natural areas at a landscape scale through management of large blocks with dispersal corridor functions considered in their placement. Species that are expected to benefit from this management direction are those that favor interior forest conditions for all or some portion of their life cycle such as the Northern Goshawk, Red-shouldered hawk, Cerulean warbler, and the West Virginia White butterfly, among others. Gray wolves may also find these areas suitable as travel corridors if they do not inhabit them on a more permanent basis. Theoretically, large block management of northern hardwoods with the aim of creating interior forest conditions should benefit RFSS plants through a decrease in herbivory by deer as discussed previously (see *Management Area Summary and Possible Effects on TES and RFSS*).

Areas with old-growth characteristics or the potential to develop old-growth features (heterogeneous age structure with many older trees, trees with cavities, and sizable coarse woody debris) have been identified in Alternatives 2-9 and the Selected Alternative as areas to be managed emphasizing the maintenance or enhancement of these features. These old growth and developing old growth areas are expected to contribute to ecosystem restoration efforts and to promote the maintenance or improvement of habitat for RFSS plants and animals found in these areas and the embedded riparian, wetland, and aquatic habitats in them.

Alternatives 2-9 and the Selected Alternative have an increased emphasis over the current Plans on meeting the requirements of mature forest-dependent wildlife species. The existing Plans tend to focus on early successional species and habitats and do not sufficiently provide for area-sensitive or edge-sensitive species.

General Summary of the Impacts of Designating Areas as Research Natural Areas or Special Management Areas on TES and RFSS

Research Natural Areas or Special Management Areas under the 2004 *Forest Plan* represent a greater sample of the historic vegetative communities, are better coordinated into a reserve network, and include a greater variety of areas with outstanding scenic, recreational, geological, paleontological, botanical, and zoological features than do the current Forest Plans. RNAs were chosen because they represent high quality ecological communities and exhibit minimal evidence of past human disturbance. Because of this, late-successional upland forest types such as northern hardwoods, northern hardwoods/hemlock, and mixed conifer forest types predominate and RFSS associated with these habitats such as *Botrychium* spp., *Panax quinquefolius* and *Dryopteris expansa*, American marten, northern goshawk and cerulean warbler should benefit.

General Summary of the Impacts of the Gathering of Special Forest Products on TES and RFSS

The effects to TES and RFSS of permitted gathering of special forest products such as birch bark, Christmas trees, conifer cones and boughs, firewood, sheet moss etc. are unknown but are expected to be minimal due to the limited extent on which these activities occur and the relatively small amount of material that is removed from the Forest.

Standards and Guidelines

Forest Service staff, with input from the Species Viability Evaluation Process that included expert panels in 2000 and 2002, crafted Standards and Guidelines (see Forestwide Standards and Guidelines in chapter 2 of the Forest Plan) designed to provide direction at both coarse and fine scales to create or maintain ecological conditions that contribute to long-term species abundance and distribution. Standards and Guidelines are Forestwide and preclude any specific Management Area prescriptions or other management goals. They assist in the prevention of a Determination of “May Impact Individuals and (be) Likely to Result in a Trend to Federal Listing or Loss of Viability” (MILT).

Specific Standards and Guidelines are discussed in each section as they relate to species and species groups.

Summary of Determinations

Tables J-2 and J-3 are a quick reference of the Determinations made for the TES and RFSS listed species. Table J-2 summarizes the listed plants, and Table J-3 summarizes the listed animals.

Table J-2. Determination Summary for the Chequamegon-Nicolet National Forests TES and RFSS Plants

Species Group	Alternatives for the Chequamegon-Nicolet National Forest								
	1- C/N	2	3	4	5	6	7	9	SA
Mesic Hardwood Forests	MINT/MINT	MINT	BI	BI	MINT	MINT	MINT	BI	NI
Dry to Dry Mesic Forests	MINT/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Barrens and Open Upland	NI/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Cliff, Talus, Exposed Rock	NI/MINT	MINT	BI	BI	MINT	MINT	MINT	MINT	MINT
Aquatic Habitat	MINT/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Marsh and Shrub Carr Habitat	NI/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Shore Habitat	MINT/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Bog/Fen Habitat	NI/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT
Forested Wetland Habitat	NI/MINT	MINT	BI	BI	MINT	MINT	MINT	MINT	MINT

Table J-3. Determination Summary for the Chequamegon-Nicolet National Forests TES and RFSS Animals.

Common Name	Alternatives for the Chequamegon-Nicolet National Forests								
	1	2	3	4	5	6	7	9	SA
Bald eagle	NI	NI	NI	NI	NI	NI	NI	NI	NI
Gray wolf	NI	BI	BI	BI	BI	BI	BI	BI	BI
Northern goshawk	MINT	MINT	BI	BI	BI	BI	BI	BI	BI
LeConte's sparrow	NI	BI	BI	BI	BI	BI	BI	BI	BI
Red-shouldered hawk	MINT	MINT	BI	BI	BI	BI	BI	BI	BI
Black tern	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Trumpeter swan	NI	BI	BI	BI	BI	BI	BI	BI	BI
Spruce grouse	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Connecticut warbler	NI	BI	BI	BI	BI	BI	BI	BI	BI
Black-backed woodpecker	NI	BI	BI	BI	BI	BI	BI	BI	BI
Sharp-tailed grouse	NI	BI	BI	BI	BI	BI	BI	BI	BI
Upland sandpiper	NI	BI	BI	BI	BI	BI	BI	BI	BI
Swainson's thrush	NI	NI	BI	BI	BI	BI	BI	BI	BI
Cerulean warbler	NI	NI	NI	NI	NI	NI	NI	NI	NI
American marten	NI	NI	BI	BI	BI	BI	BI	BI	BI
Wood turtle	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Lake sturgeon	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Greater redhorse	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Pugnose shiner	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Ellipse mussel	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Henry's elfin butterfly	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Northern blue butterfly	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Chryxus arctic butterfly	MINT	BI	BI	BI	BI	BI	BI	BI	BI
Tawny crescent butterfly	MINT	BI	BI	BI	BI	BI	BI	BI	BI
West Virginia white butterfly	MINT	NI	BI	BI	BI	BI	BI	BI	BI
Extra-striped snaketail dragonfly	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Pygmy snaketail dragonfly	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Zebra clubtail dragonfly	MINT	NI	NI	NI	NI	NI	NI	NI	NI
Green-faced clubtail dragonfly	MINT	NI	NI	NI	NI	NI	NI	NI	NI

Biological Evaluations of TES and RFSS Plants

Introduction

When a species occurs within the proclamation boundary, it is eligible for inclusion on the Regional Forester Sensitive Species (RFSS) list if it meets the other listing criteria such as a Federal listing by the U.S. Fish and Wildlife Service and a Global, Trinomial, or National Rank of 1-3 by The Nature Conservancy (USDA 2001). There are 54 plant

species listed as RFSS on the Chequamegon-Nicolet National Forests. Additionally, there are 12 plant species listed as likely to occur (LRFSS). The Chequamegon-Nicolet NF falls within the habitat range and has suitable potential habitat for these LRFSS, but they have not yet been found on the Forest. Finally, there is one plant species listed as Threatened by the US Fish and Wildlife Service. The species, their respective Statuses and most dominant Habitat Groups are given in Table J-4.

Table J-4. Chequamegon-Nicolet National Forests RFSS, LRFSS, and Threatened Plants.

Species	Common Name	Forest Status	Habitat Group
Amerorchis rotundifolia	Round-leaved orchis	RFSS	9 Forested Wetland
Arabis missouriensis var. deamii	Missouri rock cress	RFSS	3 Upland Open
Asplenium trichomanes-ramosum	Green spleenwort	RFSS	4 Rock
Astragalus alpinus	Alpine milkvetch	RFSS	7 Shore
Botrychium minganense	Mingan's moonwort	RFSS	1 Mesic Forest
Botrychium mormo	Goblin fern	RFSS	1 Mesic Forest
Botrychium oneidense	Blunt-lobed grape-fern	RFSS	1 Mesic Forest
Botrychium rugulosum	Ternate grape-fern	RFSS	3 Upland Open
Callitriche hermaphroditica	Northern water-starwort	RFSS	5 Aquatic
Calypso bulbosa	Fairy slipper	RFSS	9 Forested Wetland
Cardamine maxima	Large toothwort	LRFSS	1 Mesic Forest
Carex assiniboinensis	Assiniboine sedge	RFSS	1 Mesic Forest
Carex backii	Rocky Mountain Sedge	RFSS	2 Dry Forest
Carex crawei	Crawe's sedge	RFSS	9 Forested Wetland
Carex gynocrates	Northern bog sedge	RFSS	9 Forested Wetland
Carex lenticularis	Shore sedge	LRFSS	7 Shore
Carex livida var radicaulis	Livid sedge	RFSS	8 Bog/Fen
Carex michauxiana	Michaux's sedge	RFSS	7 Shore
Carex sychnocephala	Many-headed sedge	RFSS	7 Shore
Carex vaginata	Sheathed sedge	RFSS	9 Forested Wetland
Ceratophyllum echinatum	Spineless hornwort	RFSS	5 Aquatic
Cynoglossum virginianum var. boreale	Northern wild comfrey	RFSS	2 Dry Forest
Cypripedium arietinum	Ram's-head lady's-slipper	RFSS	9 Forested Wetland
Diplazium pycnocarpon	Glade fern	RFSS	1 Mesic Forest
Disporum hookeri	Fairy bells, Hooker's mandarin	LRFSS	1 Mesic Forest
Dryopteris expansa	Spreading wood fern	RFSS	1 Mesic Forest
Dryopteris filix-mas	Male fern	RFSS	1 Mesic Forest
Dryopteris fragrans	Fragrant fern	RFSS	4 Rock
Eleocharis engelmannii	Engelmann's spike-rush	LRFSS	7 Shore
Eleocharis olivacea	Capitate spike-rush	RFSS	7 Shore
Eleocharis quinqueflora	Few-flowered spike-rush	RFSS	7 Shore
Epilobium palustre	Marsh willow-herb	RFSS	6 Marsh
Equisetum palustre	Marsh horsetail	RFSS	7 Shore
Eriophorum chamissonis	Rusty cotton-grass	RFSS	8 Bog/Fen

Species	Common Name	Forest Status	Habitat Group
<i>Geum macrophyllum</i> var. <i>macrophyllum</i>	Large-leaved avens	RFSS	2 Dry Forest
<i>Juglans cinerea</i>	Butternut	RFSS	1 Mesic Forest
<i>Juncus stygius</i>	Moor rush	RFSS	8 Bog/Fen
<i>Leucophysalis grandiflora</i>	Large-flowered ground-cherry	RFSS	3 Upland Open
<i>Listera auriculata</i>	Auricled twayblade	LRFSS	7 Shore
<i>Listera convallarioides</i>	Broad-leaved twayblade	LRFSS	1 Mesic Forest
<i>Littorella uniflora</i>	American shore-grass	RFSS	7 Shore
<i>Malaxis brachypoda</i>	White adder's-mouth	RFSS	9 Forested Wetland
<i>Medeola virginiana</i>	Indian cucumber-root	RFSS	1 Mesic Forest
<i>Moehringia macrophylla</i>	Large-leaved sandwort	RFSS	4 Rock
<i>Myriophyllum farwellii</i>	Farwell's water-milfoil	RFSS	5 Aquatic
<i>Oryzopsis canadensis</i>	Canada mountain rice-grass	RFSS	2 Dry Forest
<i>Oxytropis campestris</i> var. <i>chartacea</i>	Fassett's locoweed	TES	7 Shore
<i>Panax quinquefolius</i>	American ginseng	RFSS	1 Mesic Forest
<i>Parnassia palustris</i>	Marsh grass-of-parnassus	RFSS	7 Shore
<i>Petasites sagittatus</i>	Arrow-leaved sweet colt's-foot	LRFSS	6 Marsh
<i>Platanthera flava</i> var. <i>herbiola</i>	Pale-green orchid	LRFSS	8 Bog/Fen
<i>Poa paludigena</i>	Bog bluegrass	LRFSS	1 Mesic Forest
<i>Polemonium occidentale</i> var. <i>lacustre</i>	Western Jacob's-ladder	RFSS	9 Forested Wetland
<i>Polystichum braunii</i>	Braun's holly fern	RFSS	1 Mesic Forest
<i>Potamogeton confervoides</i>	Algal-like pondweed	RFSS	5 Aquatic
<i>Potamogeton hillii</i>	Hill's pondweed	RFSS	5 Aquatic
<i>Potamogeton pulcher</i>	Spotted pondweed	LRFSS	5 Aquatic
<i>Pterospora andromeda</i>	Giant pinedrops	LRFSS	2 Dry Forest
<i>Pyrola minor</i>	Lesser wintergreen	RFSS	9 Forested Wetland
<i>Ranunculus gmelinii</i>	Small yellow water-crowfoot	RFSS	5 Aquatic
<i>Ranunculus lapponicus</i>	Lapland buttercup	LRFSS	9 Forested Wetland
<i>Rhynchospora fusca</i>	Brown beak-sedge	RFSS	8 Bog/Fen
<i>Streptopus amplexifolius</i>	White mandarin	RFSS	1 Mesic Forest
<i>Tiarella cordifolia</i>	Heart-leaved foam flower	RFSS	1 Mesic Forest
<i>Ulmus americana</i>	American elm	RFSS	9 Forested Wetland
<i>Vaccinium cespitosum</i>	Dwarf bilberry	RFSS	3 Upland Open
<i>Valeriana uliginosa</i>	Marsh valerian	RFSS	6 Marsh

Key to Habitat affinity groups:

Upland:

1 Mesic Forest – mesic hardwood dominated forest

2 Dry Forest – dry to dry-mesic mixed and conifer forest

3 Upland Open – upland open, barrens/savannah

4 Rock – cliff; talus slope and exposed rock, either open or forested

Wetland:

5 Aquatic – lake, river, stream

6 Marsh – open marsh (cattails, sedge meadow), shrub carr

7 Shore – shallow water/littoral zone; fluctuating shore

8 Bog/fen – bog/fen mostly open

9 Forested Wetland – black spruce, tamarack, white cedar and mixed conifer and hardwood swamp (black ash, silver maple)

Effects Reporting Rationale

In this section of the Biological Evaluation, TES and RFSS plants were grouped by general habitat preference. Each grouping discusses Key Factors, Resource Protection Measures, Effects on Habitat-Direct and Indirect, Effects on Populations-Direct and Indirect, Cumulative Effects, and Species with specific mitigating Standards and Guidelines. Due to the programmatic nature of the *2004 Forest Plan*, this grouping approach was determined to be the most efficient method of communicating differences in proposed alternatives on TES and RFSS plants. More specific effects on certain TES and RFSS plant sites are determined at the project level and are therefore beyond the scope of this document.

Key Factors are important elements affecting populations, as described previously in the general introduction that may be either positive or negative. These factors were identified within each habitat group. The 'Resource Protection Measures' heading highlights measures that focus on protection of TES and RFSS plants, especially those designed into the Standards and Guidelines. The other headings are self-explanatory.

The Determinations for effects of management practices are sometimes BI (beneficial impact) or MINT (may impact individuals but not likely to cause a trend to Federal listing or loss of viability), despite Expert panel outcome ratings (i.e. Ecological Judgments) that indicate ecological conditions would not provide long-term abundance and distribution (outcomes D and E). This is because most TES and RFSS plants are habitat specialists, found in isolated patches and at low numbers. Botanical experts believe this may be their historic and natural ecological condition (SVE 2002). Standards and Guidelines have been designed to protect them, and therefore the effects of management practices on these species are minimal. The Ecological Judgments as well as habitat quality and habitat quantity are components of the Determination, so despite the lower rating for the Ecological Judgments, the overall Determinations are more positive due to their focus on the effects of management practices on known populations rather than the species' natural propensity for rarity.

Threats to CNNF Species Long-term Abundance and Distribution

Below is a list of threats to TES and RFSS plants. Some threats are common to all plants while others may be unique to a particular species. These threats can have direct or indirect effects on the ecological conditions that contribute to the long-term abundance and distribution of plants. Those threats that can be mitigated by Forest Service action or policy are given greater emphasis throughout this Biological Evaluation.

1. Timber Harvest – Plant locations not discovered through screening and survey may be damaged by logging activity, road building, or soil compaction. This could negatively affect individuals and populations. Indirect effects like desiccation of soil from loss of canopy cover, changes in species composition, increased risk of invasion by Non-native Invasive Species (NNIS), and loss of habitat continuity from fragmentation also may occur.
2. NNIS may out-compete TES and RFSS species for nutrients, light and space. NNIS are the second leading cause of population loss in rare species (Wilcove *et al.* 1998). For example, the zebra mussel can change water chemistry. Introduced species of earthworms that consume the duff layer on the forest floor make conditions unfavorable for species that require specific habitat conditions, and plants like spotted knapweed can alter chemical conditions and take over ecosystems.

3. Herbivory – Herbivory can be inflicted by several kinds of animals, most notably on the Forests are insects and deer. Deer herbivory can limit certain plant reproduction or eliminate a species in an area where deer populations are high. Species that are particularly affected by deer browsing include the following: *Amerorchis rotundifolia*, *Calypso bulbosa*, *Cynoglossum virginianum* var. *boreale*, *Cypripedium arietinum*, *Leucophysalis grandiflora*, *Malaxis brachypoda*, *Medeola virginiana*, *Platanthera flava* var. *herbiola*, *Polemonium occidentale* var. *lacustre*, and *Streptopus amplexifolius* (Alverson *et al.* 1988, Miller *et al.* 1992, Balgooyen and Waller 1995, Augustine and Frelich 1998, Rooney 2001). Insect herbivory usually affects the tree canopy, which changes microclimatic conditions for rare understory plant species.
4. ATV - The Species Viability Evaluation experts identified increased use of ATVs as one of the greatest threats to small plant populations. ATVs can increase access to previously remote areas, do physical damage by rutting, and can carry seeds of NNIS plants and exotic earthworm casings into less disturbed areas.
5. Roads and Trails – Construction and maintenance of roads and trails can cause hydrologic and soil changes, open canopies, increased sunlight, and an increase in the transportation and germination of NNIS seeds and plant materials.
6. Collecting – Illegal collecting is a particular problem for at least one species, ginseng. Orchids, ferns, and several listed species with known medicinal effects are also collected.
7. Lack of fire - Species adapted to early successional conditions maintained by fire have been negatively affected by past fire suppression.

Standards and Guidelines

To create a baseline for comparison between alternatives, it is necessary to have a good understanding of the Standards and Guidelines currently in place on the Chequamegon-Nicolet National Forests and these same Standards and Guidelines would hold for Alternative 1. The text provided here is to allow the reader a point of reference to understand what specialists based comparisons on when discussing the differences between the current condition and the alternatives in the *2004 Forest Plan*.

Alternative 1: Summary of Current Standards and Guidelines for Chequamegon-Nicolet National Forests

The Standards and Guidelines for the Chequamegon National Forest in its 1986 Plan were separate and different from the Standards and Guidelines for the Nicolet National Forest in its 1986 Plan.

Nicolet National Forest

(Land and Resource Management Plan, Nicolet National Forest, 1986, USDA Forest Service Region 9)

Standards and Guidelines for all RFSS plants (in the 1986 plans called ‘Sensitive Species’).

1. “Sensitive Species” A listing of candidate sensitive species for the Nicolet, together with the probable effects of management practices on them, is given in the matrix of Table 15 (A final sensitive species list will be using each Forest’s candidate list). Species not selected as sensitive species will be considered species of Nicolet Forest concern and will be managed according to the standards and

guidelines given below. The complete Candidate Sensitive Species List Evaluation Process, developed in cooperation with the Wisconsin DNR and the Nature Conservancy, is on file at the Nicolet Supervisor's Office, Rhinelander, Wisconsin.

2. A biological evaluation is required where negative effects are shown to be possible for species with known locations. However, if standards and guidelines or other protection measures (such as inclusion in a RNA or 8.1 Management Area, or Forestwide allocation of essential habitat) eliminate negative effects of management practices, a biological evaluation will not be needed.

Standards and Guidelines for Specific Species.

1. Dwarf Bilberry- Maintain existing upland sod openings and reclaim selected previously planted upland sod openings (3 acres and larger in size). Some maintenance will be done through prescribed burning to favor remnant open grassland vegetation.
2. Ginseng- Harvesting of ginseng without a permit (Form 2400-14) is a violation of 36 CFR 261.6(h). District Rangers will not grant permits for harvesting of ginseng from National Forest Lands.
3. Calypso, Stoloniferous Sedge, Northern Bog Sedge, Sheathed Sedge, Ram's head Lady's Slipper, Stygian Rush, White Adder's Mouth, Small Round-Leaved Orchid, Small Purple Bladderwort, Showy Lady's Slipper- Control beaver (in conjunction with the WDNR) and remove beaver dams in areas of known rare plant sites threatened by flooding. Also protected under MA 8.1.
4. Missouri Rock-cress, Rugulose Grape Fern, Braun's Holly Fern, Foam Flower- Protected under general Standards and Guidelines and when occurring in or placed in one of the following areas: Wilderness, research natural area/scientific areas, special areas, MA 8.1, and 1.2, 2.2, 3.2, 4.2, 6.2, and 9.2.

Chequamegon National Forest

(Land and Resource Management Plan, Chequamegon National Forest, 1986, USDA Forest Service Region 9)

Standards and Guidelines for all RFSS plants.

1. "Threatened and sensitive plants known to occur on the Chequamegon National Forest are listed in Table IV-14. Sensitive species are species that may not have viable populations on the Forest. Known locations are based primarily on an inventory done under contract by Wisconsin Department of Natural Resources and reported in 'Field survey report on endangered, threatened and rare vascular plants of the Chequamegon National Forest, Wisconsin' by W. Alverson and S. Solheim (1981)."
2. "A biological evaluation will be done to assess impacts of projects on known and potential habitat of sensitive species listed in Table IV-14, including the need to do additional survey for those species, other species listed as endangered, threatened, or of special concern by Wisconsin Department of Natural Resources (DNR) and having the potential of being impacted by the project, or any others listed on a future approved update of the Regional Forester's Eastern Region Sensitive Species of Plants."

3. “As new sites or new sensitive species are identified, they will be protected according to existing recommendations or new management recommendations will be provided.”
4. “Inventory, planning, management, and monitoring will be coordinated with Wisconsin DNR. Management will attempt to provide suitable habitat for possible population growth. Monitoring of known populations will be conducted as outlined in Table V-2.”
5. “No habitat alteration is permitted that may significantly alter the microclimate or soil and water regimes of existing sensitive species habitat. This will normally require a minimum plant protection area of at least 100 to 500 feet depending on the nature of habitat change and the area, or in some cases may extend to a topographic or watershed boundary. Detailed maps showing areas where management for sensitive plants is to be emphasized will be maintained in Forest Supervisors and District offices and classified as administratively confidential.”
6. Within known locations of threatened or sensitive plant populations, including the habitat maintenance zone:
 - ✓Vegetation management will be limited to practices that maintain or enhance the habitat of the threatened or sensitive species, unless a biological evaluation concludes that management will not adversely affect that habitat.
 - ✓Grazing will not be permitted.
 - ✓Recreation use will be discouraged or prohibited, including climbing of those cliffs that provide habitat for sensitive plants. Motor-driven vehicles and mountain bikes will be prohibited where possible, or else discouraged. Controlling recreation use along lakeshores will require working cooperatively with the State below the water line.
 - ✓Mineral exploration or development that causes surface alteration will not be permitted (when within the discretion of the Forest Service).
 - ✓No additional roads or access points will be located, unless to provide access necessary to maintain or enhance threatened or sensitive species habitat, or unless a biological evaluation concludes that road construction and maintenance or the access provided will not adversely affect that species habitat.
 - ✓Artificial manipulation of water levels of streams or lakes providing habitat for threatened or sensitive plants will not be permitted unless needed to control undesirable competing vegetation, or unless a biological evaluation concludes it will not adversely affect that species habitat.
 - ✓Activities that affect water tables (levels) or the physical and chemical characteristics of lakes and streams in a manner that is detrimental to the habitat not permitted. Examples of such activities include dams, off-site road construction or reconstruction, and liming of lakes. Except in designated wilderness, beaver and beaver dams will be removed in areas of known threatened or sensitive plants if the beaver activity has potential to cause damage to the plants.
 - ✓All recovery efforts for Fassett’s locoweed will be in compliance with the Recovery Plan. Such a plan outlines methods to create a viable species population.

- ✓ The feasibility of protecting Canada yew plants from deer or snowshoe hare browsing will be considered in an environmental assessment where that species occurs within a project area. Methods such as fencing may be implemented.
- ✓ Do not use pesticides where their effects may impact threatened, endangered or sensitive plants or animals included in the Federal and State of Wisconsin official lists.

Alternative 2–9 and the Selected Alternative: Summary of Proposed Standards and Guidelines for Chequamegon-Nicolet National Forests

There are four groups of Standards and Guidelines that protect RFSS, LRFSS, and Threatened species of plants directly or indirectly: Those that are Forestwide and protect specific habitats; those that are Forestwide and protect RFSS and LRFSS plants in general; those that are Forestwide and protect individual species; and those that are specific to Management Areas. They are all reviewed in this section, except those Standards and Guidelines that protect individual species and which are covered under the habitat groups in which the respective species are found.

Those RFSS and LRFSS located in lowland forest habitat types are protected from timber harvesting and motorized activities through Forestwide Standards and Guidelines. Lowland forest types include: hemlock, lowland black spruce, cedar, tamarack, mixed swamp conifers, cedar/paper birch, black ash/elm, wet red maple, mixed lowland hardwoods, open lowland, and open upland. These forest types do occur within other kinds of Management Areas that allow harvesting and motorized activities. For more information on protection measure for these areas see Chapter 2 of the Forest Plan (Standards and Guidelines) under Water Resources, Wetlands Management, Woodland Ponds, and Mixed Lowland Conifers, Lowland Hardwoods, and Hemlock.

A summary of Forestwide Standards and Guidelines that are common to Alternatives 2-9 and the Selected Alternative and that provide resource protection measures applicable to management of plant species follows:

- A Standard to evaluate each project. A survey for TES and RFSS species when appropriate (cf. Forest Service ltr. 9/24/1999, 1950/2400/2670, OIG Evaluation Report No. 08801_10-At).
- A guideline limiting mineral activities within 500 ft of RFSS plant sites to practices that maintain habitat conditions.
- A Standard to prohibit the collection of RFSS plants, except for scientific or educational purposes, or for the conservation or propagation of the species. Collection must be authorized by Forest Service permits.
- A Standard that addresses the habitats of RFSS. It reads as follows: “Vegetation management within 100-500 feet of RFSS plant and animal sites will be limited to practices that maintain or enhance habitat and micro-climatic conditions.”
- Guideline to exclude heavy logging equipment from wet areas or reserved areas.
- Guidelines to use Wisconsin’s Forestry Best Management Practices (1995) in riparian zones.
- Guideline prohibiting livestock grazing and restricting recreational activities as needed within 500 ft of an RFSS site.
- Guideline to maintain stand level ecosystem components, patterns, and pit and mound micro-topography.

- Guideline to avoid modifying microclimate and microhabitat conditions within steep ravines, cliffs, talus slopes, and areas of exposed bedrock. Protect plant species of viability concern by not clearcutting these areas.
- Guidelines to maintain long-term soil productivity and prevent any significant impairment of the land by: (1) maintaining acceptable amounts of ground cover; (2) minimizing soil displacement, erosion rutting, nutrient loss, compaction and the effects of severe burning; (3) restoring and re-vegetating disturbed areas; leave the topsoil in place.
- Guidelines for Construction and Use of Motorized Trails to avoid (when possible) wetlands and riparian areas when designing new ATV trail.
- Guideline limiting the size of temporary openings to not more than 40 acres (except in MA 4C and 8C).
- Guideline to protect hydrologic function and maintain hydrologic regimes.

The following is a summary of Management Area (MA) resource protection measures that are applicable to habitat management of understory plants. For more details see Chapter 3 Management Area Direction in the *2004 Forest Plan*.

- Standards and Guidelines in MA 2A, 2B and 3A, 3B pertaining to managing for large patches of closed canopy forest which will provide shade and maintain soil moisture conditions.
- Guideline in MA 2B that restricts harvest on northern hardwood sites to frozen ground conditions.
- Guidelines in MA 6A stating that timber harvesting is normally not allowed and that motorized use is not allowed.
- Standards in MA 5B that prohibit timber harvest and motorized use.
- Standards and guidelines in MA 8E, 8F and 8G that prohibit disturbance and restrict vegetation, wildlife and fisheries management to those activities that maintain or enhance the character of the area (RNA, SMA or Old Growth and Natural Feature Complexes, respectively).

Possible Effects on TES and RFSS plants

Species Viability Evaluation (SVE) Results

A Species Viability Evaluation (SVE) was convened in 2002 for the purpose of soliciting the opinion of expert botanists on Ecological Judgments based on the Plan alternatives. Some of the plants on the RFSS list were evaluated in detail but assumptions were made about management of each habitat type that would affect all species in a similar way. Therefore, Determinations apply to the species in the respective habitat group. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations and that the Alternatives with higher acreages of Ecological Reference Areas, older forests, and interior forest, and with the least ATV access, would better maintain ecological conditions that contribute to the abundance and distribution of species (SVE 2002). These protected areas and restoration zones would serve as habitat refugia (Noss and Scott 1997). They also agreed that a substantial reduction in the deer population in northern Wisconsin would benefit understory plants (SVE 2002).

Most TES and RFSS plants are habitat specialists, found in isolated patches and at low numbers. Botanical experts believe this may be their historic and natural ecological condition (SVE 2002).

On average, the expert botanists gave RFSS plants higher outcome ratings in Alternatives 3, 4 and 9. The lowest outcomes were predicted in Alternative 1 followed by 2. While generally rated much better than Alternatives 1 and 2, Alternatives 5, 6 and 7 were not as favorable to rare plants as were Alternatives 3, 4, and 9 (SVE 2002). The Selected Alternative was developed after the SVE panel commenced and, consequently, was not evaluated in the SVE process.

TES and RFSS Plant Locations and the Effects of Management Areas

Element Occurrences

For this section, an analysis using ArcView was conducted showing the location of existing element occurrences (EO) of RFSS plants and the Management Areas in which they have been found. According to the National Heritage Inventory (NHI), an element occurrence is “a population of a species or an example of a natural community or natural feature naturally occurring at a specific, ecologically appropriate location” (NHI 1999).

The databases used in the ArcView program are from the most updated files as of August 2002. The following species occur on the Forest, were discovered more recently, have not yet been listed in the database, and are not listed in Table J-5: *Equisetum palustre*, *Cynoglossum virginianum* var. *boreale*, *Dryopteris filix-mas*, *Geum macrophyllum* var. *macrophyllum*, *Oryzopsis canadensis*, and *Valeriana uliginosa*. Plants listed as likely to occur (LRFSS) have not been documented on the Forest.

RFSS plants that occur in aquatic habitats were included in this analysis because activity that might occur near the body of water where the species are located could affect the site itself. Therefore, aquatic plant species and the respective Management Areas in which they have been found are listed in the table below.

Element Occurrences by Management Areas

This analysis focused on the effects of Forest Service activities on Forest Service lands via the designated Management Area Prescriptions upon RFSS plants. RFSS sites on private or other property (*i.e.*, State) were not included in this analysis.

The locations of these sites were divided into two categories; those that *do not* allow any timber harvesting activities or motorized transportation, and those that *do*. Management Areas that do not allow timber harvest or motorized activities include the following: 5, 5B, 6A, 8E, 8F, and 8G. Management Areas 8E, 8F, and 8G are also known as Ecological Reference Areas and can occur within other Management Areas. Ecological Reference Areas have common goals of providing benchmark ecological conditions for monitoring and research, providing refugia for rare species such as TES and RFSS and others, and providing ecological conditions or functions that are otherwise unavailable across the landscape. Synopses of the MA's that do allow timber harvest were presented above in the general Introduction.

Table J-5 displays the total number of element occurrences, number of occurrences found within areas where no timber harvest or motorized use is expected to occur, and number found in areas where harvest and motorized use may occur. Management Areas that allow timber harvest and motorized activities are also listed. RFSS plant occurrences within LAD areas or lowlands were considered as *protected*, regardless of the MA designation in which the species was found.

Table J-5. RFSS sites listed by plant species in their prospective MA s by alternatives

Species	E.O.*			MAs that allow timber harvesting and motorized activities that also have EOs							
	Total	Protected	Not Protected*	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt.7	Alt. 9	Sel. Alt.
<i>Amerorchis rotundifolia</i>	5	4	1	1C	1C	1C	1C	1C	1C	1C	2B
<i>Arabis missouriensis</i> var <i>deamii</i>	18	8	10	1A, 1B, 1C, 2C, & 4A	1A, 1C, 2B, 4A & 4B	1A, 1C, 2C & 4A	1A, 1B, 1C, 2C, & 4A	1A, 1B, 1C, 2C, & 4A	1A, 1B, 1C, 2C, & 4A	1A, 1C, 2C & 4A	1A, 1B, 1C, 2A, 2C, 3B & 4A
<i>Asplenium trichomanes-ramosum</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Astragalus alpinus</i>	3	1	2	3C & 4A	2C & 4A	2C & 4A	3C & 4A	3C & 4A	3C & 4A	2C & 4A	3C & 4A
<i>Botrychium minganense</i>	6	1	5	2C & 3C	2A, 2B & 2C	2A, 2B & 3C	2A, 2B & 3C	2C & 3C	2A, 2B & 3C	2A & 2C	2A, 2B & 3C
<i>Botrychium mormo</i>	61	15	46	1A, 1C, 2A, 2C, 8A & 8D	1A, 1B, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D	1A, 1C, 2A, 2B, 2C, 8A & 8D
<i>Botrychium oneidense</i>	9	2	7	1A & 2C	1A & 2B	1A & 2A	1A, 2A & 2C	1A & 2C	1A, 2A & 2C	1A, 2A & 2B	1A, 2A & 2C
<i>Botrychium rugulosum</i>	12	4	8	1B, 2A, 2B, 3C, 4A, 4B & 8A	1B, 2B, 2C, 4A, 4B & 8A	1B, 2B, 2C, 4A, 4B & 8A	1B, 2B, 3C, 4A, 4B & 8A	1B, 2B, 3C, 4A, 4B & 8A	1B, 2B, 3C, 4A, 4B & 8A	1B, 2B, 3C, 4A, 4B & 8A	1B, 2B, 3C, 4A, 4B & 8A
<i>Callitriche hermaphroditica</i>	1	0	1	2C	2B	Protected	2A	2C	2A	2B	2A
<i>Calypso bulbosa</i>	18	15	3	2A & 2C	2B & 2C	2A & 2C	2A, 2B & 2C	2A, 2B & 2C	2A, 2B & 2C	2A, 2B & 2C	2A, 2B & 2C
<i>Carex assiniboinensis</i>	6	1	5	2A & 2C	2B	2A & 2B	2A, 2B & 2C	2A, 2B & 2C	2A	2A & 2B	2A, 2B & 2C
<i>Carex backii</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Carex crawei</i>	4	1	3	1C & 2C	1C	1C	1C & 2B	1C & 2B	1C	1C & 2B	1C & 2B
<i>Carex gynocrates</i>	11	8	3	1C, 2C & 3C	1C, 2B & 3C	2A & 2B	1C, 2B & 3C	1C, 2B & 3C	1C, 2B & 3C	1C, 2B & 3C	1C, 2B & 3C
<i>Carex livida</i> var <i>radicaulis</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Carex michauxiana</i>	1	0	1	1B	3C	3C	3C	1B	3C	3C	3C
<i>Carex sychnocephala</i>	1	0	1	4A	4A	4A	4A	4A	4A	4A	2A
<i>Carex vaginata</i>	6	3	3	2A, 2C & 4A	2A, 2C & 4B	2A, 2C & 4A	2A, 2C & 4A	2A, 2C & 4A	2A, 2C & 4A	2A, 2C & 4A	2A, 2C & 4A
<i>Ceratophyllum echinatum</i>	2	1	1	2A	2B	2B	2A	2A	2A	2B	2A
<i>Cypripedium arietinum</i>	2	2	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Diplazium pycnocarpon</i>	3	2	1	1A	1A	1A	1A	1A	1A	1A	1A
<i>Dryopteris expansa</i>	8	6	2	2A & 8A	2B & 8A	2B & 8A	2B & 8A	2B & 8A	2B & 8A	2B & 8A	2B & 8A
<i>Dryopteris fragrans</i> var <i>remotiuscula</i>	15	10	5	2A & 2C	2B	2B	2A & 2B	2B & 2C	2B & 2C	2B & 2C	2A & 2B

Species	E.O.*			MAs that allow timber harvesting and motorized activities that also have EOs							
	Total	Protected	Not Protected*	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt.7	Alt. 9	Sel. Alt.
<i>Eleocharis olivacea</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Eleocharis quinqueflora</i>	1	0	1	1C	1C	1C	1C	1C	1C	1C	1C
<i>Epilobium palustre</i>	3	3	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Eriophorum chamissonis</i>	1	0	1	1B	4A	4A	4A	1B	4A	4A	4A
<i>Juglans cinerea</i>	2	1	1	2A	Protected	Protected	2A	Protected	Protected	Protected	2A
<i>Juncus stygius</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Leucophysalis grandiflora</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Littorella uniflora</i>	1	0	1	2A	2B	2B	2B	2B	2B	2B	2B
<i>Malaxis brachypoda</i>	21	18	3	1C & 2A	1C & 2B	1C & 2B	1C, 2A, & 2B	1C & 2C	1C & 2B	1C & 2B	1C, 2A, & 2B, 4B
<i>Medeola virginiana</i>	15	13	2	1C & 3C	1C & 3C	1C & 3C	1C & 3C	1C & 3C	1C & 3C	1C & 3C	1C & 3C
<i>Moehringia macrophylla</i>	1	0	1	2A	2B	2B	2B	2B	2B	2B	2B
<i>Myriophyllum farwellii</i>	4	3	1	2A	2B	2B	2B	2B	2B	2B	2B
<i>Oxytropis campestris</i> var. <i>chartacea</i>	2	2	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Panax quinquefolius</i>	16	6	10	2A, 2C, 8A & 8D	2A, 2B, 8A & 8D	2A, 2B, 8A & 8D	2A, 2B, 2C, 8A & 8D	2A, 2B, 2C, 8A & 8D	2A, 2B, 2C, 8A & 8D	2A, 2B, 8A & 8D	2A, 2B, 2C, 8A & 8D
<i>Parnassia palustris</i>	1	0	1	1A	1C	1C	1C	1A	1C	1C	1C
<i>Polemonium occidentale</i> var. <i>lacustre</i>	3	2	1	8D	8D	8D	8D	8D	8D	8D	8D
<i>Polystichum braunii</i>	6	3	3	2A, 2B & 2C	2B	2A & 2B	2A, 2B & 2C	2A, 2B & 2C	2A, 2B & 2C	2A & 2B	2A, 2B & 2C
<i>Potamogeton confervoides</i>	2	1	1	2A	2A	Protected	2A	2A	2A	2A	2A
<i>Potamogeton hillii</i>	2	2	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Pyrola minor</i>	2	1	1	1B	4A	4A	4A	1B	4A	4A	4A
<i>Ranunculus gmelinii</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Rhynchospora fusca</i>	2	2	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Streptopus amplexifolius</i>	1	1	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected
<i>Tiarella cordifolia</i>	2	1	1	2B	2B	2B	2B	2B	2B	2B	2B
<i>Vaccinium cespitosum</i>	2	2	0	Protected	Protected	Protected	Protected	Protected	Protected	Protected	Protected

* From timber harvesting and motorized traffic

** Maximum number of unprotected occurrences among Alternatives 2-9 and the Selected Alternative

Element Occurrences by Alternatives

Table J-6 is a summary of all the known RFSS sites in the ArcView database and the percentage that occur in areas without timber harvesting or motorized activities by alternative.

Table J-6. Overall Summary for the Chequamegon-Nicolet National Forest of Element Occurrences of RFSS Plant Species

Percent EO occurring in Areas without Timber Harvesting or Motorized Activities									
Files	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 9	Sel. Alt.
CHENI	27%	58%	62%	64%	58%	59%	60%	60%	58%
NHI	22%	55%	60%	62%	55%	54%	55%	56%	55%

CHENI-Data file produced and maintained by the Chequamegon-Nicolet National Forest.

NHI-Data file produced and maintained by the Natural Heritage Inventory from the Wisconsin DNR.

Additional Protection of RFSS Plants

Some RFSS plant species occur in wet habitats that will be protected by the Wisconsin's Forestry Best Management Practices (BMP's) riparian management zone categories. This analysis was unable to fully assess these zones in relation to actual rare plant occurrences. It is unclear to what extent the riparian zone could further protect those sites that would otherwise be affected by forest management activities.

There are three riparian management zone categories listed in the BMP's. Of these, two call for retaining at least 60 square feet of basal area within buffer zones measured from the ordinary high water mark landward from a stream or lake. The two buffer zones are a) 35 feet on either side of intermittent streams, and b) 100-foot buffer zones on lake shorelines or on either side of a perennial stream. In addition, on steep slopes or areas of highly erodible soils, the Riparian Management Zone may be widened. These buffers would likely add to the number of 'protected' RFSS sites that occur on the Forest. Currently, however, there are no data to confirm the inclusion of possible additional sites.

Effects

Direct Effects

This section describes potential direct effects on TES and RFSS plants due to management activities, although all known populations of these species will be protected by Forestwide Standards and Guidelines (Chapter 2, *2004 Forest Plan*).

1. Direct effects such as increased light penetration and soil desiccation from canopy thinning and/or direct mechanical damage to each species will be addressed in each project biological evaluation.
2. ATVs operated off-trail could cause direct damage to populations. In general, Alternatives with fewer miles of ATV trail will have lower probabilities of illegal off-trail use. The problems related to possible damage by ATV use are difficult to address by management area because potential new trail locations are unknown and will be identified later during project-specific analyses. Since ATV trail designation and construction and timber harvesting are both site specific on a project-by-project basis, the real impact on the ground is addressed at the project level. At that time, Forestwide Standards and Guidelines will protect RFSS and TES.

3. Beneficial effects to many species would increase with an increased emphasis on the maintenance of closed canopy condition and with greater amounts of large blocks of minimally managed land. Large, relatively continuous, blocks of interior hardwood forest (MA 2B) have the greatest emphasis in Alternative 3 and no emphasis in Alternative 1 (Table J-7).
4. The threat of non-native invasive species due to timber harvesting and introduction by ATV is real, but difficult to assess in a general manner. This is due to the fact that the specific amount of timber harvest and ATV use by management area is unknown, and will be addressed at the project level in the future.

Indirect Effects

1. Adjacent management, such as clear-cutting aspen that attracts deer, can increase herbivory on some of these forest species (Augustine & Frelich, 1998).
2. Aspen attracts beaver that can flood some TES and RFSS habitats but may create new habitat for other TES and RFSS.
3. Increased access, especially by ATVs, increases the probability of introducing non-native invasive plants far from main roads where they are currently a problem. These NNIS compete for space, light, and nutrients and may change ecosystem structure and function.
4. Roads and trails may increase the occurrence of illegal poaching of plants such as orchids and ferns by increasing access to remote areas. In general, increased ATV access leads to increased threats to populations and habitats of most RFSS plants. For more information, reference the section on ATV trails and Forest transportation systems in Chapter 3.

Cumulative Effects

Plants are vulnerable to habitat loss through forest fragmentation and development of lakes and forests on public and private lands (Wisconsin Department of Natural Resources 2002a). In the late 1800's and early 1900's forests in northern Wisconsin were harvested followed by severe wildfire in debris left from logging. In the 1930's, National Forests began to be established, with a goal of restoring the land to a forested state. During the last 10 to 15 years under the 1986 Forest Plans, emphasis on National Forest lands was forest management at the stand level. For this revision, the Forest identified a need to consider landscape pattern and provide for interior forest conditions as well as patches of open land adjacent to forested land. Large patches can improve ecological conditions that contribute to the long-term abundance and distribution of species by decreasing dispersal distance (Primack 1993). It is likely that plant species requiring interior forest conditions will benefit over time from Management Area (e.g. 2B) allocations in National Forest. However, conditions within the terrestrial cumulative effects area (Ecological Classification System Province 212 within Wisconsin and Western Michigan) may not improve over time due to fragmented land ownership patterns and potential development.

Table J-7. Allocated to Management Areas in each Alternative

Note: Acreages are rounded to the nearest thousand (or hundred). Because of rounding, total acreages for each alternative are not identical. In addition, some areas are assigned to more than one management prescription and get double or triple counted.

Management Areas	Alternatives								
	1	2	3	4	5	6	7	9	SA
Early Successional Vegetation									
1A- Aspen	400,000	168,000	101,000	138,000	158,000	168,000	153,000	101,000	158,000
1B- Aspen mixed with conifers	0	86,000	74,000	27,000	33,000	81,000	31,000	78,000	38,000
1C- Aspen mixed with Hardwood	0	167,000	72,000	76,000	95,000	146,000	87,000	72,000	95,000
Uneven-aged Northern Hardwoods									
2A- Interior Northern Hardwoods Emphasis, 5-20% Aspen	0	195,000	30,000	161,000	225,000	128,000	271,000	180,000	175,000
2B- Interior Northern Hardwoods Emphasis, 0-10% Aspen	0	23,000	454,000	234,000	130,000	142,000	143,000	282,000	209,000
2C- Northern Hardwoods, Smaller patches, 15-30% Aspen	422,000	354,000	165,000	206,000	294,000	303,000	222,000	215,000	262,000
Even-aged Northern Hardwoods									
3B- Emphasis on Oak and Oak mixed with Pine; Larger patch sizes	0	1,700	23,900	6,400	1,700	6,400	10,900	11,900	10,900
3C- Emphasis on Oak and Aspen; Smaller Patches	242,000	54,000	36,000	48,000	62,000	46,000	52,000	48,000	52,000
Upland Conifer									
4A- Red, White, and Jack Pine, primarily of plantation origin	171,000	117,000	112,000	125,000	152,000	114,000	140,000	124,000	138,000
4B- Red and White Pine of natural origin; Large patch sizes	0	17,000	65,000	50,000	17,000	20,000	30,000	53,000	30,000
4C- Surrogate Pine Barrens/Jack Pine Forest	0	10,000	13,000	13,000	13,000	10,000	13,000	13,000	13,000
Wilderness/Potential Wilderness									
5- Wilderness (Includes 2000 acres of existing RNA within boundaries)	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000
5B- Potential Wilderness ¹	0	6,300	7,900	56,100	15,400	29,000	25,800	15,800	15,500
Semi-Primitive Non-Motorized									
1986 Goal 6- Semi-Primitive Non-Motorized Area	69,000	0	0	0	0	0	0	0	0
6A- Semi-Primitive Non-Motorized Area, No Vegetation Management	0	11,300	64,600	92,000	20,200	20,200	41,700	14,700	20,100
6B- Semi-Primitive Non-Motorized Area, Limited Vegetation Management	0	56,000	108,000	83,000	56,000	48,000	73,000	81,000	48,000
Nonmotorized Areas that do not limit vegetation management activities ¹	7,600	33,300	62,000	67,000	64,500	110,900	93,100	78,000	42,500
Special Designations									
8A- Argonne Experimental Forest	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500
8B- Oconto River Seed Orchard	700	700	700	700	700	700	700	700	700
8C- Riley Lake Wildlife Area and Moquah Barrens Area	13,000	19,600	19,600	19,000	19,600	19,600	19,600	19,600	19,600
8D- Wild, Scenic and Recreational River Corridors ²	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000
8E- Existing and/or Candidate Research Natural Areas	2,500	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
8F- Special Management Areas	13,000	63,900	63,900	63,900	63,900	63,900	63,900	63,900	63,900
8G- Old Growth and Natural Feature Complexes	67,600	85,500	91,000	92,600	85,500	91,000	92,600	92,600	85,500

¹ Non-Motorized areas with full vegetation management are embedded within Management Areas 1-4.

² Wild, Scenic and Recreational River Corridors include portions of Management Area 8E, 8F and 8G in some Alternatives.

For many of these rare species their specific habitat needs are unknown. There are very few data on population trends throughout their range, much less within the cumulative effects area for terrestrial species (ECS Province 212 within Wisconsin and Western Michigan). Even where they are more common they are little studied. The botanists participating in the species viability evaluation expert panel process for the Forest repeatedly stated that many of these species are habitat specialists, may have always been rare, and will continue to be rare despite the best management of the lands in Northern Wisconsin. Within the cumulative effects area, Ecological Judgments of RFSS plants *in general* is predicted to remain at low levels, *i.e.*, outcomes D and E (SVE, 2002).

Pollination by insects is an issue of concern in North America because of a decline in populations of pollinators (Buchmann and Nabhan 1996). Loss of pollinators will have negative effects on a number of flowering RFSS plants. Unfortunately, there are no data on these trends specific to the Chequamegon-Nicolet NF or the Cumulative Effects Area.

Biological Evaluations of Habitat Groups

Habitat Group 1-Rare plant species with Mesic Hardwood Forest Habitat Affinity

Table J-8 shows RFSS species most often found in mesic hardwood forest although some do occur in other habitat types. Within this broad habitat group many species have microhabitat preferences such as soil chemistry, which in some cases may be the overriding factor for their occurrence there.

Table J-8. RFSS Plants with mesic hardwood forest affinity – 16 species

Species	Common Name	Status	Habitat Group
<i>Botrychium minganense</i>	Mingan's moonwort	RFSS	1 Mesic Forest
<i>Botrychium mormo</i>	Goblin fern	RFSS	1 Mesic Forest
<i>Botrychium oneidense</i>	Blunt-lobed grape-fern	RFSS	1 Mesic Forest
<i>Cardamine maxima</i>	Large toothwort	LRFSS	1 Mesic Forest
<i>Carex assiniboinensis</i>	Assiniboine sedge	RFSS	1 Mesic Forest
<i>Diplazium pycnocarpon</i>	Glade fern	RFSS	1 Mesic Forest
<i>Disporum hookeri</i>	Fairy bells, Hooker's mandarin	LRFSS	1 Mesic Forest
<i>Dryopteris expansa</i>	Spreading wood fern	RFSS	1 Mesic Forest
<i>Dryopteris filix-mas</i>	Male fern	RFSS	1 Mesic Forest
<i>Juglans cinerea</i>	Butternut	RFSS	1 Mesic Forest
<i>Listera convallarioides</i>	Broad-leaved twayblade	LRFSS	1 Mesic Forest
<i>Medeola virginiana</i>	Indian cucumber-root	RFSS	1 Mesic Forest
<i>Panax quinquefolius</i>	American ginseng	RFSS	1 Mesic Forest
<i>Polystichum braunii</i>	Braun's holly fern	RFSS	1 Mesic Forest
<i>Streptopus amplexifolius</i>	White mandarin	RFSS	1 Mesic Forest
<i>Tiarella cordifolia</i>	Heart-leaved foam flower	RFSS	1 Mesic Forest

RFSS=Regional Forester Sensitive Species, LRFSS="likely to occur" RFSS.

A Species Viability Evaluation panel was convened in 2002 for the purpose of soliciting the expert opinion of area botanists on Ecological Judgments based on alternatives. Some of the mesic forest plants in Table J-8 (*Carex assiniboinensis*, *Dryopteris filix-mas*, *Juglans cinerea*, *Panax quinquefolius*, and *Streptopus amplexifolius*) were evaluated in detail. In addition, generalizations were made about habitat management of this forest type that would affect all mesic hardwood forest species in a similar way. In general, expert panelists agreed that Standards and Guidelines would protect individual

populations and that alternatives with higher acreages of Ecological Reference Areas and northern hardwood interior forest would better maintain ecological conditions that contribute to the long-term abundance and distribution of species. Some species have mitigation measures unique to them and these are discussed under the “Species with Specific Standards and Guidelines” section.

Key factors

- Soil moisture and temperature moderated by closed canopy
- Competition by non-native invasive plant species
- Herbivory by deer and insects
- Damage by trampling, machinery, recreation, ATVs
- Large block, interior forest management
- Isolated populations, lack of habitat connectivity

Resource Protection Measures for Mesic Hardwood Forest Species

Management Area (MA) resource protection measures that are specifically applicable to habitat management of mesic hardwood dominated forest include:

- Standards and Guidelines in MA 2A, 2B and 3A, 3B pertain to the management of large patches of closed canopy forest, which will provide shade and maintain soil moisture conditions.
- For MA 2B: Guideline: Restrict harvest on northern hardwood sites to winter (frozen ground) conditions.
- MA 6A Guideline: Timber harvesting is normally not allowed. Motorized use not allowed.
- MA 5 and 5B: Timber harvesting not allowed and motorized use not allowed.

To clarify Table J-9 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D, and E and defined at the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives, Management Areas amounts, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table (for details the Introduction).

Table J-9. Mesic Hardwood Forest Species: Summary of Effects Analysis Factors and Determination

Mesic Forest Plant GroupS	Alternative								S.A.
	1 C/N	2	3	4	5	6	7	9	
Ecological Judgments for paneled species in group*									
<i>C. assiniboinensis</i> CNNF*	D	D	D	D	D	D	D	D	
<i>C. assiniboinensis</i> CEA*	D	D	D	D	D	D	D	D	
<i>D. filix-mas</i> CNNF*	E	E	E	E	E	E	E	E	
<i>D. filix-mas</i> CEA*	E	E	E	E	E	E	E	E	
<i>J. cinerea</i> CNNF*	E	E	E	E	E	E	E	E	
<i>J. cinerea</i> CEA*	E	E	E	E	E	E	E	E	
<i>P. quinquefolius</i> CNNF*	E	E	D	D	D	D	D	D	
<i>P. quinquefolius</i> CEA*	E	E	D	D	D	D	D	D	
<i>S. amplexifolius</i> CNNF*	E	E	D	D	D	D	D	D	
<i>S. amplexifolius</i> CEA*									
Habitat Quantity	↑	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	↓	↓	↑	↔	↔	↔	↔	↑	↔
DETERMINATION									
(for group)	MINT/MINT	MINT	BI	BI	MINT	MINT	MINT	BI	NI
Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1) *The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions CNNF—Chequamegon-Nicolet National Forest, CEA—Cumulative Effects Area (↓)—Decreasing, (↔)—Stable, (↑)—Increasing (NI)—No Impact, (BI)—Beneficial Impact, (MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability, (MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability									

Effects on Habitat

Direct

Logging could have a direct impact on habitat of mesic forest species through road building, skidding logs, and compaction of soil. Trail construction can also cause soil compaction.

The amount of northern hardwood interior forest habitat favorable to RFSS plants is expected to increase from its current emphasis at varying degrees under Alternatives 2-9 and the Selected Alternative with greatest emphasis in Alternative 3 (Fig. J-2).

Alternatives 9 and 3 also have high amounts of Ecological Reference Areas (MAs 8E, 8F, 8G) (SVE 2002).

Alternatives 3 and 9 have the highest allocations of number of blocks of (interior) northern hardwood forest with less than 20% aspen (MA 2A and MA 2B) at 483,000 acres and 462,000 acres, respectively. These areas will provide high quality habitat for species in this habitat affinity group. The Selected Alternative allocates 384,000 acres to Management Areas 2A and 2B (Fig J-2). Alternatives 3 and 4 also contain large blocks of (interior) forest. Alternatives 1 and 2 have the least amount of interior hardwood management and were therefore ranked as least favorable for this habitat group (Table J-9).

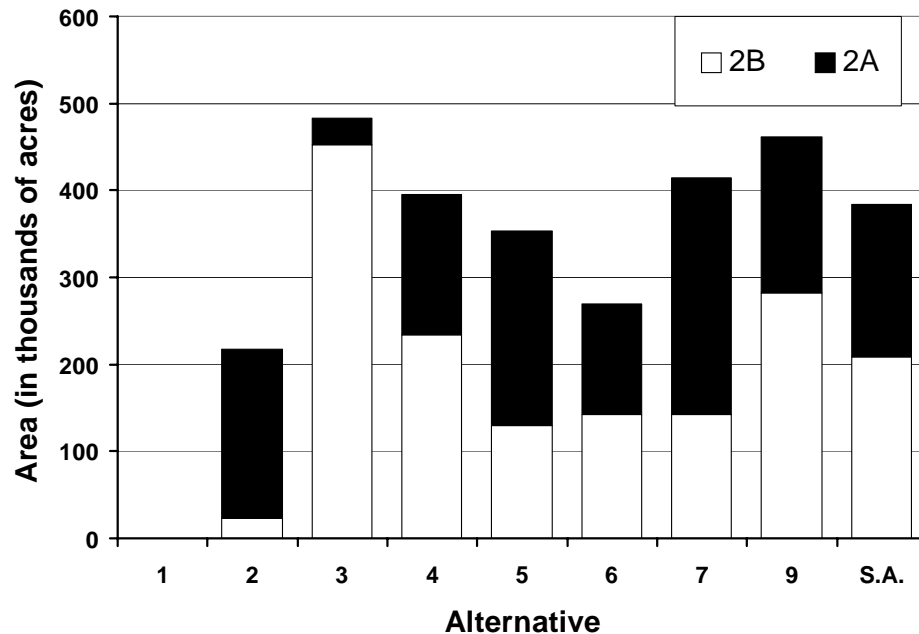


Figure J-2. Interior northern hardwoods emphasis by alternative

Indirect

Aspen clear cuts attract deer and beaver. Deer feed on young aspen stems and beaver prefer aspen as dam building material and food. Depending on the juxtaposition of aspen in the landscape, there may be an increase in deer herbivory and the possibility of beaver flooding of RFSS sites.

Greater road and trail access can increase the possibility of introducing the seeds of non-native invasive species (NNIS) into remote areas. These NNIS compete for space, light and nutrients and can change ecosystem structure and function.

Alternatives 3, 4 and 9 with less even-age management and more large-block interior forest are expected to lessen deer and beaver impact (SVE 2002). These alternatives will provide more areas for future colonization by species in this group. Alternatives 5, 6 and 7 rate less favorably than the previous three for the upland hardwood species considered here. Alternatives 1 and 2 with greater acreages of aspen received the worst outcome scores (SVE 2002). The Selected Alternative improves upon the Alternative 5, 6, 9 group through higher (>50%) allocations to MA 2B areas, however, the Selected Alternative allocates less to this MA than does Alternatives 3, 4 and 9 (Table J-7). All alternatives show an increase in habitat quantity due to the recovery of northern hardwoods from the cut over and fires of the late 1800s and early 1900s through natural succession. Alternative 3 prescribes the greater increase in habitat quality due to the highest amount of acres in interior hardwood forest management (2B) and the connectivity among the MA 2B areas is highest among the Alternatives.

Effects on Populations

Direct

The plant protection areas will help maintain ecological conditions contributing to long-term species abundance and distribution. Alternatives 3, 9, and 4, through their allocation

to MA 2A, provide for the greatest number of acres maintained in closed canopy condition.

Road and trail use, construction, and maintenance can impact individual plants and populations by direct damage. This type of damage is less likely to occur where there are lower road densities and more non-motorized acreage. Total Road Density goals, which include all roads whether open or closed to the public, are the same for all Alternatives (3.0-3.6 mi./sq. mi.) except Alternative 1 where it is not specified. Variation in Open Road Density among the Alternatives is largely dependent on the amount of non-motorized areas, where Open Road Density would be 0 mi./sq. mi. Non-motorized areas range from 342,906 acres under Alternative 4 to 125,436 acres under Alternative 1. Under the Selected Alternative, 166,676 acres are designated as non-motorized areas.

Indirect

Travel corridors provide opportunities for NNIS to establish and spread, so those alternatives that have greater densities of roads and trails on the landscape will have greater potential habitat for NNIS. Alternative 4 proposes the largest area of 0 mi/mi² of Open Road Density at 12% of the Forest. Alternatives 3, 7, and 6, propose 8%, 7%, and 6%, of the Forest in 0 mi/mi² of total road density, respectively. Alternatives 2, 5, 9 and the Selected Alternative all propose 5% of the land base in 0 mi/mi² of total road density.

Cumulative Effects

The Forest maintains important habitat for these upland mesic hardwood species. Eight of the 16 species in Table J-8 have at least half of their occurrences in Wisconsin on National Forest land (Wisconsin Department of Natural Resources 2003a). Surrounding private and public land continues to be fragmented and developed with rare plant species holding on in pockets of habitat.

Within the Cumulative Effects Area, it is likely that there will be an increase in the human development and land management activities, which contribute to habitat fragmentation, habitat simplification, loss of pollinators, loss of seed dispersers, high deer numbers, and the spread of NNIS. These factors will adversely affect populations of RFSS plants within the Cumulative Effects Area. Thus the importance of National Forest lands in maintaining these species.

Evidence of the effects of invasive non-native earthworms on some RFSS plants in mesic hardwoods continues to be gathered. Due to the earthworm actions of breaking down organic matter and soil mixing, habitat conditions are changed such that some species are unable to survive. In particular goblin fern seems to be strongly negatively effected (Gundale 2002).

Species with Specific Standards and Guidelines (Mitigation)

Juglans cinerea- Butternut

Forestwide resource protection measures applicable to habitat and species management of *Juglans cinerea* that are common to all alternatives include:

- Biological Resources/Vegetation Management/Guideline: in Northern Hardwoods to retain all butternut trees with little sign of disease and harvest those of poor vigor.
- Biological Resources/Vegetation Management/Guideline: Consider even-aged management when species composition exceeds 30% for intolerant species such as...butternut.

Panax quinquefolius- American ginseng

Forestwide resource protection measures applicable to species management of *Panax quinquefolius* that are common to all alternatives include:

- Standard: Prohibit wild ginseng harvesting on National Forest land except as provided by tribal agreements.

Group 2-Rare plant species with Dry to Dry-Mesic Forest Habitat Affinity

Table J-10 shows RFSS species most often found in dry to dry-mesic mixed and conifer forest although some do occur in other habitat types. Within this broad habitat group most species have microhabitat preferences such as soil chemistry, which in some cases may contribute to their range restriction.

Table J-10. RFSS Plants with dry to dry-mesic forest affinity

Species	Common Name	Forest Status	Habitat Group
<i>Carex backii</i>	Rocky Mountain Sedge	RFSS	2 Dry Forest
<i>Cynoglossum virginianum var boreale</i>	Northern wild comfrey	RFSS	2 Dry Forest
<i>Geum macrophyllum var. macrophyllum</i>	Large-leaved avens	RFSS	2 Dry Forest
<i>Oryzopsis canadensis</i>	Canada mountain rice-grass	RFSS	2 Dry Forest
<i>Pterospora andromeda</i>	Giant pinedrops	LRFSS	2 Dry Forest

RFSS=Regional Forester Sensitive Species, LRFSS="likely to occur" RFSS.

The Species Viability Evaluation in 2002 solicited the expert opinion of area botanists on Ecological Judgments for this habitat group based on alternatives. One of the dry forest plants in Table J-10 (*Oryzopsis canadensis*) was evaluated in detail but assumptions were made about habitat management of this forest type that would affect all these species in a similar way. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations and that Plan Alternatives with higher acreages of Ecological Reference Areas and large patches of Dry to Dry-Mesic Forest would better maintain ecological conditions that contribute to long-term abundance and distribution of species (SVE 2002).

Key factors

- Competition by non-native invasive plant species
- Herbivory
- Damage by trampling, machinery, ATVs
- Possible need for fire
- Forest management that creates small gaps
- Clearcutting

Resource Protection Measures for Dry to Dry-Mesic Forest Species

Management Area (MA) resource protection measures that are specifically applicable to habitat management of dry to dry-mesic forest include:

- Guideline in MA 4B to increase closed canopy continuity within pine-oak blocks. Convert aspen inclusions to the pine-oak type within large pine oak blocks.
- To clarify Table J-11 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D, and E and defined at

the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas amounts, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table (for details see the Introduction).

Table J-11. Dry to Dry-mesic Forest Species: Summary of Effects Analysis Factors and Determination

Dry to dry-mesic Forest Plant Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Ecological Judgments for paneled species in group*									
<i>O. canadensis</i> CNNF*	E	E	E	E	E	E	E	E	
<i>O. canadensis</i> CEA*	E	E	E	E	E	E	E	E	
Habitat Quantity	↓	↓	↑	↑	↓	↔	↔	↑	↑
Habitat Quality	↓	↓	↑	↑	↔	↔	↑	↔	↔
DETERMINATION (for group)	MINT/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions.

CNNF—Chequamegon-Nicolet National Forest, CEA—Cumulative Effects Area

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Logging could have a direct impact on this habitat through road building, skidding logs, and compaction of soil. Trail construction can also cause soil compaction. Opening the forest canopy with clearcuts and thinning would allow increased sunlight on the forest floor, causing desiccation of the soil and possibly damaging the habitat for some species. However, *Carex backii*, *Geum macrophyllum* var. *macrophyllum*, and *Oryzopsis canadensis* would be positively affected by more sun and disturbance. Direct effects by logging are mitigated by Standards and Guidelines. Implementation of Standards and Guidelines under Alternatives 2-9 and the Selected Alternative, and Wisconsin's Best Management Practices under all Alternatives will minimize damage to RFSS plants due to road construction.

Emphasis on oak-pine (MA 3B) and pine-oak (MA 4B) forest ranges from 87,000 acres in Alternative 3 to no emphasis in Alternative 1 (Fig J-3).

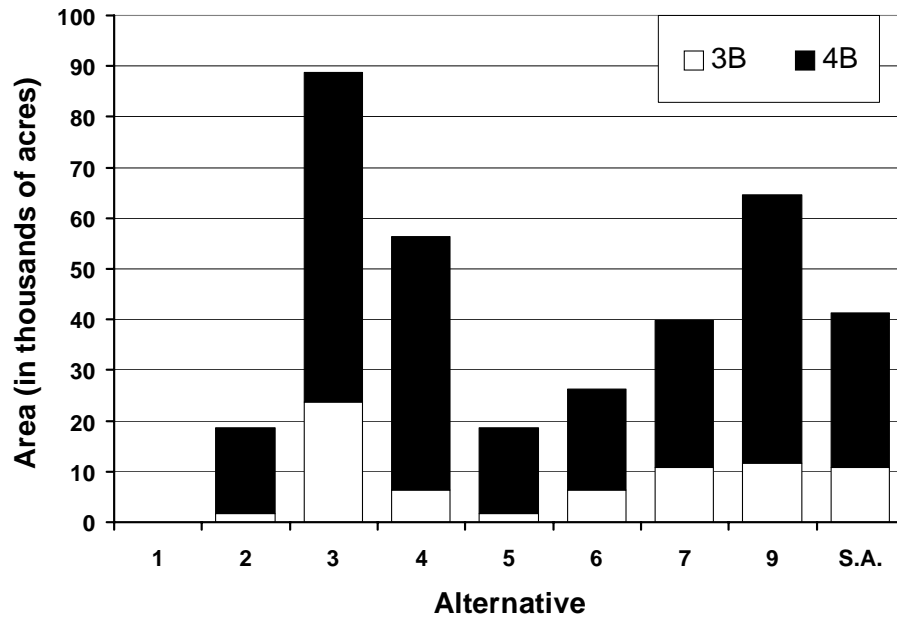


Figure J-3. Oak-pine (MA 3B) and pine-oak (MA 4B) forest emphasis by alternative

Indirect

Travel corridors provide opportunities for NNIS to establish and spread, so those alternatives that have greater densities of roads and trails on the landscape will create greater potential habitat for NNIS. These NNIS compete for space, light, and nutrients and can change ecosystem structure and function. Larger amounts of access by ATVs can increase the possibility for introducing non-native invasive plant seeds far from main roads where they are a problem now. Alt. 4 proposes the largest proportion of 0 mi/mi sq. of Total Road Density at 12% of the Forest. Alternative 3, 7, and 6 propose 8%, 7%, and 6% of the Forest in 0 mi/mi sq. of total road density, respectively. Alternatives 2, 5, 9 and the Selected Alternative all propose 5% of the land base in 0 mi/mi sq. of Total Road Density.

Effects on Populations

Direct

Plant protection areas will help maintain ecological conditions contributing to long-term species abundance and distribution if it is imbedded in an area of compatible management.

Damage from motorized vehicles is one threat to populations of rare plants. The greater the amount of ATV trails and associated use, the greater the likelihood that illegal off-trail use of ATVs will occur. The amount of ATV trails ranges from 574 miles under Alternatives 2 and 9 to 284 miles under Alternatives 1 and 4. The Selected Alternative proposes 469 miles of ATV trail and connector routes. Alternative 1 also permits off-trail use by ATVs in the Chequamegon.

Indirect

Management activities adjacent to RFSS sites, such as clearcutting aspen that attracts deer, can increase herbivory on some of these forest species.

Cumulative Effects

Approximately 10 percent of occurrences of these species in the state are on National Forest land (Wisconsin Department of Natural Resources 2003a). Plants of dry to dry-mesic, conifer, mixed and deciduous forest are vulnerable to habitat loss through forest fragmentation and development on private lands. Continued timber management added to historic land use has been shown to alter forest composition, structure and function (Wisconsin Department of Natural Resources 2002a).

Alternatives with higher amounts of natural origin white and red pine (MA 4B) will provide more habitat in the future. The quality of this habitat will increase as these pine and pine/oak emphasis areas age. The quality is expected to be higher where there is less emphasis on off-road motorized recreation.

Alternatives 3 and 4 will provide the most pine and mixed conifer habitat and with a large block emphasis (Fig. J-3). The habitat quality is greater under those alternatives with less motorized access. Motorized vehicles, especially those operated off designated trails, can damage rare plant populations through trampling, soil compaction and erosion or the spread of NNIS.

Continuation of ecological conditions contributing to long-term abundance and distribution of these RFSS species is uncertain in the larger context of the cumulative effects area.

Group 3-Rare plant species with Barrens and Open Upland Habitat Affinity

Table J-12 shows RFSS species most often found in Pine Barrens and other mostly open dry uplands, and in disturbed areas (although it must be noted that some do occur in other habitat types). Within this broad habitat group many species have microhabitat preferences such as soil chemistry, which in some cases may be the over-riding factor as to why they occur there.

Table J-12. RFSS Plants with Barrens and Open Upland habitat affinity.

Species	Common Name	Forest Status	Habitat Group
<i>Arabis missouriensis var deamii</i>	Missouri rock cress	RFSS	3 Upland Open
<i>Botrychium rugulosum</i>	Ternate grape-fern	RFSS	3 Upland Open
<i>Leucophysalis grandiflora</i>	Large-flowered ground-cherry	RFSS	3 Upland Open
<i>Vaccinium cespitosum</i>	Dwarf bilberry	RFSS	3 Upland Open

RFSS = Regional Forester Sensitive Species

The Species Viability Evaluation solicited expert opinion of area botanists on Ecological Judgments based on the proposed alternatives. Of the barrens and open upland plants in Table J-12, one (*A. missouriensis var deamii*) was evaluated in detail but assumptions were made about habitat management of its community type that would affect all these species in a similar way. Overall, expert panelists agreed that Standards and Guidelines (e.g., 100-500 foot plant protection area) would protect individual populations and that alternatives with higher acreages of Ecological Reference Areas would better maintain ecological conditions that contribute to long-term species abundance and distribution (SVE 2002).

Key factors

- Competition by non-native invasive plant species (critical in this group)
- Herbivory

- Damage by trampling, machinery, ATVs
- Lack of natural disturbance (i.e. fires, wind throw)

Resource Protection Measures for Barrens and Open Upland Species

- The following are Forestwide resource protection measures that are applicable to habitat management of Barrens and Open Upland habitat common to all alternatives.
- Biological Resources/Biological Diversity/Guideline: Avoid modifying microclimate and microhabitat conditions within steep ravines, cliffs, talus slopes and areas of exposed bedrock.

Management Area (MA) resource protection measures that are specifically applicable to habitat management of Barrens and Open Upland habitats include:

- Standard in MA 8C prohibiting off-road vehicle use.
- Standard in Ma 8C to maintain the Moquah Barrens Core Area in mostly open, early successional barrens condition.

To clarify Table J-13 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D, and E and defined at the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas amounts, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table (for details see the Introduction).

Table J-13. Barrens and Upland Open Habitat Species: Summary of Effects Analysis Factors and Determination

Barrens/upland open Habitat Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Ecological Judgments for paneled species in group*									
<i>A. missouriensis</i> var <i>deamii</i> CNNF*	D	D	D	D	D	D	D	D	
<i>A. missouriensis</i> var <i>deamii</i> CEA*	D	D	D	D	D	D	D	D	
<i>V. cespitosum</i> CNNF*	E	E	E	E	E	E	E	E	
<i>V. cespitosum</i> CEA*	E	E	E	E	E	E	E	E	
Habitat Quantity	↔	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	↓	↓	↑	↑	↔	↔	↔	↔↓	↔
DETERMINATION	NI/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions.

CNNF—Chequamegon-Nicolet National Forest, CEA—Cumulative Effects Area

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Opening the canopy, maintaining early successional habitat, and some exposing of mineral soil seedbed may be beneficial to a species such as *Arabis missouriensis* but this is unconfirmed. However, tree removal and/or controlled fire are needed to maintain habitat for *Vaccinium cespitosum* (Wolf and Brzeskiewicz 2002). All alternatives but 1 propose to create and maintain a similar amount of this habitat through MA 8C and MA 4C allocations (Table J-7).

Damage by ATV and other vehicle use could affect this habitat group. The potential in Alt.1 with cross-country travel allowed on the Chequamegon side of the Forest could be higher than in other alternatives. ATV trails pose a potential threat to this habitat affinity group because they may disturb the habitat and illegal cross-country ATV use damages the habitat further. Maximum ATV trail miles by alternative are shown in Figure J-4. In general, the lower the amount of ATV trails on the landscape, the higher the potential for preferred habitat for this group of species.

Logging could have a direct impact on this habitat through road building, skidding logs, and compaction of soil. Trail construction can also cause soil compaction. All alternatives, except Alternative 1, have a total road density upper limit of 4 mi/mi² for 57% of the Forest. Potential open road densities on average for the whole Forest only range from 2.7 mi/mi² in Alt. 4 to 2.93 mi/mi² in Alt 2. Acres of managed forest land proposed for non-motorized recreation range from 342,906 managed acres (Alternative 4) to a minimum of 151,700 managed acres (Alternative 2).

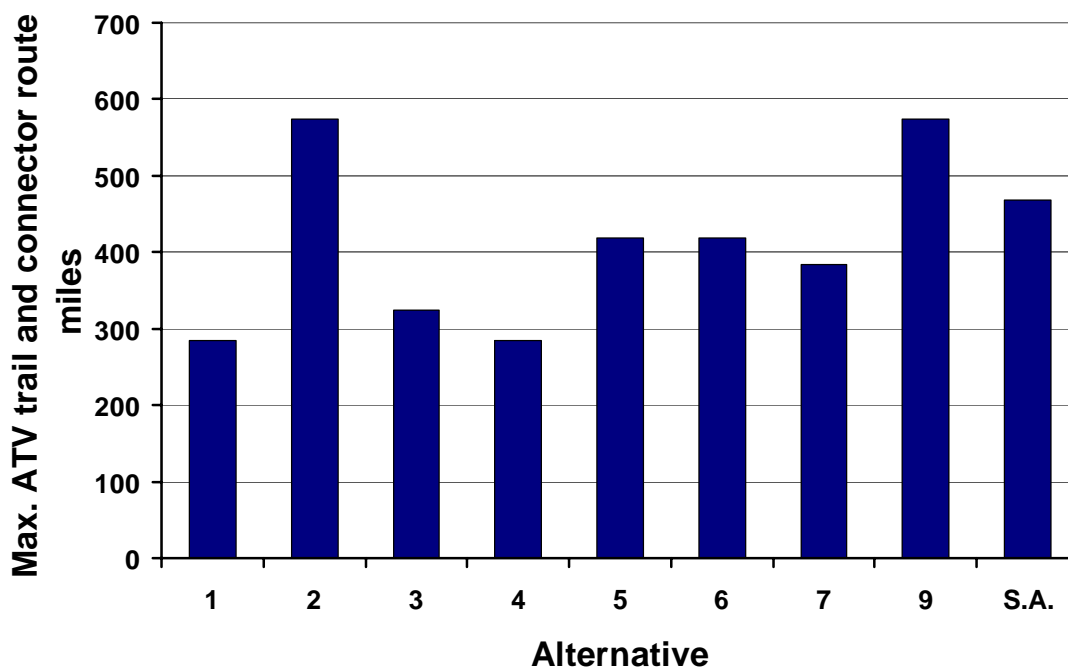


Figure J-4. Maximum ATV trail and connector route miles by Alternative

Indirect

Management of adjacent land for aspen may increase deer herbivory on susceptible RFSS plants. Within the Forest, Alternatives 1 and 2 have the most acres devoted to aspen and hence a greater chance of herbivory.

ATV use has the potential of carrying seeds of non-native invasive plants (NNIS) beyond the road corridors where they normally occur. These NNIS could out-compete rare species. Alternatives 2 and 9 have the highest number of ATV miles. Alternatives 3 and 4 have the fewest ATV miles, have the most acres allocated to Management Area 6A (semi-primitive, non-motorized), and emphasize large-block management, which may slow the spread of NNIS. The Selected Alternative proposes a moderate amount of ATV trail and connector routes relative to the other Alternatives (Fig. J-4), a moderate amount of MA 6A acres (Table J-7), and is also in the middle of the range of alternatives with respect to large-block management.

Effects on Populations

Direct

The plant protection areas will help maintain ecological conditions contributing to long-term species abundance and distribution.

Indirect

Adjacent management such as clearcutting may result in an increase in deer herbivory on some of these species.

Roads and trails provide both habitat and mechanisms of transportation for NNIS, especially for species that thrive in open, disturbed habitats. Those species that thrive along roadsides pose the greatest threat to barrens and open upland habitat. Alternatives range in the amount of land base dedicated to a total road density of 0 mi/mi². These percentages are: Alt. 1= 3%; Alt. 2= 5%, Alt. 3= 8%, Alt. 4= 12%, Alt. 5= 5%, Alt. 6= 6%, Alt. 7= 7%, Alt. 9= 5% and Sel. Alt.= 5%. Those alternatives with higher percentages of 0 mi/mi² have a greater chance of limiting the spread of NNIS.

Cumulative Effects

This is a unique group of plants, some of which can be found in unnaturally disturbed habitats, such as gravel pits, as well as more naturally created habitats like the edge of a beaver impoundment. Human-caused disturbances may only mimic natural events like wind-throw and fire, and do not fully replicate the effects of those disturbances. There is little information on why these species are rare if they can tolerate disturbance.

Most of these species occur somewhat scattered across northern Wisconsin with roughly 10 percent of occurrences on federal land, except *V. cespitosum* of which 36% of the population in Wisconsin is located on federal lands. Open habitat with moderate disturbance is abundant. As with many rare species, little is known about their needs and it is difficult to predict their population trends. Habitat conditions for these species are only slightly better on the forest than in the rest of the Cumulative Effects Area. The Forest plans to monitor sites, control non-native invasive species and manage for these RFSS following Standards and Guidelines and by designing conservation approaches. Positive ecological conditions are expected to stay at least at their present levels of scattered disconnected populations within the Cumulative Effects Area.

Species with Specific Standards and Guidelines (Mitigation)

1) *Vaccinium cespitosum*- Dwarf bilberry

Forestwide resource protection measures (guidelines) applicable to habitat and species management of *V. cespitosum* that are common to all alternatives include:

- Remove overshadowing trees and shrubs in and around northern blue butterfly breeding habitat (emphasize hand cutting).
- Create connecting corridors between dwarf bilberry populations where feasible.
- Use habitat manipulation and revegetation (planting or seeding if necessary) to create new dwarf bilberry populations.
- Cut and/or burn areas adjoining northern blue butterfly breeding habitat when expanding dwarf bilberry populations.
- Do not spray *Bacillus thuringiensis* (BT) in the vicinity of dwarf bilberry populations.
- Do not burn more than 25% of the total number of openings containing dwarf bilberry colonies per year and avoid burning bilberry colonies within them.

Group 4-Rare plant species with Cliff, Talus and Exposed Rock Habitat Affinity

The RFSS species listed in Table J-14 below are closely associated with rock substrate, mostly under a mixed forest canopy, which could be closed or somewhat open. Within this specific habitat group, these species have nutrient and substrate requirements that are very narrow.

Table J-14. RFSS Plants with Cliff, Talus and Exposed Rock habitat affinity

Species	Common Name	Forest Status	Habitat Group
<i>Asplenium trichomanes-ramosum</i>	Green spleenwort	RFSS	4 Rock
<i>Dryopteris fragrans</i>	Fragrant fern	RFSS	4 Rock
<i>Moehringia macrophylla</i>	Large-leaved sandwort	RFSS	4 Rock

RFSS = Regional Forester Sensitive Species

The Species Viability Evaluation in 2002 solicited the expert opinion of area botanists on Ecological Judgments based on alternatives. None of the three species in this group were evaluated but overall, expert panelists agreed that Standards and Guidelines (plant protection areas) would protect individual populations and that alternatives with higher acreages of Ecological Reference Areas would better maintain ecological conditions that contribute to the long-term abundance and distribution of species (SVE 2002).

Key factors

- Fragile habitat, thin soil
- Removal of overstory can harm plants
- Damage by recreational use
- Competition by non-native invasive plant species
- Isolated populations

Resource Protection Measures for species of Cliffs, Talus and Exposed Rock

The following is a summary of forestwide resource protection measures that are applicable to habitat management of Cliff, Talus and Rock habitat common to all alternatives.

- Biological Resources/Biological Diversity/Guideline: Avoid modifying microclimate and microhabitat conditions within steep ravines, cliffs, talus slopes and areas of exposed bedrock.
- Biological Resources/RFSS/Plants Species Found in Cliff...Habitats/Guideline: Protect known rare plant sites and potential habitat from damaging recreational activities.
- Biological Resources/RFSS/Plants Species Found in Cliff...Habitats/Guideline: Protect potential plant habitat from direct mechanical disturbance.

To clarify Table J-13 below, habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas, potential ATV mileage, and road density goals. Habitat quantity and habitat quality, along with professional judgment, were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table (for details see the Introduction).

Table J-15. Cliff/Talus/Exposed Rock Species: Summary of Effects Analysis Factors and Determination

Cliff/Talus/Rock Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↓	↓	↑	↑	↔	↔	↔	↑	↔
DETERMINATION	NI/ MINT	MINT	BI	BI	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Loss of habitat for this group may have occurred in the past due to logging and mining activities. Habitat quantity will not change under any alternatives. Maintaining the overstory, preventing mechanical damage, and keeping out non-native invasive species can help maintain the quality of these habitats.

Under Alternative 1 the species with this habitat affinity on the Forests fall within uneven-aged managed hardwoods (MA 2C). Under this management, potential habitat could have harvest activity. Under Alt. 2 some of this habitat is allocated as MA 2B (22,800 acres) and 6A (11,329 acres) with minimal disturbance, but the majority is in managed hardwoods [2A (432,000 acres) and 2C (483,000 acres)]. Alternative 3 has far more area allocated to MA 2B and 6A (453,400 acres and 64,600 acres, respectively), than Alternative 2 or any of the other Alternatives. Alternative 4 ranks second among alternatives in term of allocations to MA 2B and 6A (combined) (Table J-7). Under the Selected Alternative, MA 2B accounts for 209,000 acres, which is exceeded only by

Alternatives 3, 4, and 9, however, only 20,100 acres are allocated to MA 6A under this Alternative (Table J-7).

Damage by recreational use such as rock climbing is a potential threat in all alternatives. Standards and Guidelines have been designed to allow for limiting the use of these habitats for recreation, if damage becomes a problem.

Illegal ATVs use could pose a slight risk of direct damage to populations. In general alternatives with less ATV miles would decrease the chances of ATV damage (Alt. 3 (225 mi.), 4 (185 mi.) and 7 (285mi.)).

Indirect

Greater access to remote areas, especially by ATVs, can increase the possibility of introducing non-native invasive plants away from main roads where they are a problem now. Recreational cliff climbing could also introduce weeds. These exotic plants compete for space, light, and nutrients and are expected to change ecosystem structure and function. See Figure J-4 for the proposed maximum ATV trail miles by Alternative.

Effects on Populations

Direct

The plant protection areas will help maintain ecological conditions contributing to long-term species abundance and distribution if a site is imbedded in an area of compatible management.

Another direct effect on cliff, talus, and exposed rock plant species is the isolation of these populations that comes naturally due to the specificity of their habitat preferences. While the populations are often isolated, occurring on cliffs and rocky ledges, the potential for seed dispersal via the wind encourages distribution of the plant in appropriate habitat.

Cumulative Effects

The National Forests maintain important habitat for these rock-loving plants and support more than half of the combined occurrences (Wisconsin Department of Natural Resources 2003a) of all three of these species. Surrounding private and public land continues to be fragmented and developed with rare plant species holding on in pockets of habitat here on the southern edge of their range. Past mining and logging activities may have destroyed much of the habitat. Less than one-third of potential Forest habitat has been surveyed in the past 10 years. Ecological conditions that contribute to long-term species abundance and distribution are uncertain in the larger context of cumulative effects.

Species with Specific Standards and Guidelines (Mitigation)

***Asplenium trichomanes-ramosum*- Green spleenwort**

Forestwide resource protection measures applicable to habitat management of *Asplenium trichomanes-ramosum* that are common to all alternatives include:

- Biological Resources/Habitat Groups for RFSS/Plant Species in Upland Hardwood Habitats/Guideline: Protect dense bryophyte mats (moss etc.) in areas considered highly suitable for *Asplenium trichomanes-ramosum* (areas of calcareous soil and rocks).

Habitat Group 5-Rare plant species with Aquatic Habitat Affinity

These rare plant species were grouped by similar habitat preference in order to make some general statements about the effects of Forest Plan implementation. Table J-16 shows RFSS species most often found in aquatic habitats, mostly lakes and other permanent water bodies. (Species more closely associated with the shallow water of shorelines are treated separately.) Within this broad habitat group many species have microhabitat preferences such as water chemistry, which in some cases may be the overriding factor as to why they occur there.

Table J-16. RFSS Plants with Aquatic Habitat Affinity

Species	Common Name	Status	Habitat Group
<i>Callitriche hermaphroditica</i>	Northern water-starwort	RFSS	5 Aquatic
<i>Ceratophyllum echinatum</i>	Spineless hornwort	RFSS	5 Aquatic
<i>Myriophyllum farwellii</i>	Farwell's water-milfoil	RFSS	5 Aquatic
<i>Potamogeton confervoides</i>	Algal-like pondweed	RFSS	5 Aquatic
<i>Potamogeton hillii</i>	Hill's pondweed	RFSS	5 Aquatic
<i>Potamogeton pulcher</i>	Spotted pondweed	LRFSS	5 Aquatic
<i>Ranunculus gmelinii</i>	Small yellow water-crowfoot	RFSS	5 Aquatic

RFSS=Regional Forester Sensitive Species, LRFSS= "likely to occur" RFSS.

A Species Viability Evaluation was convened in 2002 for the purpose of soliciting the expert opinion of area botanists on Ecological Judgments based on alternatives. None of the aquatic plants in Table J-16 were evaluated in detail. However, overall, expert panelists agreed that Standards and Guidelines (*i.e.*, plant protection area and Wisconsin Forestry Best Management Practices) would protect individual populations of aquatic species and that due to these species being at the edge of their range, the Ecological Judgments will remain low (SVE 2002).

Key factors

- Water quality, siltation, pollution
- Competition or habitat alteration by non-native invasive species

Resource Protection Measures for Aquatic Species

- The following is a summary of Forestwide resource protection measures that are applicable to habitat management of aquatic habitat common to all alternatives.
- Biological Resources/Plant Species habitat Groups for RFSS/Aquatic/Guideline: Do not create new motorized access to lakes with documented RFSS plant species sites.
- Water Resources/Watershed Protection and Management Standards to maintain minimum in-stream flows at 25% of base flows or that flow determined from a site specific analysis using commonly accepted in-stream flow methods.
- Water Resources/Watershed Protection and Management Guidelines to follow Wisconsin Forestry Best Management Practices for Water Quality and Wisconsin Construction Site Best Management Practices Handbook.
- Biological Resources/Wildlife and Fish/Woodland Ponds/Guideline: For permanent ponds, avoid erosion and the contribution of sediment into woodland ponds.
- Social-Recreation Programs/Construction, Reconstruction, and Use of motorized trails/Standard: do not locate new motorized trails or routes over State of Wisconsin

navigable waters when alternative locations are feasible. This requirement does not apply to snowmobile trails that are routed over frozen surface waters.

- Social-Recreation Programs/Construction, Reconstruction, and Use of motorized trails/Standard: Install adequately sized culverts (or other appropriate drainage structures) and appropriate erosion control measures where motorized trails or routes cross navigable and non-navigable streams. This requirement does not apply to snowmobile trails that cross streams under frozen conditions.
- Social-Recreation Programs/Construction, Reconstruction, and Use of motorized trails/Standard: New, replacement, and reconstructed trail bridges must have closed-slat or similar running surfaces that prevent the deposit of trail sediment and debris in waterways.

To clarify Table J-17 below, habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas, potential ATV mileage, and road density goals. Habitat quantity and habitat quality, along with professional judgment, were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table (for details see the Introduction).

Table J-17. Aquatic Plant Species: Summary of Effects Analysis Factors and Determination

Aquatic Plant Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔↔
Habitat Quality	↓	↓↔	↔↑	↑	↔↓	↔	↑↔	↑↔	↔
DETERMINATION	MINT/ MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Expected direct effects to aquatic habitat will not vary by alternative. Standards and Guidelines protect aquatic habitat from possible management caused siltation.

Indirect

Recreational access (i.e. boating, ATV, off-road vehicles) can act as a vector for non-native invasive species (NNIS) such as zebra mussels and Eurasian water milfoil. These aggressive species can grow rapidly, shading out other aquatic plants, changing water chemistry and altering food webs. Infestation of aquatic resources by NNIS is a concern under all alternatives and is addressed in Forestwide Standards and Guidelines.

Alternatives 3 and 4 provide for the most miles of stream in non-motorized areas, 272 and 274 miles, respectively, thereby reducing the likelihood of potential damage of illegal ATV and off-road use and lowering the change of the introduction of NNIS to Aquatic habitat. Under the Selected Alternative, 98 miles of stream are in non-motorized areas which is approximately the same as under Alternative 1 (Fig. J-5). Alternatives 4, 7, and

6 provide for the largest acreage of lakes in non-motorized areas, which will limit the potential for introduction of aquatic NNIS from boats and boating equipment (6,064, 5,545, and 5,366 respectively). The Selected Alternative has 4,260 acres of lakes within non-motorized areas (Fig. J-5).

Zebra mussels have been found in Wisconsin waters and could indirectly affect aquatic plant species. These non-native invasive animals are filter feeders, whose feeding action improves water clarity. Clearer water allows sunlight to penetrate deeper, increasing the temperature and altering habitat. These exotic mussels also deposit waste excretions that have been shown to raise ammonia nitrogen levels in water (Sullivan and Endris 1998). It is unknown how the change in ammonia nitrogen levels would affect rare species.

The quantity of habitat does not change with any alternative, because management activities are not expected to create or destroy aquatic habitat (streams & lakes).

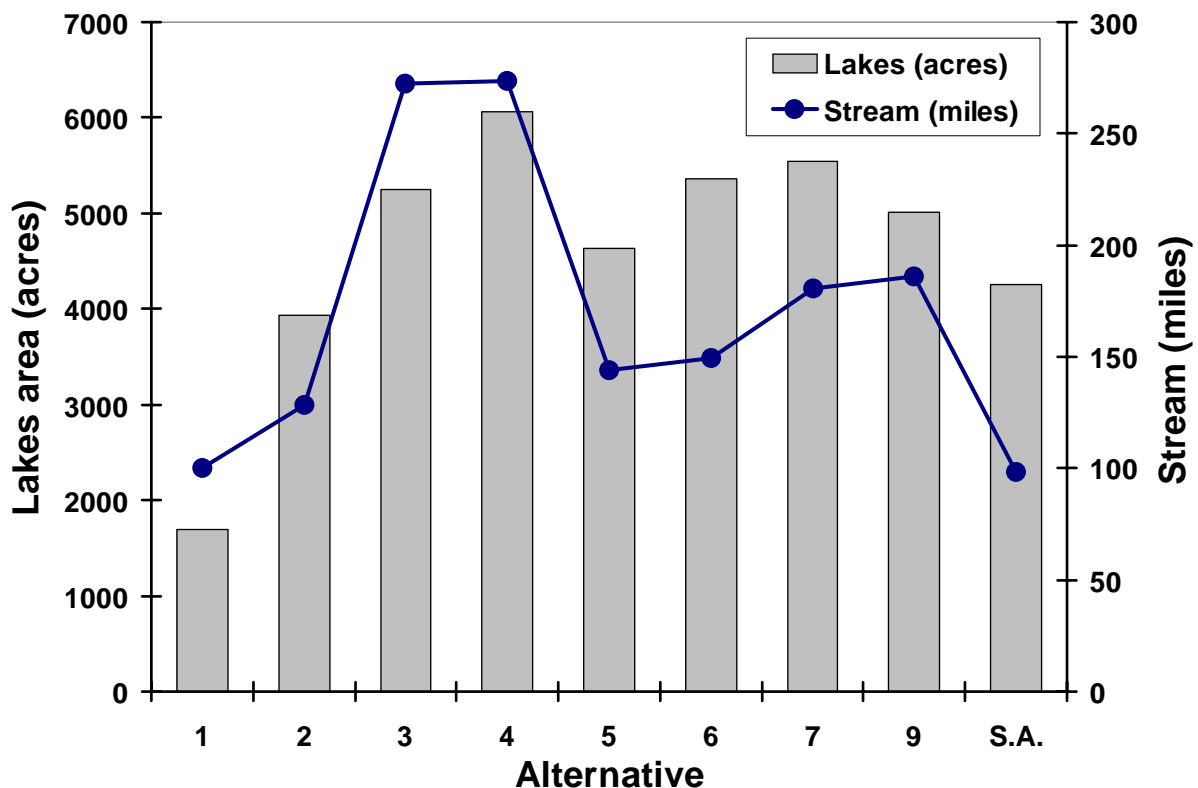


Figure J-5. Lakes and streams within non-motorized areas by alternative

Effects on Populations

Direct

Standards and Guidelines explained above are the same for all alternatives. The types of management used on the Forests and described by the Management Areas will not directly affect these aquatic species. Local municipalities set “no wake”, speed and motor size restrictions on boating equipment, so the Forest Service has no control over direct mechanical disturbance of aquatic RFSS plants by recreational activities on water.

Indirect

By controlling the access of mechanized vehicles to aquatic RFSS populations on National Forest lands the Forest Service can provide some protection. Higher totals for stream miles in non-motorized areas are likely to lead to lower likelihoods for stream damage due to illegal ATV and off-road use and lower risks of NNIS introduction to aquatic habitat from boats and boating equipment.

Cumulative Effects

At least one-tenth of the occurrences (Wisconsin Department of Natural Resources 2003a) in Wisconsin of these species are found on the Chequamegon-Nicolet. All RFSS aquatic species listed in this section are on the edge of their range here. Much remains unknown about the ecological needs of these species. While there may be more sites both on and off the Forests, these species may never have been very common in the state.

Protection of these RFSS species is difficult because control of aquatic habitat is determined by multiple ownerships of shore land, and watercraft regulations set by local municipalities. Lakes and rivers outside National Forest ownership are vulnerable to development, sedimentation and shoreline damage. Due to the fragmentation of ownership for aquatic habitat, the protection provided by the National Forests is critical on river, stream segments, and lakes for these RFSS species.

Species with Specific Standards and Guidelines (Mitigation)

Potamogeton hillii- Hill's pondweed

Forestwide resource protection measures applicable to habitat management of *Potamogeton hillii* that are common to all alternatives include:

- Biological Resources/Plant Species Habitat Groups for RFSS/Aquatic/Guideline: Avoid removing beaver dams in streams that area occupied by Hill's pondweed.

Group 6-Rare plant species with Marsh and Shrub Carr Habitat Affinity

These rare plant species were grouped by similar habitat preference in order to make some general statements about the effects of Forest Plan implementation. Table J-18 shows RFSS species most often found in marsh habitats, both marsh and sedge meadow and those species more closely associated with wet shrub habitat (alder and willow). These are habitats are likely to be found at the edge of wet forest, and the borders of streams and lakes in the floodplain. Within this broad habitat group, species have microhabitat preferences such as water chemistry, which in some cases may be the limiting factor.

Table J-18. RFSS Plants with Marsh and Shrub Carr Habitat Affinity

Species	Common Name	Status	Habitat Group
<i>Epilobium palustre</i>	Marsh willow-herb	RFSS	6 Marsh
<i>Petasites sagittatus</i>	Arrow-leaved sweet colt's-foot	LRFSS	6 Marsh
<i>Valeriana uliginosa</i>	Marsh valerian	RFSS	6 Marsh

RFSS=Regional Forester Sensitive Species, LRFSS= "likely to occur" RFSS.

The Species Viability Evaluation in 2002 solicited the expert opinion of area botanists on Ecological Judgments based on alternatives. None of the marsh plants in Table J-16 were evaluated in detail but they did deal with plants in other wetland situations such as bogs

and shorelines. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations of wetland species (SVE 2002).

Key factors

- Water quality, siltation, pollution, changes in hydrologic regimes
- Competition by non-native invasive plant species
- Herbivory
- Changes in hydrology

Resource Protection Measures for Marsh and Shrub Carr Species

The following is a summary of Forestwide resource protection measures that are applicable to habitat management of open wetland habitats common to all alternatives.

- Biological Resources/Plant Species habitat Groups for RFSS/open wetland habitats. Guideline: Maintain natural hydrological regimes and limit runoff and sedimentation caused by adjacent area management activities within known plant habitat.
- Biological Resources/Plant Species habitat Groups for RFSS/open wetland habitats. Guideline: Limit travel by vehicles and/or equipment to frozen ground conditions in known RFSS plant habitat.
- Water Resources/Watershed Protection and Management Guidelines to protect water from sedimentation.
- Water Resources/Watershed Protection and Management Guidelines to follow Wisconsin Forestry Best Management Practices for Water Quality and Wisconsin Construction Site Best Management Practices Handbook.
- Social-Recreation Programs/Construction, Reconstruction, and Use of motorized trails/Standard: do not locate new motorized trails or routes through wetlands when alternative locations are feasible. This requirement does not apply to snowmobile trails that cross wetlands under frozen conditions (without the use of fill). If a new trail or route must be located within a wetland, alternatives to earthen fill must be considered.

To clarify Table J-19 below, habitat quantity and habitat quality arrows were produced by Forest Service analysis of the different alternatives' vegetation direction, Management Areas, potential ATV mileage, and road density goals. Habitat quantity and habitat quality, along with professional judgment, were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table.

Table J-19. Marsh/Shrub Carr Species: Summary of Effects Analysis Factors and Determination

Marsh/Shrub Carr Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔↔
Habitat Quality	↓	↓	↑	↑	↔	↔	↑	↓	↔
DETERMINATION	NI/MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Possible direct effects to marsh and shrub carr habitat may vary by alternative, depending on the placement of new trails and ability to relocate existing trails away from wetlands. Standards and Guidelines regarding wetlands are applied across Alternatives 2-9.

Indirect

The threat of possible NNIS spread through ATV use is an indirect threat to this habitat group. NNIS may out-compete the natural flora and can lead to habitat degradation. Alternatives 2 and 9 have the greatest potential for ATV's to introduce non-native species because they allow for the most ATV trail among all alternatives (Fig. J-4).

Effects on Populations

Direct

Standards and Guidelines used for wetland habitats are the same for Alternatives 2-9 and the Selected Alternative. The types of management typically used on the Forests will not directly affect the known populations of these marsh and shrub carr species.

Indirect

Alternative 4 provides for the largest acreage of lakes and most miles of stream in non-motorized areas of all alternatives (Fig J-5). Increases in aquatic and wetland habitats within non-motorized areas is likely to lead to decreases in the likelihood of introducing NNIS into some marshes and mechanically damaging plants (see Aquatics section in Forestwide Standards and Guidelines, Chapter 2, *2004 Forest Plan*).

Cumulative Effects

These wetland species are on the southern edge of their range in Wisconsin and may have always been rare here. About 10 percent of sites (Wisconsin Department of Natural Resources 2002b) in the state are on the Forests. Given the past history of wetlands in the state, many outside the national forest are at risk. Wetland species in general may be under surveyed, other occurrences both on and off the Forests may well exist. Ecological Judgments in the Cumulative effects area will not rise substantially above their current low levels.

Group 7-Rare plant species with Shore Habitat Affinity

These rare plant species were grouped by similar habitat preference in order to make some general assumptions about the effects of Forest Plan implementation. Table J-20 below shows TES and RFSS species most often found on the shoreline or restricted to shallow water or littoral zone. Within this broad habitat group some species have microhabitat preferences such as water chemistry, or hydrologic processes that in some cases may be the over-riding factor as to why they occur there.

Although it falls into the Shore Habitat Affinity grouping, Fassett's locoweed (*Oxytropis campestris* var. *chartacea*) is discussed separately because it is Federally listed as Threatened by the U.S. Fish and Wildlife Service and because the Forest Plan includes mitigation measures specific to the protection of the species.

Table J-20. RFSS Plants with Shore Habitat Affinity

Species	Common Name	Status	Habitat Group
<i>Astragalus alpinus</i>	Alpine milkvetch	RFSS	7 Shore
<i>Carex lenticularis</i>	Shore sedge	LRFSS	7 Shore
<i>Carex michauxiana</i>	Michaux's sedge	RFSS	7 Shore
<i>Carex sychnocephala</i>	Many-headed sedge	RFSS	7 Shore
<i>Eleocharis engelmannii</i>	Engelmann's spike-rush	LRFSS	7 Shore
<i>Eleocharis olivacea</i>	Capitate spike-rush	RFSS	7 Shore
<i>Eleocharis quinqueflora</i>	Few-flowered spike-rush	RFSS	7 Shore
<i>Equisetum palustre</i>	Marsh horsetail	RFSS	7 Shore
<i>Littorella uniflora</i>	American shore-grass	RFSS	7 Shore
<i>Listera auriculata</i>	Auricled twayblade	LRFSS	7 Shore
<i>Oxytropis campestris</i> var. <i>chartacea</i>	Fassett's locoweed	TES	7 Shore
<i>Parnassia palustris</i>	Marsh grass-of-parnassus	RFSS	7 Shore

RFSS=Regional Forester Sensitive Species, LRFSS= "likely to occur" RFSS.

A Species Viability Evaluation was convened in 2002 for the purpose of soliciting the expert opinion of area botanists on Ecological Judgments based on alternatives. Two of the above species (*Carex michauxiana* and *Astragalus alpinus*) were analyzed in detail but assumptions were made that Forest management would affect all shore species in a similar way. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations of shore species using Forestry Best Management Practices for Riparian Areas etc. (SVE 2002).

Key factors

- Water quality, siltation, pollution
- Competition by non-native invasive plant species
- Recreational use – boats, ATVs that cause damage
- Lakes with fluctuating shoreline (for some species [including Fassett's locoweed])
- Hydrologic regime changes

Resource Protection Measures for Shoreline Species

There is a detailed section in the Forestwide Standards and Guidelines entitled "Water Resources" that provide very specific protection for aquatic systems. Notable within this section with direct influence on shore plants are:

- Water Resources/Watershed Protection and Management Guidelines to protect water from sedimentation.
- Water Resources/Watershed Protection and Management Guidelines to follow Wisconsin Forestry Best Management Practices for Water Quality and Wisconsin Construction Site Best Management Practices Handbook.
- Biological Resources/Wildlife and Fish/Woodland Ponds/Guideline: For permanent ponds, avoid erosion and the contribution of sediment into woodland ponds.
- Biological Resources/Plant Species Habitat Groups for RFSS/Aquatic/Guideline: Do not create new motorized access to lakes with documented RFSS plant species sites

To clarify Table J-21 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D and E and defined at the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table.

Table J-21. Shore Habitat Species (excluding Fassett's Locoweed): Summary of Effects Analysis Factors and Determination

Factors and Determination									
Shore Plant Group	Alternative								S.A.
	1 C/N	2	3	4	5	6	7	9	
Ecological Judgments for paneled species in group*									
<i>michauxiana</i> CNNF*	E	E	E	E	E	E	E	E	
<i>C. michauxiana</i> CEA*	E	E	E	E	E	E	E	E	
<i>A. alpinus</i> CNNF*	E	E	E	E	E	E	E	E	
<i>A. alpinus</i> CEA*	E	E	E	E	E	E	E	E	
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↓	↓	↑	↑	↔	↔	↔	↔	↔
DETERMINATION	MINT/ MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

* The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions.

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Expected direct effects to aquatic habitat will not vary by alternative due to the Forestwide Standards and Guidelines that protect this habitat (see Forestwide Standards and Guidelines, Chapter 2, of the 2004 Forest Plan).

Indirect

Recreational access can cause direct mechanical damage to plants and can act as a vector for non-native invasive plants such as Purple loosestrife that out-compete native species. In addition to activities such as boating, ATVs are a popular recreational activity that can assist in the spread of NNIS. Alternative 1 allows for cross-country ATV travel on the Chequamegon side and Alternatives 2 and 9 have the greatest potential ATV miles (Fig. J-4). Greater allocations to non-motorized Management Areas is likely to reduce the threat of non-native invasive species to shore habitat species. Competition by non-native invasive plants is a concern under all alternatives and is addressed in Forestwide Standards and Guidelines.

Another NNIS threat is the zebra mussel, which has been found in Wisconsin waters. These non-native invasive animals are filter feeders, increasing water clarity. Clearer water allows sunlight to penetrate deeper, thereby warming up the water and altering

habitat. It is unknown how this would affect rare plant species. These exotic mussels also deposit waste excretions that have been shown to raise ammonia nitrogen levels in water (Sullivan 1998) but the effects of this change are unknown.

Quantity of habitat will not change across alternatives because management activities will not be creating or reducing any shoreline habitat.

Effects on Populations

Direct

Standards and Guidelines used for shore habitats are the same for all alternatives. The types of management typically used on the Forests will not directly affect these littoral zone and shore species.

Indirect

The effects are the same as those in the 'Effect on Habitat' section above.

Cumulative Effects

None of these shoreline species has over 30 locations in the state (Wisconsin Department of Natural Resources 2003a), with 20% of these species located on Forestland. Therefore, the control of this habitat is important, but is more difficult since there are multiple ownerships of shore land. Where private land interspersed with public, it is difficult to control disturbance factors such as ATVs driving on beaches. Lakes outside National Forest ownership are vulnerable to development. As a result this makes the protection of river and stream segments and lakes in federal ownership important to the species in this habitat group.

Most of these species are assumed to have always been at low, dispersed population levels and most are on the edge of their range in Wisconsin. It is possible that there are other occurrences both on and off the Forests as surveys over the past 20 years have been sporadic and infrequent. Ecological Judgments cannot be expected to be more favorable in the Cumulative Effects Area, considering the pressures on habitats on private lands and fact that some species occur here at the edges of their respective ranges.

Table J-22. Fassett's locoweed: Summary of Effects Analysis Factors and Determination for Alternative 1

Fassett's locoweed	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔
DETERMINATION	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Table J-23. Fassett's locoweed: Summary of Effects Analysis Factors and Determinations for Alternatives 2-9 and the Selected Alternative

Fassett's locoweed	Alternative							
	2	3	4	5	6	7	9	S.A.
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↔	↔	↔	↔	↔	↔	↔	↔
Population Trend	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	NI	NI	NI	NI	NI	NI	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing.

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MLT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Standards and Guidelines (Mitigation) specific to *Oxytropis campestris* var. *chartacea*, Fassett's locoweed

Forestwide resource protection measures applicable to habitat management of *Oxytropis campestris* var. *chartacea* that are common to all alternatives include:

Standard: Protect and manage all known plant sites utilizing Fassett's locoweed Recovery Plan direction (US Fish and Wildlife Service 1991). All land use activities (except population monitoring and those activities necessary to protect the site) will be excluded from water's edge to the high water mark and within a habitat maintenance zone 200 feet inland from the high watermark of locoweed populations.

Effects on Habitat - Fassett's locoweed

Fassett's locoweed is known from only two sites in Bayfield County on the Chequamegon land base and none on the Nicolet. Its distribution in Wisconsin outside of the National Forest is limited to Portage and Waushara counties. Expected direct effects to known locations on the National Forest will not vary by alternative due to species-specific mitigation and Forestwide Standards and Guidelines that protect shoreline habitat (see Forestwide Standards and Guidelines, Chapter 2, of the 2004 *Forest Plan*) and the aforementioned mitigation measures specific to the species.

Roads and ATV trails can act as a vector for non-native invasive plants which could potentially out-compete Fassett's locoweed but no new roads or ATV trails are proposed near known Fassett's locoweed sites in any of the alternatives. Relocation of the roads near Fassett's locoweed sites is not proposed in any of the alternatives. Soil disturbance and mechanical damage to plants is a potential effect of ATV-use but ATV-use is not currently allowed at known Fassett's locoweed sites and would continue to be prohibited under all alternatives. Recreation such as boating on the lakes where the species is found are not expected to negatively impact existing populations and no provisions exist or are proposed to limit recreation except in the buffer areas around known locations.

Quantity of habitat will not change across alternatives because management activities will not be creating or reducing any shoreline habitat on Forestland suitable for Fassett's locoweed (Tables J-22, J-23).

Effects on Populations - Fassett's locoweed

Fassett's locoweed is a habitat specialist and Standards and Guidelines applicable to shore habitats in general, and to Fassett's locoweed habitat, in particular, are the same for all

alternatives. The types of management typically used on the Forests will not directly affect these areas.

Indirect effects of management activities on populations are the same as those in the 'Effect on Habitat – Fassett's locoweed' section above.

Cumulative Effects – Fassett's locoweed

Fassett's locoweed populations are expected to remain stable throughout the cumulative effects area. In Portage and Waushara Counties (outside of the CEA), from which Fassett's locoweed is known, the species is found only on privately owned land (US Fish and Wildlife Service 1988). Consequently, the importance of the populations in and adjacent to Forestland is magnified. Private shoreline development of the lakes where the species is found may negatively impact the species. In addition, development of the shoreline of other lakes in the area that may provide suitable habitat for the species may limit the species viability by reducing its ability to expand its range, however, the capacity of the species to disperse over land is unknown but presumed to be limited (US Fish and Wildlife Service 1991). Due to the high habitat specificity of the species, other land use activities within the CEA are not expected to impact this species in any predictable way.

Habitat Group 8-Rare plant species with Bog and Fen Habitat Affinity

Table J-24 below shows RFSS species most often found in bog or fen (or poor fen) habitats, mostly open with little canopy. Within this broad habitat group some species have microhabitat preferences such as water chemistry, which may be the over-riding factor as to why they occur there.

Table J-24. RFSS Plants with Bog/Fen Habitat Affinity

Species	Common Name	Status	Habitat Group
<i>Carex gynocrates</i>	Northern bog sedge	RFSS	8 Bog/Fen
<i>Carex livida</i> var. <i>radicaulis</i>	Livid sedge	RFSS	8 Bog/Fen
<i>Eriophorum chamissonis</i>	Russet cotton-grass	RFSS	8 Bog/Fen
<i>Juncus stygius</i>	Moor rush	RFSS	8 Bog/Fen
<i>Platanthera flava</i> var. <i>herbiola</i>	Pale-green orchid	LRFSS	8 Bog/Fen
<i>Rhynchospora fusca</i>	Brown beakrush	RFSS	8 Bog/Fen

RFSS=Regional Forester Sensitive Species, LRFSS= "likely to occur" RFSS.

The Species Viability Evaluation solicited the expert opinion of area botanists on Ecological Judgments based on alternatives. Only one of the above species (*Juncus stygius*) was analyzed in detail but assumptions were made that Forest management would affect all bog/fen species in a similar way. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations of shore species and by using Forestry Best Management Practices for Riparian Areas etc. (SVE 2002).

Key factors

- Herbivory
- Competition by non-native invasive plant species
- Isolation of habitats
- Mechanical Damage (i.e. ATV or snowmobile)

Resource Protection Measures for Bog and Fen Species

Forestwide resource protection measures applicable to habitat management of bog/fen plants that are common to all alternatives:

- Biological Resources/Plant Species Habitat Groups for RFSS/Open Wetland Habitat Group/Guideline: maintain natural hydrologic regimes, limit runoff and sedimentation and protect wetlands from direct mechanical disturbance.
- Water Resources/Watershed Protection and Management Guidelines to maintain hydrologic wetland functions for forest management practices such as timber harvesting, road and trail construction.
- Social-Recreation Programs/Construction, Reconstruction, and Use of motorized trails/Standard: do not locate new motorized trails or routes through wetlands when alternative locations are feasible. This requirement does not apply to snowmobile trails that cross wetlands under frozen conditions (without the use of fill). If a new trail or route must be located within a wetland, alternatives to earthen fill must be considered.

To clarify Table J-25 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D, and E and defined at the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table.

Table J-25. Bog/fen Species: Summary of Effects Analysis Factors and Determination

Bog/fen Group	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Ecological Judgments for paneled species in group*									
<i>J. stygius</i> CNNF*	E	E	E	E	E	E	E	E	
<i>J. stygius</i> CEA*	E	E	E	E	E	E	E	E	
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↓	↓	↑	↑	↓	↓	↔↓	↔	↔↓
DETERMINATION	NI/ MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

* The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

The amount of ericaceous bog habitat will may vary across alternatives. Expected direct effects to bog/fen habitat also, may vary by alternative, depending on the placement of new roads and trails and ability to relocate existing roads and trails away from wetlands. Effects such as siltation and slash dumping will be mitigated using Forestwide Standards

and Guidelines. Direct damage to ericaceous shrubs does occur from snowmobile trails and could also occur from illegal off-trail use of ATVs on bog mats.

Indirect

Recreational and other access can act as a vector for non-native invasive plants such as purple loosestrife that out-compete native species. It can also cause direct mechanical damage to plants. Alternative 1 allows for cross-country ATV travel on the Chequamegon and Alternatives 2 and 9 have the greatest number of potential ATV trail miles (Fig. J-4). Alternatives 3 and 4, with larger allocations to blocks of non-motorized areas and large blocks of northern hardwood areas with lower road density goals than the other alternatives will have bogs embedded within the areas. That will reduce the chances of ATVs spreading NNIS into these areas bringing in weed seed. Competition by non-native invasive plants is a concern under all alternatives and is addressed in Forestwide Standards and Guidelines.

Herbivory by deer could increase as an indirect effect of managing for early successional aspen forest adjacent to bogs. Alternative 1 with the highest acreage of aspen management would increase this possibility and would have an overall slight negative affect on bog species. Among the alternatives, Alternatives 2, 5 6, and the Selected Alternative have projected larger amounts of aspen in 100 years, though less than Alternative 1. Alternatives 3 and 4 have the largest acreage of landscape scale interior forest and least aspen. Alternatives 3 and 4 would manage for large ecosystem complexes that would include bog and fen communities. If these large patches support fewer deer there will be less herbivory on RFSS plants. Nevertheless, the fact that vegetation management in these areas does not occur make noticeable changes in the habitat quality unlikely.

Effects on Populations

Direct

Standards and Guidelines used for bog/fen habitats will protect the species in this group and are the same for Alternatives 2-9 and the Selected Alternative. Additionally, the types of management typically used on the Forests will not directly affect these species.

Indirect

Expert SVE panelists favored Alternatives 3 and 4 because these alternatives propose the least amount of ATV miles. ATVs can cause damage to bog and fen habitats as well as spread NNIS seed (SVE 2002). The proposed maximum ATV trail miles by alternative are shown in Figure J-4.

Expert panelists preferred alternatives with a general focus on large interior patches and less even age management (SVE 2002) due to the possible increase deer herbivory that could adversely impact one of the species (*P. flava* var. *herviola*) if it should occur in the habitat on the Forests. Alternatives 3, 4 and 9 provide for the greatest amount of large-scale patches (MA 2B, 6A) that would include bogs as part of the matrix (Table J-7). The Selected Alternative ranks fourth in terms of MA 2B and MA 6A (combined) acreage.

Quantity of habitat does not change across alternatives. Management activities do not create or reduce bog/fen habitat and therefore habitat quantity does not change.

Cumulative Effects

On average, 10 percent of occurrences (Wisconsin Department of Natural Resources 2003a) for these species are on the National Forest. Search efforts have been sporadic over the past 20 years on the Forests. There are many bogs and fens yet to survey so more populations of these RFSS may be found. These rare plants, with the exception of the likely-to-occur *Platanthera flava* var. *herbiola*, are on the edge of their range in Northern Wisconsin and it is not known if their ranges are expanding, contracting, or stable.

This habitat is under greater threat where development is increasing on private land. Even lakes with a wide bog mat on the edge are being developed. With continued development, expectations include edge effect increases and patch size decreases. Populations will continue to be isolated, restricting colonization. While new sites may be found, they would not be enough to offset the loss on private lands. Therefore, Ecological Judgments for this plant group is expected to decrease in the Cumulative Effects area.

Group 9-Rare plant species with Forested Wetland Habitat Affinity

Table J-26 below shows RFSS species most often found on the Chequamegon-Nicolet in black spruce, tamarack, cedar and mixed conifer forested wetlands and some of them most often in hardwood lowlands (black ash and bottomland forest). Within this broad habitat group some species have microhabitat preferences such as water chemistry, which in some cases may be the over-riding factor for their occurrence there.

Table J-26. RFSS Plants with Forested Wetland Habitat Affinity

Species	Common Name	Status	Habitat Group
<i>Amerorchis rotundifolia</i>	Round-leaved orchis	RFSS	9 Forested Wetland
<i>Calypso bulbosa</i>	Fairy slipper	RFSS	9 Forested Wetland
<i>Carex crawei</i>	Crawe's sedge	RFSS	9 Forested Wetland
<i>Carex gynocrates</i>	Northern bog sedge	RFSS	9 Forested Wetland
<i>Carex vaginata</i>	Sheathed sedge	RFSS	9 Forested Wetland
<i>Cypripedium arietinum</i>	Ram's-head lady's-slipper	RFSS	9 Forested Wetland
<i>Malaxis brachypoda</i>	White adder's-mouth	RFSS	9 Forested Wetland
<i>Poa paludigena</i>	Bog bluegrass	LRFSS	9 Forested Wetland
<i>Polemonium occidentale</i> var <i>lacustre</i>	Western Jacob's-ladder	RFSS	9 Forested Wetland
<i>Pyrola minor</i>	Lesser wintergreen	RFSS	9 Forested Wetland
<i>Ranunculus lapponicus</i>	Lapland buttercup	LRFSS	9 Forested Wetland
<i>Ulmus Americana</i>	American elm	RFSS	9 Forested Wetland

RFSS=Regional Forester Sensitive Species, LRFSS= "likely to occur" RFSS.

The Species Viability Evaluation solicited the expert opinion of area botanists on Ecological Judgments based on alternatives. Two of the above species (*Amerorchis rotundifolia* and *Calypso bulbosa*) were analyzed in detail but assumptions were made that Forest management would affect all wetland forest species in a similar way. *Cypripedium arietinum* and *Malaxis brachypoda* were evaluated for the Chippewa N. F. and *Pyrola minor* for the Superior. Panelist's made comments regarding potential indirect management effects on species that pertain to the Chequamegon-Nicolet since habitat characteristics are similar. Overall, expert panelists agreed that Standards and Guidelines would protect individual populations of forested wetland species (SVE 2002).

Key factors

- Herbivory
- Old growth white cedar
- Beaver flooding of RFSS sites
- Heavy canopy cover
- Competition by non-native invasive plant species
- Juxtaposition of aspen management

Resource Protection Measures for Forested Wetland Species

Forestwide resource protection measures applicable to habitat management of Forested wetland plants that are common to all alternatives:

- Biological Resources/Plant Species Habitat Groups for RFSS/Forested Wetland Habitat Group/Guideline: Protect hydrologic functions and maintain natural hydrologic regimes.
- Biological Resources/Plant Species Habitat Groups for RFSS/Forested Wetland Habitat Group/Guideline: Prohibit permanent or temporary openings within 100-500 feet of identified plant sites.
- Biological Resources/Plant Species Habitat Groups for RFSS/Forested Wetland Habitat Group/Guideline: Do not manipulate habitat and increase beaver populations adjacent to rare plant sites.
- Water Resources/Watershed Protection and Management Guidelines to protect water from sedimentation.
- Water Resources/Watershed Protection and Management Guidelines to follow Wisconsin Forest Best Management Practices for Water Quality and Wisconsin Construction Site Best Management Practices Handbook.
- Social-Recreation Programs/ Construction, Reconstruction, and Use of motorized trails/Standard: do not locate new motorized trails or routes through wetlands when alternative locations are feasible. This requirement does not apply to snowmobile trails that cross wetlands under frozen conditions (without the use of fill). If a new trail or route must be located within a wetland, alternatives to earthen fill must be considered.

To clarify Table J-27 below, the Ecological Judgments that were made during the Species Viability Expert (SVE) panels are coded as A, B, C, D and E and defined at the beginning of this Biological Evaluation. Habitat quantity and habitat quality arrows were produced by Forest Service analysis of the differing alternatives' Management Areas, potential ATV mileage, and road density goals. Ecological Judgments, habitat quantity, and habitat quality along with professional judgment were then used to make the Determinations at the bottom of the table. The Determinations for habitat groups are NI, BI, MINT, and MILT and are defined in the Key below the table.

Table J-27. Forested Wetland Species: Summary of Effects Analysis Factors and Determination

Forested Wetlands	Alternative								
	1 C/N	2	3	4	5	6	7	9	S.A.
Ecological Judgments for paneled species in group*									
<i>A. rotundifolia</i> CNNF*	E	E	E	E	E	E	E	E	
<i>A. rotundifolia</i> CEA*	E	E	E	E	E	E	E	E	
<i>C. bulbosa</i> CNNF*	E	E	D	E	E	E	E	E	
<i>C. bulbosa</i> CEA*	E	E	E	E	E	E	E	E	
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↓	↓	↑	↑	↓	↔↓	↔↓	↔	↔↓
DETERMINATION	NI/ MINT	MINT	BI	BI	MINT	MINT	MINT	MINT	MINT

Key: C/N= Chequamegon/Nicolet Forests current plans (Alt. 1)

* The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Direct

Under all alternatives management effects to forested wetland habitat are expected to be similar and to be beneficial. Effects from roads and trails will vary by alternative depending on the placement of new trails and ability to relocate existing trails away from wetlands.

Quantity of forested wetland habitat does not vary across alternatives. Management activities do not create or reduce forested wetland habitat and therefore the quantity does not change.

Indirect

Managing for early successional forest (especially aspen) adjacent to forested wetlands can cause an increase in herbivory and beaver activity (SVE 2002), which can be deleterious to some species. Beaver activity can flood rare plant habitat. Alternative 1, with the highest acreage of aspen management, would increase this possibility and would have an overall negative affect on some species of forested wetlands due to herbivory and flooding. Alternatives 2 (249,400 acres), 5 (228,000 acres) and 6 (230,600 acres) have projected larger amounts of aspen over 100 years, though less than Alternative 1 (267,000 acres). The Selected Alternative has a projected aspen coverage of 216,200 acres after 100 years and the remaining alternatives (Alt. 3, 4, 7 and 9) project between 185,000 acres and 209,600 acres of aspen on the Forests. Expert panelists felt that Alternatives 3 and 4, with the least aspen and even-age management adjacent to RFSS sites would be better for these species (SVE 2002).

Competition by non-native invasive plants is a concern under all alternatives and is addressed in Forestwide Standards and Guidelines (see Chapter 2 of Proposed Plan). Alternatives 3, 4 and 9 which provide for large patches of interior forest composed of complexes of communities would be less likely to provide an avenue for invasive plants in the wetland communities.

Travel corridors provide opportunities for NNIS to establish and spread, so those alternatives that have greater densities of roads and trails on the landscape will have greater potential habitat for NNIS. Alternative 4 proposes the largest area of 0 mi/mi² - Total Road Density –12% of the Forests. Alternatives 3, 7, and 6, propose 8%, 7%, and 6%, of the Forest in 0 mi/mi² of total road density, respectively. Alternatives 2, 5, 9 and the Selected Alternative all propose 5% of the land base in 0 mi/mi² of total road density.

Recreational access can act as a vector for non-native invasive plants such as swamp thistle that out-compete native species. In addition, illegal off-trail ATV trampling can cause direct mechanical damage to plants. Alternative 1 allows for cross-country ATV travel on the Chequamegon side and Alternative 2 and 9 have the greatest number of ATV miles (Fig. J-4). Expert panelists preferred alternatives with less ATV designation such as Alternative 4 (SVE 2002).

Alternatives 3, 4 and 9 provide for the protection of the greatest amount of large-scale patches (MA 2B, 6A) that would include forested wetlands as part of the matrix (Table J-7). Expert panelists preferred alternatives with general focus on large interior patches and less even age management (SVE 2002).

The Determination of BI (beneficial impact) for Alternatives 3 and 4 is due to the reduced management for aspen under these Alternatives compared to others. The reduction in the management for aspen will then reduce deer herbivory and beaver flooding adjacent to rare plant sites. This is considered a beneficial impact for the habitat and thus ranked accordingly.

Effects on Populations

Direct

The forested wetlands habitat group is protected under the Forestwide Standards and Guidelines and they are the same for Alternatives 2-9 and the Selected Alternative. The types of management typically used on the Forests will not directly affect these species.

Indirect

Indirect effects regarding compatible forest management (less aspen adjacent to wetland forest) to reduce potential deer herbivory and the issues of non-native invasive competition are discussed at the beginning of the plants section.

Cumulative Effects

There are about 225,000 acres of lowland conifer and lowland hardwood forest on the Chequamegon-Nicolet National Forest. Many thousands of acres have had botanical surveys, especially those of higher quality. It is very possible that there are more occurrences of these rare species on the Forests. On average in this group the National Forest supports over one-fourth of the known populations in Wisconsin (Wisconsin Department of Natural Resources 2003a).

Botanists in the SVE panel recognized that guidelines protect wetlands from harvest. However, they remained concerned about aspen and even-aged management (high in Alternatives 1 and 2) around population sites of RFSS species and the potential for herbivory and increased beaver activity that could cause flooding and damage to some species (SVE 2002). Ecological Judgment outcome scores for the species that represented this habitat (*Calypso* and *Amerorchis*) were more favorable under Alternatives 3 and 4 than for the other Alternatives because they have large blocks of interior forest, which would include wetlands.

Forested wetlands are threatened where development is increasing on private land. Expectation is that edge effect will increase and patch size decrease. Wetland conifer and hardwood forest is harvested on lands outside the National Forest. Ecological Judgments for this plant group is expected to decrease in the Cumulative Effects Area in all alternatives based on increased threats.

Biological Evaluations of TES and RFSS Animals

Introduction

There are 27 species of birds, mammals, turtle, fish, mussels, and insects included in the Regional Foresters Sensitive Species List for the Chequamegon-Nicolet National Forests (Table J-28). Additionally, four RFSS are not known to occur on the Forests but they do occur on other Forests in Region 9, and potentially suitable habitat is found on the Forests. These four species are included at the end of the Biological Evaluation, are addressed in less detail than the other RFSS in the Biological Evaluations. For these species, determinations of effect of alternatives on populations are omitted. Included are the bald eagle and the gray wolf, both of which are Federally listed as threatened.

Table J-28. RFSS and TES of Animals for which there are Biological Evaluations. Unless otherwise noted, each species is designated RFSS.

Group	Species	Common Name
Birds	<i>Haliaeetus leucocephalus</i> *	Bald Eagle
	<i>Accipiter gentilis</i>	Northern Goshawk
	<i>Ammodramus leconteii</i>	Le Conte's Sparrow
	<i>Buteo lineatus</i>	Red-shouldered Hawk
	<i>Chlidonias niger</i>	Black Tern
	<i>Cygnus buccinator</i>	Trumpeter Swan
	<i>Falcipecten canadensis</i>	Spruce Grouse
	<i>Oporornis agilis</i>	Connecticut Warbler
	<i>Picoides arcticus</i>	Black-backed Woodpecker
	<i>Tympanuchus phasianellus</i>	Sharp-tailed Grouse
	<i>Bartramia longicauda</i>	Upland Sandpiper
	<i>Catharus ustulatus</i>	Swainson's Thrush
	<i>Dendroica cerulea</i>	Cerulean Warbler
Mammals	<i>Canis lupus</i> **	Gray Wolf
	<i>Martes americana</i>	American Marten
	<i>Myotis septentrionalis</i> ***	Northern Myotis
	<i>Pipistrellus subflavus</i> ***	Eastern Pipistrelle
Turtle	<i>Clemmys insculpta</i>	Wood Turtle
Fish	<i>Acipenser fulvescens</i>	Lake Sturgeon
	<i>Moxostoma valenciennesi</i>	Greater Redhorse
	<i>Notropis anogenus</i>	Pugnose shiner
Mussels	<i>Venustaconcha ellipsiformis</i>	Ellipse Mussel
	<i>Plethobasus cyphus</i> ***	Bullhead Mussel
Butterflies	<i>Incisalia henrici</i>	Henry's Elfin Butterfly
	<i>Lycaeides idas nabokovi</i>	Northern Blue Butterfly
	<i>Oeneis chryxus</i>	Chryxus Arctic Butterfly
	<i>Phyciodes batesii</i>	Tawny Crescent Butterfly
	<i>Pieris virginianensis</i>	West Virginia White Butterfly
Dragonflies	<i>Ophiogomphus anomalus</i>	Extra-striped Snaketail Dragonfly
	<i>Ophiogomphus howei</i>	Pygmy Snaketail Dragonfly
	<i>Stylurus scudderii</i>	Zebra Clubtail Dragonfly
	<i>Gomphus viridifrons</i>	Green-faced Clubtail Dragonfly
	<i>Somatochlora forcipata</i> ***	Forcipate Emerald Dragonfly

*Federally Threatened

** Federally Threatened within Wisconsin

*** Not documented from CNNF

Effects Reporting Rationale

Proposed protective measures covered by Standards and Guidelines are included in Alternatives 2-9 and the Selected Alternative as part of the discussion for each species. However, Standards and Guidelines that function as protective measures under Alternative 1, the existing condition, are summarized only once in this introduction for all species. Existing standards, guidelines, and other factors are described as directed in the two separate 1986 Forest Plans for the Chequamegon and Nicolet National Forests (USDA Forest Service Region 9 1986a, 1986b). Determinations listed for each species under Alternative 1 are based on plan direction. For more detailed information, see each Forest's Land and Resource Management Plan (USDA Forest Service Region 9 1986a, 1986b).

Alternative 1: Summary of Current Standards and Guidelines for Chequamegon-Nicolet National Forests

Nicolet National Forest

(Land and Resource Management Plan, Nicolet National Forest, 1986, USDA Forest Service)

In general, the Forest used a philosophy that the more diverse and spatially distributed the vegetation types, the more varied and dispersed the wildlife would be. Consideration of landscape scale biological diversity was not emphasized. Thirty-two Management Indicator Species were selected to be monitored and represented 368 species of wildlife found on the Forest. Table 15 (p. 60-61) in that Forest Plan gives predictions of the effect of various management activities on sensitive species.

Forestwide Standards and Guidelines

- Forestwide Standards and Guidelines call for cooperation with the State of Wisconsin to maintain an area that was closed to dry-land trapping to benefit American marten and bobcat.
- Forestwide Standards and Guidelines call for cooperation with local governments to develop motorized restrictions on selected lakes for loons.
- Existing small upland openings are to be maintained for upland bird species such as Le Conte's sparrow and for plant species like the dwarf bilberry. New permanent openings are to be constructed on approximately 3% of the Forest's upland acres.
- Large bogs will be maintained in an open and brushy condition for sandhill crane and Lincoln's sparrow.
- Alder is retained along streams with wood turtle populations.
- Jack pine is emphasized in Management Area 4.1 for spruce grouse.
- Standards and Guidelines provide protection for goshawk and red-shouldered hawk nest territories.
- Artificial nest structures are recommended for waterfowl, as well as managing impoundments to benefit wetland species. New impoundments are created especially where they benefit bald eagle, osprey, and great blue heron nesting territories.
- Riparian management zones are managed for old growth, hemlock, balsam fir, cedar, white pine, paper birch, or aspen to promote or discourage beaver along streams, maintain conifer cover, and provide future structure for water bodies.

- Five percent of managed upland timber stands, except for uneven aged northern hardwood species, are maintained as old growth. This type of old growth is not to be thinned or harvested until “well beyond normal rotation age.” Long-lived species are emphasized.
- Standing dead trees are maintained in all areas where timber harvest takes place.
- Some areas are to be maintained with an emphasis on aspen management for upland game birds.
- Designated deeryards are managed for wintering deer. This includes increasing conifers such as hemlock, white pine, jack pine, balsam fir, spruce, and cedar.
- Riparian areas of Class I and II trout streams are maintained in long-lived hardwood, conifers, or as shrub meadow.
- Habitat along warm water streams is managed to maintain viable populations of beaver and other furbearers.
- EPA registered chemicals are permitted to remove rough fish or to fertilize selected waters.

Management Area Standards and Guidelines

Wilderness, RNAs, Special areas are intended to provide for species such as barred owl and Blackburnian warbler. Management Areas 1.2, 2.2, 3.2, 4.2, 6.2 and 9.2 call for lower road densities than other areas of the forest.

Chequamegon National Forest

(Land and Resource Management Plan Chequamegon National Forest, 1986, USDA Forest Service)

Diversity of species is emphasized at a stand level rather than landscape level with recommendations for creating and maintaining upland openings less than 10 acres in size throughout the forest. Ruffed grouse, white-tailed deer and other early successional species are emphasized in several Management Area prescriptions. Ten management indicator species represent other species found on the forest.

A list of candidate sensitive mammals, birds, reptiles, amphibians and fish is presented. Management Activities that could negatively affect the habitat of such species should be analyzed in a biological evaluation. Table IV-15 (p. IV-84) in that Forest Plan shows the predicted effect of various management activities on sensitive species

Forestwide Standards and Guidelines

- Protection of springs, pond construction and construction of lowhead impoundments are recommended.
- Dead standing and downed logs are to be retained.
- Beaver is to be emphasized near warm water streams and lakes.
- Deer yards are managed by maintaining 40 percent conifer in the areas.
- Two live den trees are retained per acre.
- Aspen species are discouraged near Class I and II trout streams. Long-lived tree species are encouraged within 300-feet of streams. In addition, gravel is to be placed in streams to provide spawning and rearing habitat.
- Eagle, osprey, and double-crested cormorant nest areas are protected.
- Roads are closed if needed to protect sensitive species; road density is limited in known and potential gray wolf territories.

- The Moquah Barrens Wildlife Area is managed to provide for sharp-tail grouse habitat.

Management Area Standards and Guidelines

Each Management Area prescription includes specific guidelines for retaining dead standing and down trees during harvest activities. Typically, they included retaining one to two dead standing trees per acre, one den tree per acre, and two or three mast-producing trees per acre when present.

Alternative 2-9 and the Selected Alternative: Summary of Proposed Standards and Guidelines for Chequamegon-Nicolet National Forests

A summary of Forestwide Standards and Guidelines that provide resource protection measures applicable to management of plants and to habitats for animals that are common to Alternatives 2-9 and the Selected Alternative can be found above under Effects Reporting Rationale. For the specific Standards and Guidelines, reference Chapter 2 of the *2004 Forest Plan*.

There are instances where an Ecological Judgment and a respective Determination appear to disagree. Each is based on separate considerations. Ecological Judgments are expert opinions regarding the long-term abundance and distribution of each species. They are expressed as outcome ratings, and are based on predicted ecological conditions under respective alternatives. Determinations are based on Ecological Judgments as well as the effects of proposed management direction on habitat quantity, habitat quality, and population trend. They are expressed by one of four Determination statements: no impact (NI), beneficial impact (BI), may impact individuals but not likely to cause a trend to federal listing or loss of viability (MINT), or may impact individuals and likely to result in a trend to federal listing or loss of viability (MILT).

It is possible for a species to receive an Ecological Judgment that indicates conditions would not provide long-term abundance and distribution (outcomes D and E), and yet receive a Determination of BI or MINT. Most such apparent discrepancies are explained by the restricted habitats of these species that result in low Ecological Judgments, with favorable Determinations based on management direction and Standards and Guidelines that do indeed protect those existing habitats, regardless of magnitude. If habitat for and numbers of a particular species have been uncommon in the past, are currently uncommon, and are predicted to be uncommon in the future, this typically leads to a low Ecological Judgment. The same species may receive a favorable Determination because the existing habitat, regardless of magnitude, will be protected or enhanced by proposed management direction.

Biological Evaluations of Individual Species

SPECIES: *Haliaeetus leucocephalus*

COMMON NAME(S): Bald Eagle

STATUS:

FWS: Threatened

USFS: na

STATE OF WISCONSIN: SC

RANKING: G4, S2N

DISTRIBUTION

The bald eagle is a wide-ranging species that historically nested throughout North America, in at least 45 of the contiguous 48 states. The bald eagle population statewide is substantial, with a total of 831 eagle nest territories occupied by breeding adults in 2002 (Wisconsin Department of Natural Resources 2002c). On the Chequamegon land base in 2002, there were a total of at least 41 territories; on the Nicolet land base in 2000 there were at least 40 historic territories.

Key Factors

- Human disturbance of nest sites
- Forested areas with super-canopy trees, typically white or red pine, near lakes and large rivers that contain fish suitable as prey

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the bald eagle that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines protecting riparian areas.
- Guideline to promote and maintain long-lived supercanopy trees, especially white pine.
- Standards and Guidelines pertaining to management of white pine.
- Standards and Guidelines pertaining to Fisheries Habitat Management.
- Standards and guidelines specific to bald eagle (management of existing and potential habitat; protection of nest sites).

Table J-29. Bald Eagle: Summary of Effects Analysis Factors and Determination for Alternative 1

Bald Eagle	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔
DETERMINATION	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Table J-30. Bald Eagle: Summary of Effects Analysis Factors and Determinations for Alternatives 2-9 and the Selected Alternative

Bald Eagle	Alternative							
	2	3	4	5	6	7	9	S.A.
Habitat Quantity	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	NI	NI	NI	NI	NI	NI	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Habitat requirements for eagles include large productive lake and river systems with relatively low levels of disturbance, and adequate numbers of supercanopy nest trees, with white pine favored. Standards and Guidelines would offer protection for all known eagle territories on the Forests, in all alternatives. Standards and Guidelines common to Alternatives 2-9 and the Selected Alternative would also protect aquatic and riparian habitats, and encourage management of white pine. There are differences in management among alternatives. The area of water bodies greater than 10 acres in size located within non-motorized areas ranges from of 1,698 acres (Alternative 1) to 6,064 acres (Alternative 4). Under the Selected Alternative, 4,280 acres of lakes would be located in non-motorized areas. The area of habitat available in non-motorized areas, however, does not appear to be a limiting factor, especially as eagles become increasingly tolerant of human activity. There are also differences among alternatives in allocation of Management Areas 2B and 4B, both of which have additional guidelines concerning white pine management and both are likely to represent current habitat or offer bald eagle habitat in the future. Alternative 3 provides the greatest acreage of both 2B and 4B Management Areas among all alternatives including the Selected Alternative (Table J-7). Although Alternatives 2-9 and the Selected Alternative are all likely to at least maintain habitat quality and quantity on the Forest, the potential gains as a result of MA 2B and MA 4B allocations remains unknown.

Effects on Populations

Bald eagle populations are predicted to remain stable or increase under all alternatives because the quality and quantity of habitat is predicted to remain stable or increase (Tables J-29, J-30). The number of active bald eagle territories on the Chequamegon-Nicolet National Forests has shown a consistent upward trend over the past several decades. This trend is expected to continue as long as unoccupied suitable habitat exists.

Cumulative Effects

Bald eagle numbers are expected to remain stable or increase throughout the cumulative effects area. In 1997, bald eagle numbers had recovered to the point that the Wisconsin Department of Natural Resources removed the species from the WDNR endangered and threatened species list. Statewide, numbers have increased steadily over the past three decades (Dhuey & Skoloda 2000). Although a decrease in super canopy trees and an increase in development of private lands that surround lakes and rivers are expected, unoccupied suitable habitat remains on Forest lands and other public lands. As of 1999, approximately half of the known eagle nests in Wisconsin were on public lands and, where nests occur, the habitat is managed to protect existing sites and to promote future nest and perch sites (Dhuey & Skoloda 2000)

SPECIES: *Canis lupus*

COMMON NAME(S): Gray Wolf (= Timber Wolf, Wolf)

STATUS:

FWS: Threatened within Wisconsin as of April 1, 2003 (US Fish and Wildlife Service 2003). The process to delist is expected to begin in 2004 (Wydevin *et al.* 2003).

USFS: na

STATE OF WISCONSIN: Threatened

RANKING: S1

DISTRIBUTION

Wolves are found in all geographic units of the Chequamegon and in limited numbers in the northern portion of the Nicolet, due in part to relocation of depredating wolves to that area by the WDNR. Forestwide, there are approximately 20 wolf packs on the Chequamegon land base with 77-80 wolves present as of Spring, 2001. For unknown reasons, wolves have been slower to populate the Nicolet land base. Breeding activity was reported there with one pack present consisting of at least 2 wolves (Wydevin *et al.* 2003).

Key Factors

- Road density and associated human disturbance
- Areas of low human disturbance for denning and rendezvous sites

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the gray wolf that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines specific to wolf (protection of den and rendezvous sites; management of road densities in existing and potential wolf habitat).
- Standards and Guidelines pertaining to location of motorized trails.
- Standards pertaining to road densities and road closures.
- Standards and Guidelines pertaining to road decommissioning.

Table J-31. Gray Wolf—Summary of Effects Analysis Factors and Determination for Alternative 1

Gray Wolf	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↗↑	↗↑
DETERMINATION	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Table J-32. Gray Wolf: Summary of Effects Analysis Factors and Determination for Alternatives 2-9 and the Selected Alternative

Gray Wolf	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Habitat Quantity	See Table J-31	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↑	↑	↑	↑	↑	↑	↑	↑
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of gray wolf habitat are expected to remain stable or increase under all alternatives. Potential increases in the quality of habitat are the result of an increased emphasis on roadless areas, semi-primitive non-motorized areas and other non-motorized areas under Alternatives 2-9 and the Selected Alternative when compared to the existing condition (Table J-7). These habitat quality improvements are likely to lead to beneficial impacts on the wolf. Wolves favor areas with relatively low road density and relatively low levels of human disturbance (Mladenoff *et al.* 1995), which are provided by these management areas. No off-road ATV use on the Chequamegon land base under Alternatives 2-9 and the Selected Alternative are also likely to benefit the wolf.

Effects on Populations

Gray wolf populations are expected to remain stable or increase under all alternatives because the quality and quantity of habitat are expected to remain stable or increase. The number of wolves on the Chequamegon-Nicolet National Forests is expected to remain stable in areas where they currently exist. As wolves colonize unused suitable habitat, especially on the eastern side of the Forest, the population is expected to increase under all alternatives. Wolves may increase at a slower rate and rise to lower levels under Alternative 1 because of a higher open road density and greater off-road vehicle access when compared to other alternatives.

Cumulative Effects

Wolves are expected to increase in number and expand their range into unused suitable habitat in coming years. The Wisconsin Wolf Management Plan (Wisconsin Department of Natural Resources 1999) identifies over 5,800 square miles of favorable wolf habitat within the state with 2,200 square miles already occupied by wolves. Public lands including National Forest comprise much of this area. The amount of favorable habitat could support as many as 500 wolves. This exceeds the state management goal of 350 wolves as well as the 250-wolf threshold required to remove state and federal protections.

Increased fragmentation of forested habitat, and increased human development and disturbance, are likely to occur over time on private lands surrounding the National Forest. This will diminish the quality of the habitat for the gray wolf, and magnify the importance of National Forest lands in maintaining wolf populations.

SPECIES: *Accipiter gentilis*

COMMON NAME(S): Northern Goshawk

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G5, S2N,SZN

DISTRIBUTION

This species has a large range in North America including much of Canada and the US, and portions of Mexico. Goshawks are present on the Forests year-round. The species is found at low densities throughout the forests, although numbers are generally higher on the Nicolet. On the Chequamegon land base, there appear to be very few active nests per year, with no more than four known to be active at any one time out of approximately 10 known historic territories. In 2000, there were only two known active nests on the Chequamegon land base, one each on the Washburn (failed, suspected fisher predation) and Medford/Park Falls Ranger District (fledged 2 young). Surveys for goshawks and research on the Chequamegon land base have been limited. The Nicolet land base has had more research and monitoring for goshawks than the Chequamegon side, and thus has more information. In 2000, the Nicolet land base had 52 historic territories, 14 of which were active. Of those, only 9 were successful and 19 young were fledged (four additional young were taken by falcons).

Key Factors

- Conifer swamps and upland deciduous woodlands with adequate prey
- Mature, closed canopy northern hardwoods and conifer stands for nesting
- Habitat fragmentation
- Nest site disturbance

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the northern goshawk that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management of mixed lowland conifer, lowland hardwoods, and hemlock.
- Standards and Guidelines specific to northern goshawk and red-shouldered hawk (protection of nest sites; maintenance and restoration of potential habitat; restrictions on goshawk take).

Management area resource protection measures applicable to management of the northern goshawk that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to biological diversity, including protection and management of lowland conifer types, reducing fragmentation, and encouraging closed-canopy hardwood areas; MA 2A, 2B, 2C, MA 3A, 3B, 3C, MA 4A, 4B, 4C.

Table J-33. Northern Goshawk: Summary of Effects Analysis Factors for Alternative 1

Northern Goshawk	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-34. Northern Goshawk: Summary of Effects Analysis Factors and Determination

Northern Goshawk	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	C	C	C	C	
Ecological Judgments CEA*	D	D	C	C	D	D	D	D	
Habitat Quantity	See Table J-33	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↔	↑	↑	↗↑	↑	↑	↑	↑
Population Trend		↔	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	MINT	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions.

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

MINT—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Forest fragmentation and other forms of habitat alteration are the greatest threats to northern goshawk. Clearcutting, which temporarily increases forest fragmentation, and selective cutting, which alters habitat conditions, are proposed under all alternatives. These activities could disturb nesting goshawks and increase their risk of predation. These same timber-harvesting activities also create conditions favorable to prey of the northern goshawk. The amount of acres identified as suitable for timber production ranges from 785,000 in Alternative 4 to 900,000 in Alternative 1 (Fig. J-6). Under the Selected Alternative, 860,000 acres are identified as suitable for timber production. Because timber-harvesting activities diminish the value of woodlands and nesting habitat and may indirectly lead to higher levels of predation and nest failure despite potential increases in prey numbers, the acreage suitable for timber harvest may be viewed as a measure of habitat quality. Areas where timber harvesting does not occur are expected to increase in their suitability to goshawks as they mature and canopy closure increases. All alternatives, with the exception of Alternative 1, provide for interior forest conditions (MA 2B, 3B, and 4B) that would be favorable to northern goshawk with greater emphasis in Alternatives 3-9 and the Selected Alternative (Figure J-6).

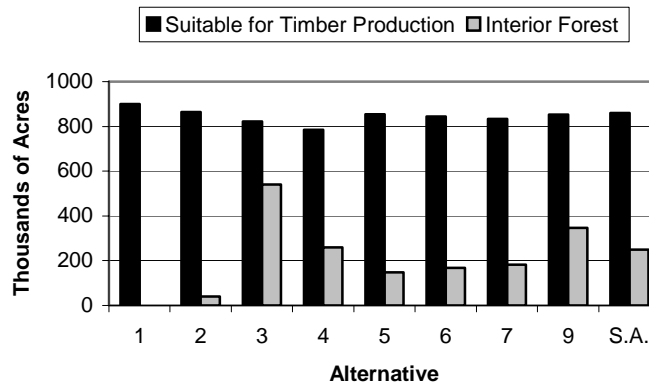


Figure J-6. Relative Comparison of Acres Suitable for Timber Production and Acres of Interior Forest (MA 2B, 3B, 4B) by Alternative

Human disturbance of nest sites pose additional threats to northern goshawk. Motorized recreation allows greater access within forested habitats and could be disruptive during nesting. The amount of motorized access and designated non-motorized areas varies by Alternative. Alternatives with less motorized access, more designated non-motorized areas, and fewer miles of motorized trails would provide habitat more favorable to the northern goshawk. Standards and Guidelines that provide protections for northern goshawk nest sites and habitat would apply across Alternatives 2-9 and the Selected Alternative. The amount and quality of habitat for northern goshawk are expected to remain stable or increase under all alternatives (Table J-34).

Effects on Populations

Northern goshawk populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under Alternatives 1 and 2 (outcome D), and to increase to outcome C under Alternatives 3-9 (Table J-34). The increase under these alternatives is attributed to various combinations of more interior forest, fewer acres suitable for timber harvesting, less motorized access, and fewer miles of motorized trails under these alternatives. The Selected Alternative is comparable to Alternatives 3-9 on these attributes and it is likely that it would have been given a similar ecological judgment to Alternatives 3-9.

Although an increase in interior forest (MA 2B) under Alternatives 2-9 and the Selected Alternative will likely promote fisher (*Martes pennanti*) populations and may increase the threat of goshawk predation by fisher, succession in these areas will provide nest sites with adequate cover which may outweigh the increased fisher predation threat. Erdman *et al.* (1998) suggest that aspen and birch provide inferior nest sites, which are exposed, particularly in years with forest tent caterpillar outbreaks, and are prone to predation by fisher. The Ecological Judgments are consistent with the trends in indicators important to northern goshawk across the alternatives.

Cumulative Effects

Increased fragmentation of forested habitat and increased human development and disturbance are likely to occur over time on private lands surrounding the National Forest. This will result in a decrease in the quantity and quality of northern goshawk habitat. Consequently, the importance of National Forest lands in maintaining the ecological conditions that contribute to long-term species abundance and distribution of northern goshawk will be magnified. Within the cumulative effects area, the likelihood of ecological conditions that contribute to long-term species abundance and distribution for northern goshawk is predicted to remain at its present level (outcome D) under all but Alternatives 3 and 4, where it increases to outcome C (Table J-34). Alternatives 3 and 4 provide conditions most favorable to northern goshawk: higher amounts of interior forest and non-motorized areas, and lower amounts of suitable timber harvesting acres and motorized access. Although Alternatives 5-9 and the Selected Alternative also contain a combination of factors favorable to northern goshawk, they may not be sufficient to improve the likelihood of positive ecological conditions above current levels when considered in this broader context.

SPECIES: *Ammodramus leconteii***COMMON NAME(S):** Le Conte's Sparrow**STATUS:****FWS:** none**USFS:** RFSS and known to occur on the CNNF**STATE OF WISCONSIN:** SC/M**RANKING:** G4, S2B, SZN**DISTRIBUTION**

The breeding range of Le Conte's Sparrow is primarily in central Canada. Robbins (1991) reported this species to be an uncommon summer resident in the northern and central portions of Wisconsin, but other specialists have opined that it is a regular breeder in the northern third of the state. There have been only two records of a Le Conte's sparrow from the NRRI Breeding Bird Survey (1992-2000)(Sauer *et al.* 2003) conducted annually on the Chequamegon land base. At least one location was in a sedge meadow swamp. There are no documented observations on the Nicolet land base although there are two probable locations there based on Wisconsin Breeding Bird Atlas surveys (Wisconsin Society for Ornithology 2003).

Key Factors

- Open grassland, sedge meadows (especially those resulting from beaver activity), and shallow marshes
- Habitat fragmentation
- Beaver management

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the LeConte's sparrow that are common to Alternatives 2-9 and the Selected Alternative include:

- Avoid fragmenting shallow water marshes, or large wetlands that contain open water.
- Maintain and restore needed sedge and shrub components in LeConte's sparrow habitat.
- Standards and Guidelines pertaining to aspen and beaver management.

Table J-35. LeConte's Sparrow: Summary of Effects Analysis Factors for Alternative 1

LeConte's Sparrow	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-36. LeConte's Sparrow: Summary of Effects Analysis Factors and Determination

LeConte's Sparrow	Alternative								S.A.
	1	2	3	4	5	6	7	9	
Ecological Judgments CNNF*	C	C	C	C	C	C	C	C	
Ecological Judgments CEA*	C	C	C	C	C	C	C	C	
Habitat Quantity	See Table J-35	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality		↔	↔	↔	↔	↔	↔	↔	↔
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions, CNNF—Chequamegon-Nicolet National Forests, CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of open habitat suitable for LeConte's sparrow will remain stable or increase under all alternatives. The increase in habitat under Alternatives 2-9 and the Selected Alternative range from 400 to 1,200 acres and would occur through the expansion of the Riley Lake Wildlife Management Area. This would provide a large block of contiguous habitat for LeConte's sparrow. The amount and quality of sedge meadow and shallow marsh habitat are closely associated with the number of active and abandoned beaver ponds because beaver activity promotes the creation or maintenance of these areas. Standards and Guidelines affecting beaver management would apply across Alternatives 2-9 and the Selected Alternative, consequently, the amount and quality of the associated habitats are expected to be the same across these alternatives.

Effects on Populations

LeConte's sparrow populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase marginally. Surrogate Barrens may provide additional habitat for the species. Ecological Judgments are consistent among the alternatives (Table J-36). Because agricultural fields and other open areas may also support LeConte's sparrow, Forest land is not believed to represent a large portion of this species' habitat. Increases in sedge meadow, marsh, and barrens habitats are likely to only minimally increase LeConte's sparrow populations.

Cumulative Effects

The amount and quality of LeConte's sparrow habitat likely would remain stable within the Cumulative Effects Area. The adoption of wetland water quality standards in 1991 drastically slowed the loss of wetlands within Wisconsin (Wisconsin Department of Natural Resources 2002c); this includes the shallow marshes and sedge meadows important to LeConte's sparrow. Best Management Practices (BMPs) designed to minimize effects on water quality have been in place statewide since 1995. BMPs apply to activities such as timber harvesting and road building within wetlands, streams, and riparian areas on all ownerships.

The Wisconsin Department of Natural Resources identified northern sedge meadow as a priority grassland habitat for management within the Northern Highland/Lake Superior Lowland, an area that covers much of the Cumulative Effects Area (Sample and

Mossman 1997). This includes 65,000 acres of permanent grassland in blocks greater than 100 acres, including 38% sedge or wet grass meadows, and encompasses the Crex Meadows/Fish Lake Complex. Within the bounds of the analysis area, the likelihood of ecological conditions contributing to long-term abundance and distribution for LeConte's sparrow is predicted to remain at its present level under all alternatives (Table J-36).

SPECIES: *Buteo lineatus*

COMMON NAME(S): Red-shouldered Hawk

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G5, S1N, S3, S4B

DISTRIBUTION

Wisconsin is on the northern edge of the range of the Red-shouldered hawk, which is primarily in the southeastern US. In Wisconsin, the species is an uncommon migrant and summer resident, uncommon winter resident in the south, and rare winter resident in central Wisconsin (Robbins 1991). Summer records exist for almost all counties. Suitable habitat includes unfragmented, mature floodplain forests along major rivers, including the Mississippi River, St. Croix River north to St. Croix Falls, the Chippewa River to Chippewa Falls, the Wisconsin River to Wausau, and the Wolf River to Shawano.

The species is found at low densities throughout the forests, although numbers are generally higher on the Nicolet, in particular the southern portion. There has been focused attention on this species on the Nicolet land base. There, in 1999, 52 of 73 historic nesting sites were searched, of which there were 21 active nests; 10 nests produced 24 young. On the Chequamegon land base, the species may be locally common but there have only been 2 located during the NRRI Breeding Survey (Sauer *et al.* 2003) and very few known nesting locations.

There has been little consistency in surveys on the Chequamegon land base. Taylor County of the Medford/Park Falls Ranger District appears to have a relatively high density of red-shouldered hawks as indicated by proactive road surveys. These surveys have located 18 territories, 5 of which have had stick nests located, but active nest sites and reproduction is still unknown. There is little information on this species for the rest of the Chequamegon side, but one new territory was located in 2000 on the Washburn RD (no nest found).

Key Factors

- Mature closed canopy northern hardwood or mixed conifer/hardwood forests
- Habitat fragmentation

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the red-shouldered hawk that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management of mixed lowland conifer, lowland hardwoods, and hemlock

- Standards and Guidelines specific to northern goshawk and red-shouldered hawk (protection of nest sites; maintenance and restoration of potential habitat.

Management area resource protection measures applicable to management of the red-shouldered hawk that are common to Alternatives 2-9 include:

- Standards and Guidelines pertaining to biological diversity, including protection and management of lowland conifer types, reducing fragmentation, and encouraging closed-canopy hardwood areas; MA 2A, 2B, 2C, MA 3A, 3B, 3C, MA 4A, 4B, 4C.

Table J-37. Red-shouldered Hawk: Summary of Effects Analysis Factors for Alternative 1

Red-shouldered Hawk	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-38 Red-shouldered Hawk—Summary of Effects Analysis Factors and Determination

Red-shouldered Hawk	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	C	C	C	C	C	C	C	
Ecological Judgments CEA*	D	D	C	C	C	C	C	C	
Habitat Quantity	See Table J-37	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↑	↑	↑	↑	↑	↑	↑	↑
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	MINT	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions, CNNF—Chequamegon-Nicolet National Forests, CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing, (NI)—No Impact,

(BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Habitat conditions for red-shouldered hawk are expected to remain stable or improve under all alternatives. Timber harvesting, which temporarily increases forest fragmentation, could disturb nesting red-shouldered hawks and increase their risk of predation or nest failure. Standards and Guidelines that provide protections for red-shouldered hawk nest sites and habitat would apply across Alternatives 2-9 and the Selected Alternative. The amount of acres identified as suitable for timber production ranges from 785,000 in Alternative 4 to 900,000 in Alternative 1 (Fig. J-6). Under the Selected Alternative, 860,000 acres are identified as suitable for timber production. Because timber-harvesting activities diminish the value of woodlands and nesting habitat and may indirectly lead to higher levels of predation and nest failure despite potential increases in prey numbers, the acreage suitable for timber harvest may be viewed as a measure of habitat quality. Areas where timber harvesting does not occur are expected to increase in their suitability to red-shouldered hawks as they mature and canopy closure increases. With the exception of Alternative 1, all alternatives provide for interior forest

conditions that would be favorable to red-shouldered hawks with greater emphasis in Alternatives 3-9 and the Selected Alternative.

Effects on Populations

Red-shouldered hawk populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions that contribute to long-term species abundance and distribution is predicted to remain at its present level (outcome C) under Alternatives 2-9, and to decrease to outcome D under Alternative 1 (Table J-38). A lack of interior forest combined with the greatest amount of acres suitable for timber production is responsible for the decrease in the likelihood of habitat improving ecological conditions under Alternative 1. The Selected Alternative, with interior forest allocations similar to Alternatives 4-9 (Fig. J-6) is likely to have a similar likelihood of improving ecological conditions.

Despite fewer acres identified for timber production and greater amounts of interior forest, Ecological Judgments did not improve beyond current levels under Alternatives 2-9. Red-shouldered hawks are at the northern periphery of their range within the National Forest in Wisconsin. Available habitat in the southern portion of the National Forest is well populated, while similar habitat further north is sparsely populated or vacant. Although conditions are more favorable for red-shouldered hawks under Alternatives 2-9 and the Selected Alternative, it is unlikely that a sufficient amount of the National Forest would be occupied to improve the Ecological Judgments above its current level. Overall, the Ecological Judgments agree with estimated trends of habitat conditions across the alternatives.

Cumulative Effects

Increased fragmentation of forested habitat, and increased human development and disturbance are likely to occur over time on private lands surrounding the National Forest, and will decrease the quantity and quality of red-shouldered hawk habitat. This magnifies the importance of National Forest lands to this species. Within the cumulative effects area, the likelihood of ecological conditions contributing to long-term species abundance and distribution for red-shouldered hawks is predicted to remain at its present level under all but Alternatives 1 and 2, where it decreases to outcome D (Table J-38). Alternatives 1 and 2 contain the highest amounts of acres available for timber production and the fewest acres of interior forest. When considered in this broader context, the habitat conditions under Alternatives 2-9 and the Selected Alternative may not be sufficient to maintain the likelihood of ecological conditions that contribute to long-term abundance and distribution of the species at its present level.

SPECIES: *Chilidonias niger*

COMMON NAME(S): Black Tern

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G4, S3B, SZN

DISTRIBUTION

This species is widely distributed in Canada and the northern U.S. It occurs throughout Wisconsin, but it is more common southeast of a line from Lacrosse to Marinette (Robbins 1991). Individual numbers have been declining. A statewide survey in 1979 indicated a very poor fledgling success due to unknown reasons (Tilghman 1980). This species has not been consistently surveyed on the Forests. There are 6 known nesting sites on Laona/Lakewood Ranger District, 5 known sites on Eagle River/Florence RD, and one historical known nesting site on Medford/Park Falls RD. Overall, the status of the species is unknown on the Forests.

Key Factors

- Lakes and ponds with a mixture of open water and emergent vegetation
- Human disturbance
- Fluctuating water levels

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the black tern that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to wetlands management.
- Guidelines specific to black tern maintain impoundment and flowage water levels emphasizes eradication of purple loosestrife where black terns occur.
- Prohibit any net increase in motorized vehicle access to lakes.

Table J-39. Black Tern: Summary of Effects Analysis Factors for Alternative 1

Black Tern	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-40. Black Tern: Summary of Effects Analysis Factors and Determination

Black Tern	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	E	E	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↔	↔	↔	↔	↔	↔	↔	↔
Population Trend	J-39	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions,

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing, (NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of black tern habitat would remain stable under all alternatives. The greatest threats to black terns on the National Forest are fluctuating water levels and nest failure or nest destruction from wave action of motorized watercraft. Standards and guidelines that apply across Alternatives 2-9 and the Selected Alternative would maintain water levels on impoundments with nesting terns, and protect known territories. Habitat within non-motorized areas, which range from 125,000 acres under Alternative 1 to 342,000 acres under Alternative 4, would be afforded greater protection from wave action from motorized watercrafts. Under the Selected Alternative, approximately 170,500 acres of Forest are in non-motorized areas (Table J-41). Known tern nesting sites, however, have not been documented within existing or proposed non-motorized areas.

Effects on Populations

Considered a common summer resident in much of Wisconsin, the black tern is far less common within the forested counties of the state where favorable marsh habitat is less abundant (Robbins 1991). This includes the Chequamegon-Nicolet National Forests where there are twelve current or historic known nesting sites. The likelihood of ecological conditions contributing to the long-term species abundance and distribution on the National Forest is expected to remain at its current level (outcome D) under Alternatives 3-9, and to decrease to outcome E under Alternatives 1 and 2 (Table J-40). The decrease to outcome E under Alternatives 1 and 2 is attributed to fewer acres of suitable habitat within non-motorized areas in these alternatives compared to others. Allocations to non-motorized areas under the Selected Alternative are approximately 30,000 acres less than those under Alternative 5 (Table J-41). Motorized watercraft and associated wave action can reduce nesting success. Nevertheless, black terns are not known to nest within existing or proposed non-motorized areas.

Cumulative Effects

The black tern has declined throughout its range over the past four decades for unknown reasons (US Fish and Wildlife Service 1999). Protection of wetlands, in general, and nesting sites, in particular, are the focus of conservation efforts locally. Within the cumulative effects area, the likelihood of ecological conditions that contribute to the long-term species abundance and distribution for black tern is predicted to remain at its present level under all alternatives (Table J-40). The cumulative effects area includes all or parts of Polk and Burnett counties, and areas near Lake Superior that contain more marsh habitat than is found on the National Forest. The inclusion of this additional habitat where terns are more commonly found explains the absence of the decline in ecological conditions seen in the outcomes under Alternatives 1 and 2.

Table J-41. Total Acres of Non-motorized Areas by Alternative.

	Alternatives								
	1	2	3	4	5	6	7	9	SA
Non-Motorized Areas	125,000	151,000	281,000	342,000	200,000	252,000	278,000	234,000	170,500

SPECIES: *Cygnus buccinator*

COMMON NAME(S): Trumpeter Swan

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Endangered

RANKING: G4, S1B, SZN

DISTRIBUTION

By the 1960's, the range of this species had been reduced to the northwestern U.S., western Canada, and Alaska, and the species had been extirpated in the Midwest. The species was reintroduced into Wisconsin in 1989 (Wisconsin Department of Natural Resources 2003b). Currently, there are about 20 breeding pairs in Wisconsin. Birds have been released on Great Divide and Eagle River/Florence Ranger Districts, and there have been documented successful nests on the Great Divide District. There have been sightings, but no nesting at this time on other portions of the Forests.

Key Factors

- Large, shallow, permanent wetlands with a mixture of open water and emergent vegetation
- Beaver control and beaver dam removal
- Human disturbance

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the trumpeter swan that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to wetlands management.
- Standards and Guidelines specific to trumpeter swan (management and protection of habitat).
- Consider using beaver as a management tool where shallow water marshes are desired; maintain beaver populations and their works except when there are adverse effects on important resource values.

Table J-42. Trumpeter Swan: Summary of Effects Analysis Factors for Alternative 1

Trumpeter Swan	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-43. Trumpeter Swan: Summary of Effects Analysis Factors and Determination

Trumpeter Swan	Alternative								S.A.
	1	2	3	4	5	6	7	9	
Ecological Judgments CNNF*	D	D	C	C	D	C	C	C	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-42	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount of trumpeter swan habitat would remain stable and the quality of habitat would remain stable or increase under all alternatives. No new wetlands would be created under any of the alternatives. Greater amount of non-motorized acres under Alternatives 2-9 and the Selected Alternative likely would reduce human disturbance and improve the quality of the habitat when compared to Alternative 1. Shallow marshes, closely associated with beaver activity, often provide wetland habitat suitable for trumpeter swans. Standards and Guidelines affecting beaver management would apply across Alternatives 2-9 and the Selected Alternative and, consequently, the amount and quality of the associated habitats are expected to be consistent among these alternatives.

Effects on Populations

There are few trumpeter swans on the Chequamegon-Nicolet National Forests, and there are documented nesting occurrences, including one area that is proposed to be non-motorized under Alternatives 2-9 and the Selected Alternative. The former range of the bird within Wisconsin remains unclear, but it is unlikely that the species nested in the forested northeastern region of the state (Wisconsin Department of Natural Resources 2003b), where approximately half of the National Forest is located. Suitable habitat is available on the National Forest and Standards and Guidelines regarding management and protection of trumpeter swans would apply across Alternatives 2-9 and the Selected Alternative. The likelihood of ecological conditions that contribute to the long-term species abundance and distribution increases to outcome C under Alternatives 3, 4, 6, 7, and 9 (Table J-43). A combination of more non-motorized areas and fewer motorized trails explains the likely improvement under these alternatives compared to present Plans (Alt. 1) and Alternatives 2, 5 and probably the Selected Alternative.

Cumulative Effects

The amount and quality of trumpeter swan habitat likely would remain stable within the Cumulative Effects Area. The adoption of wetland water quality standards in 1991 drastically slowed the loss of wetlands within Wisconsin, but not before 47% of the original wetlands had been lost (Wisconsin Department of Natural Resources 2003c). Best Management Practices (BMPs) designed to minimize effects on water quality have been in place statewide since 1995. BMPs apply to activities such as timber harvesting and road building within wetlands, streams, and riparian areas on all ownerships. Within

the Cumulative Effects Area, the likelihood of ecological conditions that contribute to the long-term abundance and distribution for trumpeter swan is predicted to remain at its present level under all alternatives (Table J-43).

SPECIES: *Falcipennis canadensis*

COMMON NAME(S): Spruce Grouse

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G5, S1S2B, S1S2N

DISTRIBUTION

This species is a year-round resident over much of Canada and Alaska. It is an uncommon resident in northern Wisconsin, which is at the southern edge of the species' range. The range in Wisconsin has been suggested to be the northernmost tier of counties from Bayfield to Florence, and second-tier counties Sawyer, Price, Oneida, Langlade, plus one area in Taylor County (Robbins 1991). Spruce grouse were reported only from blocks in northern Forest, eastern Vilas, and eastern Oneida Counties in the first four years (1995-1998) of Wisconsin Breeding Bird Atlas work (Wisconsin Society for Ornithology 2003). In the 1990s, remnant populations were found within both the Chequamegon and Nicolet land bases. There is an established breeding population on the Great Divide District (mostly Ashland and Sawyer Counties). There are other sparse reports on the Forests, including three known locations on Lakewood/Laona District, two known locations on Eagle River/Florence District and one on the Park Falls District.

Key Factors

- Large blocks of spruce bog, jack pine, and upland spruce/fir with a well developed middle story
- Road and trail densities and associated human disturbance

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the spruce grouse that are common to Alternatives 2-9 and the Selected Alternative include:

- Lowland conifer, lowland hardwood, and hemlock will only be harvested to benefit or maintain habitat for species of viability concern.
- Guideline emphasizing management of spruce grouse habitat (mosaic of jack pine/spruce patches in an array of age classes).
- Standards pertaining to road densities and road closures.
- Standards and Guidelines pertaining to road decommissioning.

Management area resource protection measures applicable to management of the spruce grouse that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 1B: Increase conifer component (especially black spruce) where spruce grouse are present.

Table J-44. Spruce Grouse: Summary of Effects Analysis Factors for Alternative 1

Spruce Grouse	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-45. Spruce Grouse: Summary of Effects Analysis Factors and Determination

Spruce Grouse	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	C	C	C	C	
Ecological Judgments CEA*	D	D	C	C	C	C	C	C	
Habitat Quantity	See	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-44	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions, CNNF—Chequamegon-Nicolet National Forests, CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of lowland conifer habitat, which comprises about 70% of the spruce grouse habitat on the National Forest, would remain stable. The remainder, comprised of jack pine, balsam fir, and upland spruce, is expected to decrease from its present amount of 72,500 acres by varying amounts ranging from 10-29% across the alternatives (Fig. J-7). These decreases represent a 3-8% decrease in total potential spruce grouse habitat. However, quality of habitat may increase. Under Alternatives 2-9 and the Selected Alternative, Guidelines for Management Area 1B contain direction to increase the conifer component in areas where spruce grouse occur. The amount of MA 1B ranges from 27,000 acres under Alternative 4 to 86,000 acres under Alternative 2, with no emphasis in Alternative 1. Under the Selected Alternative, MA 1B accounts for 38,000 acres (Table J-7). Further contributing to increased habitat quality, Alternatives 2-9 and the Selected Alternative have Standards and Guidelines to maintain a mosaic of conifer habitat and manage access to reduce incidental harvest of spruce grouse.

Effects on Populations

Spruce grouse populations are expected to remain stable because the quality and quantity of the majority of habitat are expected to remain stable or increase and the quantity of habitat will see only modest (3-8%) reductions overall under all alternatives. There is one small breeding population of spruce grouse known on the National Forest, and several other known occurrences. The likelihood of ecological conditions contributing to the long-term species abundance and distribution of spruce grouse is predicted to remain at its present level (outcome D) under Alternatives 1 and 2, and to increase to outcome C under Alternatives 2-9. Documentation of the Species Viability Evaluation process provides no explanation for this difference. Because habitat quantity and quality under

the Selected Alternative is expected to be similar to that of Alternatives 2-9, the ecological judgment of the Selected Alternative would likely be similar as well.

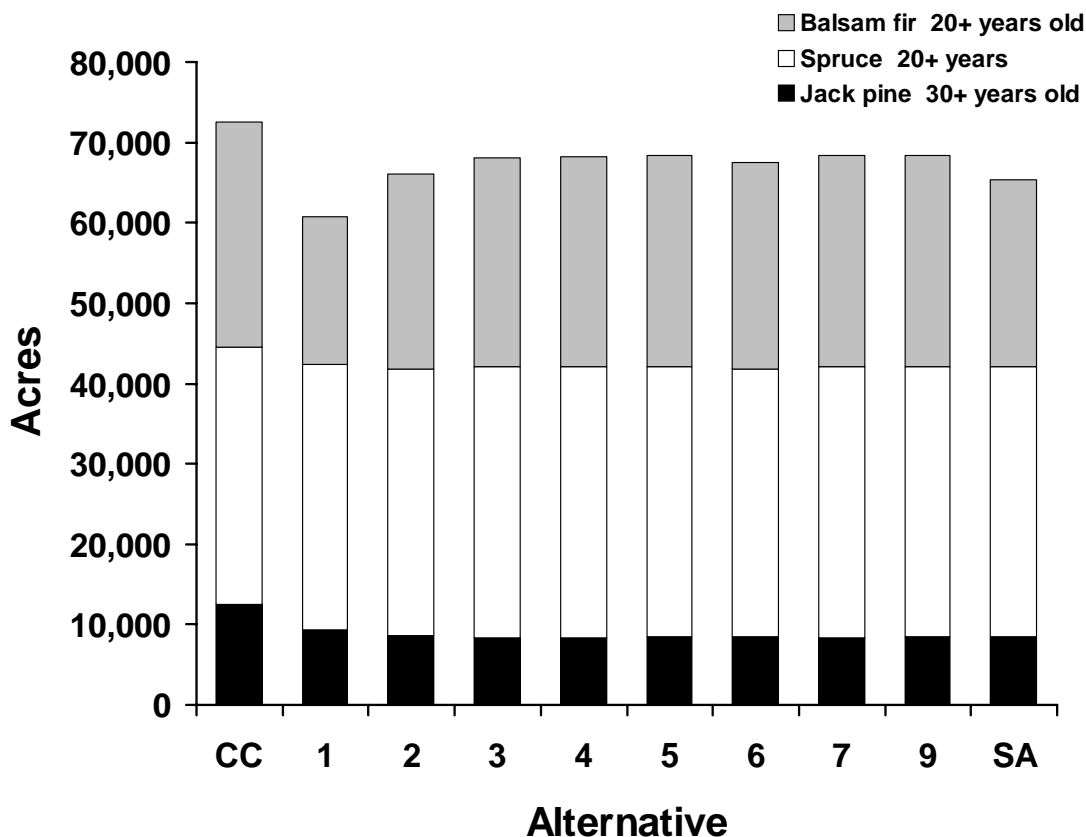


Figure J-7. Jack Pine, Upland Spruce, and Balsam Fir Acres at 10 years by Alternative. "CC" represents the current condition.

Cumulative Effects

The amount and quality of spruce grouse habitat likely would remain stable within the cumulative effects area. The range of the spruce grouse within Wisconsin is confined to all or portions of Sawyer, Bayfield, Ashland, Price, Iron, Oneida, Vilas, Langlade, Forest, and Florence counties. The black spruce-tamarack bogs that comprise the majority of spruce grouse habitat are inaccessible, of low economic value, and unsuitable for development. They are likely to remain unchanged over time. Within the cumulative effects area the likelihood of ecological conditions contributing to long-term species abundance and distribution of spruce grouse is predicted to remain at its present level under Alternatives 1 and 2, and to increase to outcome C under the remaining alternatives (Table J-45). Documentation of the Species Viability Evaluation process provides no explanation for this difference. The ecological judgment for the Selected Alternative would likely be similar to that of Alternatives 3-9 due to similar allocations to potential spruce grouse habitat.

SPECIES: *Oporornis agilis*

COMMON NAME(S): Connecticut Warbler

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G4, S3B, SZN

DISTRIBUTION

The Connecticut Warbler has a limited breeding distribution in the northern Great Lakes states; 85% of the North American breeding range is in central and eastern Canada (Canadian Wildlife Services 2001). There have been 19 recorded locations of the Connecticut Warbler on the Chequamegon land base recorded by the NRRI Breeding Bird Survey conducted yearly since 1991. Four individuals in three locations were recorded during NRRI surveys in 2000 (Sauer *et al.* 2003). On the Nicolet land base of the Forest, there have been 10 individuals in 9 locations on the Nicolet Breeding Bird Survey (Wisconsin Society for Ornithology 2003).

Key Factors

- Mature black spruce-tamarack bogs and mature jack pine forests with dense shrub understory
- Habitat fragmentation

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the Connecticut warbler that are common to Alternatives 2-9 and the Selected Alternative include:

- Guideline specific to Connecticut warbler (harvest jack pine in blocks greater or equal to 100 acres where possible).

Management area resource protection measures applicable to management of the Connecticut warbler that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 4A: Maintain at least 80% of the existing jack pine within the management area.
- For MA 4C: Use the maximum jack pine rotation age of 70 years to maintain isolated stands for wildlife such as Connecticut warbler.

Table J-46. Connecticut Warbler: Summary of Effects Analysis Factors for Alternative 1

Connecticut Warbler	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-47. Connecticut Warbler: Summary of Effects Analysis Factors and Determination

Connecticut Warbler	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	C	D	C	C	D	D	D	D	
Ecological Judgments CEA*	C	C	C	C	C	C	C	C	
Habitat Quantity	See Table J-46	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality		↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑
Population Trend		↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The mature lowland coniferous habitat where this species is most abundant would remain unchanged across all alternatives. No management would occur in this habitat type under Alternatives 2-9 or the Selected Alternative unless it benefited species of viability concern. Mature jack pine with a dense shrub understory, like that sometimes found in pine barrens, also provides habitat for Connecticut warblers. The amount and distribution of this habitat are more limited than the lowland coniferous habitat that is interspersed across much of the forests.

Barrens restoration would occur on 15,000 acres under all alternatives except Alternative 1 where it would occur on 8,000 acres. Management Area 4A and Management Area 4C, surrogate pine barrens would also provide suitable habitat conditions. The combined amount of MAs 4A and 4C ranges from 124,000 acres under Alternative 6, to 173,000 acres under Alternative 1 (Table J-7). Under the Selected Alternative, approximately 150,000 acres would be allocated to MA 4A and 4C. Standards and guidelines that encourage the restoration and maintenance of jack pine for Connecticut warblers would apply across Alternatives 2-9 and the Selected Alternative. The quantity and quality of Connecticut warbler habitat are expected to remain stable or increase under all alternatives.

Effects on Populations

Connecticut warbler populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions that contribute to long-term species abundance and distribution within the National Forest is predicted to remain at its present level (outcome C) under Alternatives 1, 3, and 4, and to decrease to outcome D under Alternatives 2, 5, 6, 7, and 9 (Table J-47). The Ecological Judgments do not agree with the estimated population and habitat trends for Connecticut warbler within the National Forest. Documentation of the Species Viability Evaluation process provides no explanation for this difference. Management Area direction regarding the amount and age class distribution of jack pine was modified in response to comments from SVE panelists. Changes to the 2004 *Forest Plan* made after the completion of the SVE panel were not considered in Ecological Judgments displayed in Table J-44 but because they followed SVE panel suggestions, the judgments in the table represent conservative estimates. These changes included maintaining or increasing the jack pine component in MA 4A,

increasing the desired jack pine composition component of MA 4B and using the extended rotation age for jack pine in MA 4C. The Selected Alternative, because of similar allocations to MA 4A and 4C as well as identical Standards and Guidelines would probably have been given an ecological judgment similar to Alternatives 7 or 9.

Cumulative Effects

The amount and quality of the majority of Connecticut warbler habitat likely would remain stable within the cumulative effects area. The black spruce-tamarack bogs where Connecticut warblers are found are inaccessible, of low economic value, and unsuitable for development. They are likely to remain unchanged over time. The cumulative effects area also includes the remainder of the jack pine barrens that extends from the southwestern corner of Burnett County to southern Bayfield County. Within the cumulative effects area, the likelihood of ecological conditions contributing to the long-term species abundance and distribution for Connecticut warbler is predicted to remain at its present level under all alternatives (Table J-47). This agrees with the predicted trends in habitat indicators for Connecticut warbler within the cumulative effects area.

SPECIES: *Picoides arcticus*

COMMON NAME(S): Black-backed Woodpecker

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G5, S2B, SZN

DISTRIBUTION

This woodpecker has a large breeding range in Canada and Alaska. Robbins (1991) considered the species to be an uncommon resident in northern Wisconsin. Two observations of black-backed woodpeckers were reported from 1995-2000 in Wisconsin Breeding Bird Surveys on the Chequamegon land base while none have been observed since breeding bird surveys began on the Nicolet land base in 1986. However, there have been incidental reports of Black-backed woodpeckers on the Nicolet land base. The Wisconsin Breeding Bird Atlas Project has identified 16 blocks in the state with probable or confirmed breeding (Wisconsin Society for Ornithology 2003).

Key Factors

- Decadent jack pine, balsam fir, tamarack, cedar, and black spruce stands for foraging and nesting
- White cedar swamps for thermal cover

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the black-backed woodpecker that are common to Alternatives 2-9 and the Selected Alternative include:

- Objective: Avoid timber salvage in up to 15% of areas affected by catastrophic storm events to provide for natural disturbance processes and an accumulation of coarse woody debris

- Lowland conifer, lowland hardwood, and hemlock will only be harvested to benefit or maintain habitat for species of viability concern
- Maintain a dead conifer habitat component across the landscape to provide feeding and nesting sites for black-backed woodpeckers

Management area resource protection measures applicable to management of the black-backed woodpecker that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 4B: leave 15-25% of potential salvage areas unharvested for each disturbance event.

Table J-48. Black-backed Woodpecker: Summary of Effects Analysis Factors for Alternative 1

Black-backed Woodpecker	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↗↓	↗↓
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-49. Black-backed Woodpecker: Summary of Effects Analysis Factors and Determination

Black-backed Woodpecker	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	D	C	C	C	
Ecological Judgments CEA*	D	D	C	C	C	D	C	C	
Habitat Quantity	See Table J-48	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓	↗↓
Habitat Quality		↔	↔	↔	↔	↔	↔	↔	↔
Population Trend		↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of lowland conifer habitat, which comprises over 90% of all black-backed woodpecker habitat on the National Forest, would remain stable under all alternatives. The other 10%, older jack pine and balsam fir, would range from 17,900 to 28,000 acres after 10 years across the alternatives, a reduction of 0-36% below the current amount (Fig. J-8). Under the Selected Alternative, 19,400 acres of jack pine and balsam fir would be in the older (>60 years old) after 10 years. The older age classes of these species are more susceptible to wind throw and fire, which subsequently attract the beetles that serve as food for black-backed woodpeckers. Under Alternatives 2-9 and the Selected Alternative, the reduction of jack pine and balsam fir is offset by management emphasis on black-backed woodpecker habitat. Management Area 4B, which ranges from 17,000 acres under Alternatives 2 and 5 to 65,000 acres under Alternative 3, contains direction to leave 15-25% of potential salvage areas unharvested for each disturbance event. The Selected Alternative allocates 30,400 acres to MA 4B. Standards and Guidelines that maintain decadent conifer habitat also would apply across the National Forest under Alternatives 2-9 and the Selected Alternative.

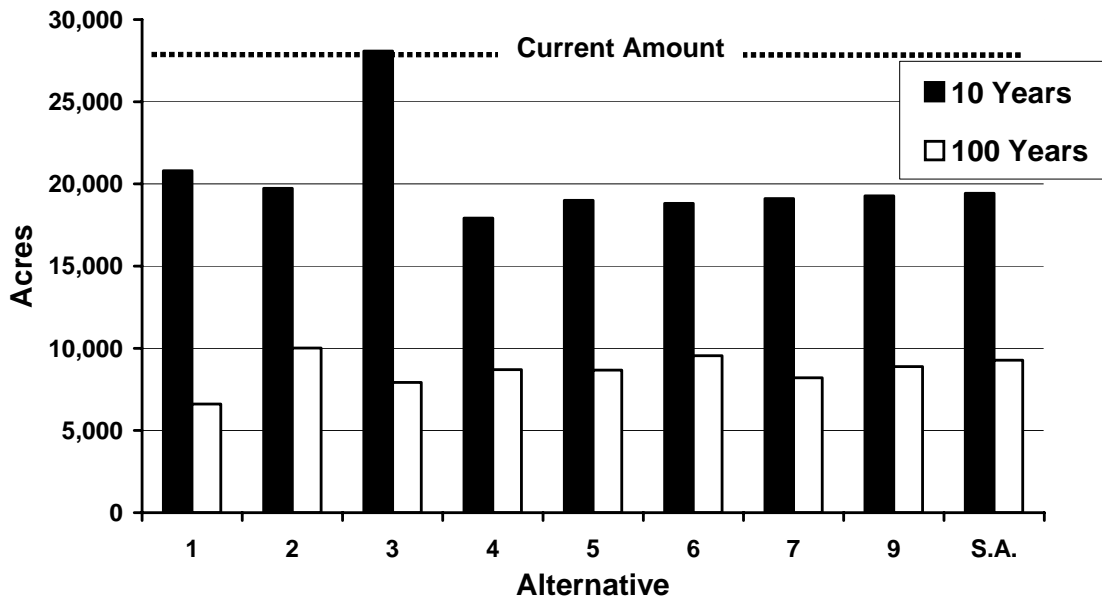


Figure J-8. Current and Estimated Combined Acres of Jack Pine and Balsam Fir Greater than 60 Years Old at 10 and 100 Years.

Effects on Populations

Black-backed woodpecker populations are expected to remain stable under all alternatives because the quality and quantity of the majority of the habitat are expected to remain stable. Even in preferred habitats, black-backed woodpeckers are considered uncommon to rare except when populations irrupt in response to fires and outbreaks of wood-boring insects (Yunick 1985). These events and the associated population irruptions are unpredictable and temporary, usually lasting for several years until the food source disappears.

The likelihood of ecological conditions contributing to the long-term species abundance and distribution is predicted to remain at its current level under Alternatives 1, 2, and 5, and to increase to outcome C under Alternatives 3, 4, 6, 7, and 9. The Ecological Judgments do not agree with the estimated population and habitat trends for black-backed woodpecker within the National Forest. Documentation of the Species Viability Evaluation process provides no explanation for this difference. Allocations to MA 4B under the Selected Alternative group it more closely with those Alternatives that were given ecological judgments of outcome C than with those that were assigned outcome D (Table J-49).

Cumulative Effects

The amount and quality of lowland conifer habitat likely would remain stable within the cumulative effects area under all alternatives. In large part this habitat is inaccessible, of low economic value, and unsuitable for development. The amount and quality of older jack pine and balsam fir are likely to remain stable or decline within the cumulative effects area because of shorter rotations and more aggressive salvage logging on many state, county, and private lands outside the National Forest. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its current outcome under Alternatives 1, 2, and 6, and to increase to outcome C under Alternatives 3, 4, 5, 7 and 9 (Table J-49). Documentation of the Species Viability

Evaluation process provides no explanation for this difference. Likely, allocations to MA 4B under the Selected Alternative would promote habitat conditions enabling the black-backed woodpecker to increase in numbers within the CEA.

SPECIES: *Tympanuchus phasianellus*

COMMON NAME(S): Sharp-tailed Grouse

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G4, S2B, S2N

DISTRIBUTION

The species is widely distributed in central Canada, Alaska, and the northern Rocky Mountain states (Connelly *et al.* 1998). Wisconsin is at the southeastern margin of the range, where the species is mainly associated with scattered barren relicts, most of which are found in west central and northwestern Wisconsin. There may be as little as 1,000 square miles of sharp-tailed grouse habitat in Wisconsin, and most of that has been considered to be poor quality. The sharp-tailed grouse is uncommon where it is a resident in north and central Wisconsin. Two areas within the Forest that maintain sharp-tailed grouse habitat and breeding populations are the Moquah Barrens Wildlife Management Area in Bayfield County and Riley Lake Wildlife Management Area in Price County. The 2001 population count at Moquah was 19 displaying males, while the Riley 2001 count was recorded at 17 displaying males. Reports in the Wisconsin Breeding Bird Atlas program also identified locations in the vicinity of the Nicolet land base (Wisconsin Society for Ornithology 2003).

Key Factors

- Large areas of open/brush upland or bog with suitable leks

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the sharp-tailed grouse that are common to Alternatives 2-9 and the Selected Alternative include:

- Develop and/or maintain barrens communities on appropriate habitat types.
- Expand available habitat by providing temporary openings adjacent or close to large open areas with known sharp-tailed grouse populations.

Management area resource protection measures applicable to management of the sharp-tailed grouse that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and guidelines for MA 8C Riley Lake Wildlife Area and Moquah Barrens Area (management and enhancement of wildlife area and barrens).

Table J-50. Sharp-tailed Grouse: Summary of Effects Analysis Factors for Alternative 1

Sharp-tailed Grouse	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-51. Sharp-tailed Grouse: Summary of Effects Analysis Factors and Determination

Sharp-tailed Grouse	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-50	↑	↑	↑	↑	↑	↑	↑	↑
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Sharp-tailed grouse habitat is expected to remain stable or improve under all alternatives. Sharp-tailed grouse habitat is found within the Riley Lake Wildlife Management Area and the Moquah Barrens Area, which combined form Management Area 8C. The amount of habitat remains at its present level under Alternative 1, but increases by 6,000 to 7,000 acres under all other alternatives. Management Area 4C which is intended to serve as surrogate pine barrens may provide additional habitat for sharp-tailed grouse in the northwestern part of the National Forest.

Effects on Populations

Sharp-tailed grouse populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the National Forest is predicted to remain at its present level under all alternatives. Despite an increase in habitat, the likelihood of positive ecological conditions does not increase under Alternatives 2-9 or the Selected Alternative perhaps because the habitat improvements, which may result in more individuals, do not alleviate the isolation of the two populations from each other and from other populations in Wisconsin.

Cumulative Effects

The amount and quality of sharp-tailed grouse habitat likely would remain stable within the cumulative effects area under all Alternatives. Seven sites outside the National Forest are managed for conditions favorable to sharp-tailed grouse (Mezera 2002). These sites are on public lands and likely will continue to be managed in this manner. All nine sites within the state are isolated from each other, and this will not change.

Within the cumulative effects area, the likelihood of ecological conditions that contribute toward long-term species abundance and distribution for sharp-tailed grouse is predicted to remain at its present level under all alternatives (Table J-51). This is consistent with the predicted trends in habitat for sharp-tailed grouse within the cumulative effects area.

SPECIES: *Bartramia longicauda*

COMMON NAME(S): Upland Sandpiper

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G5, S2B, SZN

DISTRIBUTION

This species ranges throughout much of North America, but its greatest concentration is in the Great Plains states. Its distribution in Wisconsin is statewide but spotty. Most of the records are from the east-central part of the state and it is uncommon in the west and central portion of the state. It has a very limited distribution on the Forest due to limited habitat. It has been recorded on both Nicolet and Chequamegon Breeding Bird Surveys, with 35 recorded on the Chequamegon land base between 1992 and 1996, and 5 recorded on the Nicolet land base between 1987 and 1998. Moquah Barrens in Bayfield County offers some of the best habitat on the Forests. There is also habitat available in private agricultural inholdings.

Key Factors

- Large areas of open grasslands and barrens

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the upland sandpiper that are common to Alternatives 2-9 and the Selected Alternative include:

- Develop and/or maintain barrens communities on appropriate habitat types.

Management area resource protection measures applicable to management of the upland sandpiper that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines for MA 8C Riley Lake Wildlife Area and Moquah Barrens Area (management and enhancement of wildlife area and barrens).

Table J-52. Upland Sandpiper: Summary of Effects Analysis Factors for Alternative 1

Upland Sandpiper	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-53. Upland Sandpiper: Summary of Effects Analysis Factors and Determination

Upland Sandpiper	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	C	D	D	C	C	C	C	C	
Habitat Quantity	See	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	Table	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑	↔↑
Population Trend	J-52	↑	↑	↑	↑	↑	↑	↑	↑
DETERMINATION	NI	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of upland sandpiper habitat are expected to remain stable or increase under all alternatives. Upland sandpipers prefer open grassland or barrens habitat. On the Chequamegon-Nicolet National Forests this habitat is found within the Riley Lake Wildlife Management Area and the Moquah Barrens Area, which combined form Management Area 8C. The amount of habitat remains the same under Alternative 1, but increases by 6,000 to 7,000 acres under all other alternatives.

Effects on Populations

According to SVE panelists, the outcome D ecological judgment for the Forest under Alternatives 1-9 were based largely on the disjunct nature of population segments. Upland sandpiper populations are expected to remain stable or increase under all alternatives including the Selected Alternative because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the National Forest is predicted to remain at its present level under all alternatives. Despite an increase in habitat, the likelihood of positive ecological conditions does not increase under Alternatives 2-9 or the Selected Alternative. This is likely because upland sandpipers and their habitat have never been abundant within the National Forest. The increase in habitat under these alternatives, which may result in more individuals, is not sufficient to increase the likelihood of positive ecological conditions.

Cumulative Effects

The amount and quality of upland sandpiper habitat likely would remain stable within the cumulative effects area. It includes the jack pine barrens that extend from the southwestern corner of Burnett County to southern Bayfield County, and the eastern region of Wisconsin, such as Door and Brown Counties, where this bird is more numerous. Within the cumulative effects area, the likelihood of ecological conditions contributing to long-term species abundance and distribution for upland sandpiper is predicted to remain at its present level under Alternatives 2 and 3, and to increase to outcome C under the remaining Alternatives 1, 4, 5, 6, 7, and 9 (Table J-53). Documentation of the Species Viability Evaluation process provides no explanation for this difference.

SPECIES: *Catharus ustulatus*

COMMON NAME(S): Swainson's Thrush

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/M

RANKING: G5, S2B, SZN

DISTRIBUTION

This species has a widespread distribution in North America, including Canada and the northern Rocky Mountain states, as well as the northeastern US. In Wisconsin, it is uncommon and restricted to the northern forested part of the state. On the Forests, it is somewhat more common on the northern portions of both land bases, with the greatest likelihood of occurrence in the Great Divide and Eagle River/Florence Ranger Districts. Most of the confirmed state Breeding Bird Atlas records are from these districts, together with one from the northwestern corner of Lakewood/Laona RD. Records from Forest bird surveys include 39 records on the Nicolet land base from 1987-1998, and 17 records from the Chequamegon land base from 1991-1996.

Key Factors

- Mature lowland conifer and mixed upland deciduous/conifer
- Dense conifer understory

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the Swainson's thrush that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management of mixed lowland conifer, lowland hardwood, and hemlock.
- Guidelines specific to Swainson's thrush (protect known nest sites; protect and manage habitat; encourage conifer understory within high quality habitat.)

Management area resource protection measures applicable to management of the Swainson's thrush that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 1B, MA 2A and 2B, and MA 3B – exclude long-lived conifer transition zones (between uplands and lowlands) from sale treatment areas, unless treatment would provide an opportunity to increase the long-lived conifer component.

Table J-54. Swainson's Thrush: Summary of Effects Analysis Factors for Alternative 1

Swainson's Thrush	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-55. Swainson's Thrush: Summary of Effects Analysis Factors and Determination

Swainson's Thrush	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	C	C	C	C	C	C	C	C	
Ecological Judgments CEA*	C	C	C	C	C	C	C	C	
Habitat Quantity	See Table J-54	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↑	↑	↑	↑	↑	↑	↑	↑
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	NI	NI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of lowland conifer are expected to remain stable or increase under all alternatives including the Selected Alternative. Mature mixed upland deciduous/conifer habitat is most closely associated with Management Area 2B. It ranges from no emphasis under Alternative 1 to 453,000 acres under Alternative 3. Accordingly, the absence of MA 2B areas and the limited emphasis (23,000 acres) on MA 2B proposed in Alternative 2 were given NI determinations while the other Alternatives were given BI determinations as a result of greater MA 2B emphasis (Table J-7). The Selected Alternative allocates 209,000 acres to MA 2B. Standards and Guidelines that protect known occupied habitat and that provide for management of Swainson's thrush habitat would apply across Alternatives 2-9 and the Selected Alternative.

Effects on Populations

Swainson's thrush populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The Ecological Judgments reflected expectations that long-term species abundance and distribution within the National Forest would remain at their present levels under all alternatives, despite an increase in habitat quality. Documentation of the Species Viability Evaluation process provides no explanation for this. The Selected Alternative falls within the range of alternatives in terms of allocations to MAs with the potential to provide habitat for this specie and, consequently, is not expected to differ in ecological judgments from the other alternatives.

Cumulative Effects

Ecological conditions within the CEA are predicted to remain at their present level under all Alternatives. Increases in the habitat quantity and quality through the exclusion of long-lived conifer transition zones from sale treatment areas and the promotion of hemlock regeneration may be augmented by the trend of increasing spruce-fir forest type coverage in the Northern third of Wisconsin based on FIA data from 1983-1996 (Schmidt 1997). These trends may lead to increases in Swainson's thrush numbers in the future.

SPECIES: *Dendroica cerulea*

COMMON NAME(S): Cerulean Warbler

STATUS:

FWS: Species of Concern. There has been a petition to list the Cerulean Warbler as Threatened with Critical Habitat (Federal Register, Vol. 67, No. 205, October 23, 2002).

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G4, S2S3B, SZN

DISTRIBUTION

The center of the range of the species is in the east-central US, and Wisconsin is at the northwest edge of the range. The range has been expanding somewhat in the Northeast, possibly due to forest maturation. In Wisconsin, the species is generally found in the southern two thirds of the state, with spotty records in the north (Rosenberg *et al.* 2002). The range has possibly expanded to northern Wisconsin, although this may be due, in part, to more intensive surveys in recent years.

Robbins (1991) listed this species as a rare migrant and rare summer resident in northern Wisconsin. Scattered observations have occurred on both sides of the Forests during breeding bird surveys and other surveys, including several on the Medford unit. That unit of the Park Falls/Medford Ranger District is probably the only district with a chance of harboring a viable population. From the state Breeding Bird Atlas project, there have been no confirmed nesting records within the Forests (Wisconsin Society for Ornithology 2003).

Key Factors

- Large blocks of mature hardwood forest with canopy gaps
- Habitat fragmentation

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Management area resource protection measures applicable to management of the cerulean warbler that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 2C: Maintain continuous blocks of northern hardwood closed canopies.
- For MA 2A, 2B: Increase closed canopy continuity within northern hardwood blocks. Increase the average patch size of northern hardwoods by converting aspen inclusions within the larger northern hardwood blocks.
- For MA 3A: Maintain continuous blocks of northern hardwoods.

Table J-56. Cerulean Warbler: Summary of Effects Analysis Factors for Alternative 1

Cerulean Warbler	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-57. Cerulean Warbler: Summary of Effects Analysis Factors and Determination

Cerulean Warbler	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	D	D	D	C	
Ecological Judgments CEA*	D	D	C	C	D	D	D	C	
Habitat Quantity	See Table J-56	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality		↑	↑	↑	↑	↑	↑	↑	↑
Population Trend		↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	NI	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Habitat conditions for cerulean warbler are expected to remain stable or improve under all alternatives. With the exception of Alternative 1, all alternatives provide for interior forest conditions that would be favorable to cerulean warblers with the greatest emphasis in Alternatives 3-9 and the Selected Alternative. Timber harvesting, which temporarily increases forest fragmentation, would occur under all alternatives, but Standards and Guidelines that maintain continuous blocks of northern hardwood would apply across Alternatives 2-9 and the Selected Alternative within Management Areas 2A, 2B, and 2C.

Effects on Populations

There are few documented occurrences of cerulean warblers on the Chequamegon-Nicolet National Forests but no documented breeding populations. This warbler is at the northern periphery of its range within Wisconsin (Robbins 1991) although Cerulean warblers are known to have extended their range northward within Wisconsin. To date, no confirmed breeding populations have been documented on the National Forest (Wisconsin Society for Ornithology 2003). Suitable habitat is available within the National Forest, and Standards and Guidelines regarding northern hardwood blocks would apply across Alternatives 2-9 and the Selected Alternative.

The likelihood of ecological conditions contributing to long-term species abundance and distribution within the National Forest is predicted to remain at its current level under Alternatives 1, 2, 5, 6, and 7, and increase to outcome C under Alternative 3, 4, and 9, which contain greater amounts of northern hardwood interior forest. The Selected Alternative falls between these two groups of alternatives in terms of allocation to northern hardwood interior forest (Fig. J-2).

Cumulative Effects

Most of the CEA does not lie within the range of the cerulean warbler, but changes, especially in land ownership, may have effects on potential cerulean warbler habitat. Division of private lands into smaller ownership parcels is likely to increase within the Cumulative Effects Area over time. Disparate objectives among landowners increases the likelihood that forested areas will become fragmented, and less suitable for cerulean warblers.

The likelihood of ecological conditions contributing to long-term species abundance and distribution within the analysis boundary is predicted to remain at its current level under Alternatives 1, 2, 5, 6, and 7, and increase to outcome C under Alternative 3, 4, and 9, which contain greater amounts of northern hardwood interior forest. The Selected Alternative's emphasis on interior northern hardwood forest (MA 2B) is likely to be sufficient to group this alternative with Alternatives 3, 4 and 9 rather than the other alternatives. The lack of improvement under the Alternatives 1, 2, 5, 6 and 7 reflects the uncertainty in forest management objectives on other ownerships, and indicates that the National Forest will play an important role in maintaining habitat for species sensitive to forest fragmentation.

SPECIES: *Martes americana*

COMMON NAME(S): American Marten (= Pine Marten)

STATUS

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SE

RANKING: G5, S3

DISTRIBUTION

This species has a large range in northern North America including much of boreal Canada and Alaska. It is also found in northern New England, the Rocky Mountain states, and Minnesota. Wisconsin populations are limited to two reintroduction sites, one each on the Chequamegon and Nicolet land bases.

Key Factors

- Continuous mature upland deciduous forest
- Structure such as woody debris and large cavity trees
- Habitat fragmentation

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the American marten that are common to Alternatives 2-9 and the Selected Alternative include:

- Objective: Avoid timber salvage in up to 15% of areas affected by catastrophic storm events to provide for natural disturbance processes and an accumulation of coarse woody debris.
- Reserve up to 10 snag and den trees per acre emphasizing the largest trees.
- Guidelines specific to American marten (trapping closure area; salvage area harvesting).

Management area resource protection measures applicable to management of the American marten that are common to Alternatives 2-9 and the Selected Alternative include:

- For MA 2C: Maintain continuous blocks of northern hardwood closed canopies.

- For MA 2A, 2B: Increase closed canopy continuity within northern hardwood blocks. Increase the average patch size of northern hardwoods by converting aspen inclusions within the larger northern hardwood blocks.
- For MA 3A: Maintain continuous blocks of northern hardwoods.
- For MA 4B: Leave 15-25% of potential salvage areas unharvested for disturbance events greater than 100 acres.

Table J-58. American Marten: Summary of Effects Analysis Factors for Alternative 1

American Marten	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-59. American Marten: Summary of Effects Analysis Factors and Determination

American Marten	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	B	C	C	D	D	C	
Ecological Judgments CEA*	D	D	B	C	C	D	D	C	
Habitat Quantity	See Table J-58	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↔	↑	↑	↑	↑	↑	↑	↑
Population Trend		↔	↑	↑	↑	↑	↑	↑	↑
DETERMINATION	NI	NI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

Habitat conditions for American marten are expected to remain stable or improve under all alternatives. With the exception of Alternative 1, all alternatives provide for interior forest conditions that would be favorable to American marten with greater emphasis in Alternatives 3-9 and the Selected Alternative. Timber harvesting, which temporarily increases forest fragmentation, would occur under all alternatives, but Standards and Guidelines that maintain continuous blocks of northern hardwood would apply across Alternatives 2-9 and the Selected Alternative within Management Areas 2A, 2B, and 2C. Additional Standards and Guidelines that provide for the retention of woody debris and large cavity trees as well as those specific to American marten would apply across the National Forest under Alternatives 2-9 and the Selected Alternative.

Effects on Populations

American marten populations are expected to remain stable or increase under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the National Forests is predicted to remain at its present level (outcome D) under Alternatives 1, 2, 6, and 7, to increase to outcome C

under Alternatives 4, 5, and 9, and to increase to outcome B under Alternative 3 (Table J-59). The Ecological Judgments for Alternatives 6 and 7 do not agree with the estimated population and habitat trends for American marten within the National Forests. Documentation of the Species Viability Evaluation process provides no explanation for this discrepancy. The Selected Alternative, given its emphasis on interior northern hardwoods forest, is likely to improve the ecological conditions for American marten over the existing conditions. Due to the small size of the reintroduced populations, the success of these reintroductions may depend on the degree to which demographic (e.g. limited mate availability) and genetic (e.g. inbreeding) obstacles are overcome.

Cumulative Effects

Division of private lands into smaller ownership parcels is likely to increase within the Cumulative Effects Area over time. Disparate objectives among landowners increases the likelihood that forested areas will become fragmented, and less suitable for martens.

The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA is predicted to remain at its present level under Alternatives 1, 2, 6, and 7, to increase to outcome C under Alternatives 4, 5, and 9, and to increase to outcome B under Alternative 3, because it calls for the greatest amount of northern hardwood interior forest. The lack of improvement under Alternatives 1, 2, 6 and 7 (Table J-59) reflects the uncertainty in forest management objectives on other ownerships, and indicates that the National Forests will play an important role in maintaining habitat for species sensitive to forest fragmentation. The Selected Alternative, in many ways similar to Alternative 5 except with a greater emphasis on MA 2B, is likely to improve ecological conditions for the American marten not only on the Forest but also in the CEA.

SPECIES: *Clemmys insculpta*

COMMON NAME(S): Wood Turtle

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G4, S3

DISTRIBUTION

The original range of this species extended from Nova Scotia to eastern Minnesota, south to northeastern Iowa, east to Virginia and north to New York. In Wisconsin, wood turtles were once found throughout the state, except in the southwestern-most portion. Today, they are most common in northern and western Wisconsin. Small scattered populations exist in isolated habitat, primarily along the Black, Wisconsin, St. Croix, Brule and Baraboo Rivers. The wood turtle occurs in scattered populations across the Forests. Waterways on the Forests with documented occurrences are the Yellow River, Jump River, Elk River, and possibly SF Flambeau River on Medford/Park Falls RD; Morgan Creek, Brunswiler River, and Spring Brook on the Great Divide RD. On the Nicolet, researchers have marked 45 individuals since 1991 on the Lakewood/Laona RD and documented four nesting locations. There are fewer locations on the Eagle River/Florence RD, with 6 documented observations and one suspected nesting site just off the Forest.

Key Factors

- Steep, eroding, sandy, or gravelly slopes along riverbanks for nesting
- Down logs and other woody debris

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the wood turtle that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines protecting riparian areas.
- Guidelines specific to wood turtles (protection and monitoring of known nesting sites; protection of potential nesting habitat).

Table J-60 Wood Turtle: Summary of Effects Analysis Factors for Alternative 1

Wood Turtle	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-61. Wood Turtle: Summary of Effects Analysis Factors and Determination

Wood Turtle	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	B	D	D	C	D	
Ecological Judgments CEA*	D	D	D	C	D	D	D	D	
Habitat Quantity	See Table J-60	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of wood turtle habitat are expected to remain stable or increase under all alternatives. Standards and Guidelines that provide greater protection to known and potential nesting sites, and riparian areas would apply under Alternatives 2-9 and the Selected Alternative. This would improve habitat quality under these alternatives beyond what would be expected under Alternative 1.

Effects on Populations

Wood turtle populations are expected to remain stable or increase because the quality and quantity of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is expected to remain at its current level under Alternatives 1, 2, 5, 6, and 9, to increase to outcome C under Alternatives 3 and 7, and to increase to outcome B under Alternative 4. SVE panelists attributed the improvements in the ecological outcome under Alternatives 3, 4,

and 7 to greater acreages of non-motorized areas under these alternatives. However, potential wood turtle habitat does not closely correspond with the non-motorized areas proposed under these alternatives. Under the Selected Alternative, approximately 193,000 acres are allocated to non-motorized areas (Table J-41). This amount is greater than in Alternatives 1 and 2 but is less than alternatives 5, 6 and 9, all of which were assigned ecological judgments of outcome D.

Cumulative Effects

The amount and quality of wood turtle habitat within the CEA are expected to remain stable. Best Management Practices (BMPs) designed to minimize effects on water quality have been in place statewide since 1995. BMPs apply to activities such as timber harvesting and road building within wetlands, streams, and riparian areas on all ownerships. Illegal collection for biological supply houses and the pet trade, and predation of communal nesting sites will continue to be problems for this species. The likelihood of positive ecological conditions within the CEA is expected to increase to outcome C under Alternative 4, and remain at its current level under the remaining alternatives analyzed by the SVE panelists. The Selected Alternative has greater similarity in terms of ecological conditions favoring the wood turtle to the remaining alternatives than it does to Alternative 4.

SPECIES: *Acipenser fulvescens*

COMMON NAME(S): Lake Sturgeon (=Freshwater Sturgeon, Great Lakes Sturgeon, Rock Sturgeon, Stone Sturgeon, Red Sturgeon, Ruddy Sturgeon, Common Sturgeon, Shell Back Sturgeon, Bony Sturgeon, Smooth Back, Rock Fish, Rubber Nose, Black Sturgeon, Dogface Sturgeon)

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/H

RANKING: G3, S3

DISTRIBUTION

Statewide, the species is found within the Mississippi, Lake Michigan, and Lake Superior drainage basins. On the Forests, the lake sturgeon is found in wide rivers (>50ft wide) within the Mississippi drainage. Populations are known to occur on the Chequamegon within the SF Flambeau and WF/EF Chippewa Rivers and larger lakes connected to those rivers. The species does not occur on the Nicolet.

Key Factors

- Deep pools within large warmwater rivers
- Barriers to migration
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the lake sturgeon that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to watershed protection and management.

- Design, construct, and maintain stream crossings and dams to minimize the disruption of migration or movement of fish and other aquatic life.
- Incorporate principles of stream geomorphology and maintain the dynamic stability of stream by designing and implementing in stream channel restoration and enhancement projects.

Table J-62. Lake Sturgeon: Summary of Effects Analysis Factors for Alternative 1

Lake Sturgeon	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-63. Lake Sturgeon: Summary of Effects Analysis Factors and Determination

Lake Sturgeon	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	C	D	C	C	D	C	C	D	
Ecological Judgments CEA*	C	D	C	C	D	C	C	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table J-62	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend		↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of lake sturgeon habitat are expected to remain stable or increase under all alternatives. The amount of deep pools and barriers to migration associated with large warmwater rivers would not change under any of the alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Lake sturgeon populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under Alternatives 1, 3, 4, 6, and 7, and to decrease to outcome D under the remaining alternatives (Table J-63). The Ecological Judgments for Alternatives 2, 5, and 9 do not agree with the estimated habitat and population trends for lake sturgeon within the National Forests. Documentation of the Species Viability Evaluation process indicates that the declines in the likelihood of positive ecological

conditions are attributed to fewer non-motorized acres under these alternatives when compared to alternatives 1, 3, 4, 6 and 7. Emphasis on non-motorized areas under the Selected Alternative is similar to those under Alternative 5 (Table J-41) and likely would receive the same ecological judgment (outcome D).

Cumulative Effects

Division of private lands into smaller ownership parcels is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the lake sturgeon. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the lake sturgeon is predicted to remain at its current level under Alternatives 1, 3, 4, 6, and 7, and to decrease to outcome D under the remaining alternatives. Documentation of the Species Viability Evaluation process provides no explanation for this difference. Emphasis on non-motorized areas under the Selected Alternative is similar to those under Alternative 5 (Table J-41) and likely would receive the same ecological judgment (outcome D).

SPECIES: *Moxostoma valenciennesi*

COMMON NAME(S): Greater Redhorse (= Common Redhorse, Redhorse)

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G3, S2S3

DISTRIBUTION

Statewide, the species is found in the Lake Michigan Drainage and Mississippi Drainage, and is absent from the Lake Superior Drainage. Statewide surveys over the last two decades have documented a broad distribution within the upper Chippewa basin (Lyons et al, 2000), and the species is currently found in the Chippewa Drainage on the Chequamegon land base. Specifically, it is found in the EF/WF Chippewa Rivers, Chippewa Flowage, and Lower Clam Lake. It has been documented in several drainages just off the forest and has potential to occur in the SF Flambeau River (Medford/Park Falls Ranger District), Namekagon River (Great Divide RD) and Wisconsin River (Eagle River/Florence RD).

Key Factors

- Rocky substrate free of sediment
- Barriers to migration
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the greater redhorse that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to watershed protection and management.
- Design, construct, and maintain stream crossings and dams to minimize disrupting the migration or movement of fish and other aquatic life.
- Incorporate principles of stream geomorphology and maintain the dynamic stability of streams by designing and implementing in stream channel restoration and enhancement projects.

Table J-64. Greater Redhorse: Summary of Effects Analysis Factors for Alternative 1

Greater Redhorse	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↗↑	↗↑
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-65. Greater Redhorse: Summary of Effects Analysis Factors and Determination

Greater Redhorse	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	D	D	D	D	
Ecological Judgments CEA*	D	D	C	C	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-64	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of greater redhorse habitat are expected to remain stable or increase under all alternatives. The amount of rocky substrate and barriers to migration would not change under any of the alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Greater redhorse populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level (outcome C) under Alternatives 3 and 4, and to decrease to outcome D under the remaining alternatives (Table J-65), which have fewer acres of non-motorized areas and are expected to have more road and trail crossings which could affect stream channel integrity. The Selected Alternative allocates slightly fewer acres to

non-motorized areas than Alternative 5 and more than Alternatives 1 and 2, all of which were given ecological judgments of outcome D by SVE panelists.

Cumulative Effects

Division of private lands into smaller ownership parcels is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the greater redhorse. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the greater redhorse is predicted to remain at its current level under Alternatives 3 and 4, which have the greatest amounts of non-motorized acres, and to decrease to outcome D under the remaining alternatives analyzed by the SVE panelists. The Selected Alternative would probably have been assigned an ecological judgment of outcome D because it places a similar emphasis on non-motorized areas as those alternatives that were given outcome D judgments.

SPECIES: *Notropis anogenus*

COMMON NAME(S): Pugnose Shiner (=Pug-nosed Shiner, Shiner)

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G3, S2S3

DISTRIBUTION

The species is found in the Mississippi River and Lake Michigan drainages, mainly in southeastern and northwestern Wisconsin. The only location of this species known on the Forests is in Delta Lake on the Washburn RD from the 1950's. Perhaps the only potential for this species is on the Washburn RD.

Key Factors

- Clear lakes and low gradient streams with suitable aquatic vegetation
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the pugnose shiner that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management and protection of riparian areas.
- Standards and Guidelines pertaining to fisheries habitat management, particularly those concerning management of stream habitat and riparian areas.
- Avoid mechanical and chemical weed removal in lakes containing pugnose shiner habitat, unless weed removal will benefit pugnose shiner.

Table J-66. Pugnose Shiner: Summary of Effects

Analysis Factors for Alternative 1

Pugnose Shiner	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-67. Pugnose Shiner: Summary of Effects Analysis Factors and Determination

Pugnose Shiner	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	D	D	D	D	
Ecological Judgments CEA*	D	D	C	C	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-66	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions
 CNNF—Chequamegon-Nicolet National Forests,
 CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of pugnose shiner habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Pugnose shiner populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level (outcome D) under Alternatives 1, 2, 5, 6, 7, and 9, and to increase to outcome C under Alternatives 3 and 4 (Table J-67). Documentation from the SVE panels indicates that the increase in the likelihood of positive ecological conditions under Alternatives 3 and 4 is attributed to a lower potential for shoreline impacts because of the greater amount of non-motorized acres. Emphasis on non-motorized areas under the Selected Alternative is similar to those under Alternative 5 (Table J-41) and likely would receive the same ecological judgment (outcome D).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to

access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the pugnose shiner. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the pugnose shiner is predicted to increase to outcome C under Alternatives 3 and 4, which have the greatest amounts of non-motorized acres, and to remain at its current level under the remaining alternatives. The Selected Alternative would probably have been assigned an ecological judgment of outcome D because it places a similar emphasis on non-motorized areas as those alternatives that were given outcome D judgments.

SPECIES: *Venustaconcha ellipsiformis*

COMMON NAME(S): Ellipse Mussel

STATUS

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G3G4, S2

DISTRIBUTION

This species is found throughout most Midwestern states, including much of upper Mississippi watershed. Populations are considered to be moderately widespread with spotty distribution. In Wisconsin, it is found at 11 sites in 5 southeastern river systems, and in the Fox River drainage. On the Forests there is only one known location, the Yellow River above Chequamegon Waters (Park Falls/Medford Ranger District).

Key Factors

- Changes in water quality (e.g., siltation, sedimentation)
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the ellipse mussel that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to watershed protection and management.
- Incorporate principles of stream geomorphology and maintain the dynamic stability of stream by designing and implementing in stream channel restoration and enhancement projects.
- Design, construct and maintain stream crossings and dams to minimize disrupting the migration or movement of fish and other aquatic life. Passage may be blocked for a prescribed fish management procedure or if passage is deemed unnecessary.
- Relocate live mussel specimens, at documented species concentration sites (mussel beds), to similar habitat upstream from in stream excavation project areas.

Table J-68. Ellipse Mussel: Summary of Effects Analysis Factors for Alternative 1

Ellipse Mussel	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-69. Ellipse Mussel: Summary of Effects Analysis Factors and Determination

Ellipse Mussel	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-68	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of ellipse mussel habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Ellipse mussel populations are expected to remain stable under all alternatives because the quantity and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under all alternatives (Table J-69).

Cumulative Effects

Freshwater mussels as a group have dramatically declined throughout North America because of habitat destruction from dams, dredging, channelization, siltation, and contaminants, and the expansion of non-native mollusk populations such as zebra mussel (Williams *et al.* 1993). A number of these threats to freshwater mussels also apply within the cumulative effects area. In recent years, the Northern Rivers Initiative and Wisconsin Waters Project, broad-scale efforts to protect water bodies within the state, have been launched. The coordination of public, private, and government interests sought by these efforts offers the best opportunity for the continued existence of many freshwater mussel populations.

SPECIES: *Incisalia henrici* (= *Callophrys henrici*)

COMMON NAME(S): Henry's Elfin Butterfly

STATUS

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G5, S2

DISTRIBUTION

This species has a large distribution from Nova Scotia south to Texas and Florida. The Great Lakes states may be on the northwest edge of its range. Although widespread in distribution, it is very local and rarely encountered. It has only been located on the Forests in the Riley Lake area of Price County.

Key Factors

- Open and brushland habitats

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the Henry's elfin butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Develop and/or maintain barrens communities on appropriate habitat types.
- Standards and Guidelines specific to Henry's elfin (prescribed fire in barrens).

Management area resource protection measures applicable to management of the Henry's elfin butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines for MA 8C Riley Lake Wildlife Area and Moquah Barrens Area (management and enhancement of wildlife area and barrens).

Table J-70. Henry's Elfin Butterfly: Summary of Effects Analysis Factors for Alternative 1

Henry's Elfin Butterfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-71. Henry's Elfin Butterfly: Summary of Effects Analysis Factors and Determination

Henry's Elfin Butterfly	Alternative								S.A.
	1	2	3	4	5	6	7	9	
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	Table	↔	↔	↔	↔	↔	↔	↔	↔
Population Trend	J-70	↔	↔	↔	↔	↔	↔	↔	↔
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of habitat for Henry's elfin butterfly are expected to remain stable or increase under all alternatives. Henry's elfin butterfly prefers open grassland/brushlands or barrens habitat. On the Chequamegon-Nicolet National Forests this habitat is found within the Riley Lake Wildlife Management Area and the Moquah Barrens Area, which combined form Management Area 8C. The area allocated to MA 8C remains at its present level of 12,700 under Alternative 1, but increases by 6,000 to 7,000 acres under all other alternatives including the Selected Alternative.

Effects on Populations

Populations of Henry's elfin butterfly are expected to remain stable or increase because the amount of habitat is expected to remain stable or increase under all alternatives. The likelihood of ecological conditions contributing to long-term species abundance and distribution for this species is predicted to remain at its present level under all alternatives (Table J-71).

Cumulative Effects

The amount and quality of Henry's elfin butterfly habitat likely would remain stable within the cumulative effects area. It includes the jack pine barrens that extend from the southwestern corner of Burnett County to southern Bayfield County. Within the cumulative effects area, the likelihood of ecological conditions contributing to long-term species abundance and distribution for Henry's elfin butterfly is predicted to remain at its present level under all alternatives.

SPECIES: *Lycaeides idas nabokovi*

COMMON NAME(S): Northern Blue Butterfly (= Nabokov's Blue Butterfly)

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Endangered

RANKING: G5TU, S1

DISTRIBUTION

The species is Holarctic. In North America, it ranges from Alaska and N. Canada to the Maritime Provinces, south to central California, S. Colorado, Minnesota, and Wisconsin. It is only known in Wisconsin in six general areas (8 specific sites). Four of the six areas are located on the Nicolet on the Lakewood/Laona RD, with a population of approximately 1,000 individuals. There are no known populations of the Northern Blue Butterfly on the Chequamegon land base.

Key Factors

- Barrens with dwarf bilberry
- Habitat fragmentation/isolation

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the northern blue butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Limit mortality at roadbed puddling sites through road maintenance that discourages puddle formation.
- Guidelines pertaining to dwarf bilberry (*Vaccinium cespitosum*), host plant for northern blue (protection, management, and expansion of known populations; restrict spraying of BT).

Table J-72. Northern Blue Butterfly: Summary of Effects Analysis Factors for Alternative 1

Northern Blue Butterfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-73. Northern Blue Butterfly: Summary of Effects Analysis Factors and Determination

Northern Blue Butterfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	-	-	-	-	-	-	-	-	
Habitat Quantity	See	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑
Habitat Quality	Table	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑
Population Trend	J-72	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of habitat for the northern blue butterfly are expected to remain stable or increase under all alternatives. The northern blue butterfly is known to occur at four sites on the Chequamegon-Nicolet National Forests. It is always found in association with its host plant dwarf bilberry, but the presence of dwarf bilberry does not in itself indicate the presence of the northern blue butterfly (Wolf and Brzeskiewicz 2002). Standards and guidelines to protect and increase populations of dwarf bilberry would apply under Alternatives 2-9 and the Selected Alternative.

Effects on Populations

Populations of northern blue butterfly are expected to remain stable or increase under all Alternatives because the amount of habitat is expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution for this species is predicted to remain at its present level under all alternatives (Table J-73).

Cumulative Effects

Within the CEA, the northern blue butterfly has been recorded at three sites outside of the National Forests (Wolf and Brzeskiewicz 2002). Only one of these locations supports a population that is not threatened by habitat degradation. In the absence of management, the northern blue butterfly is likely to be extirpated at the other two sites. This underscores the importance of maintaining or increasing the amount of habitat for the species on the National Forest.

SPECIES: *Oeneis chryxus*

COMMON NAME(S): Chryxus Arctic Butterfly (= Brown Arctic Butterfly)

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G5, S2?

DISTRIBUTION

This species is widespread and common in much of montane North America south to central New Mexico and across Canada to Manitoba. There are more isolated populations in eastern Canada and the Great Lakes States. It may be threatened in minor portions of its range. Wisconsin and Michigan are at a periphery of its range. Within the Forests, it is known from only one area, the Moquah barrens, where it is highly localized.

Key Factors

- Barrens habitat

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the brown arctic butterfly that are common to Alternatives 2-9 under all Alternatives include:

- Develop and/or maintain barrens communities on appropriate habitat types.
- Standards and Guidelines specific to *Chryxus arctic* (protect known locations).

Management area resource protection measures applicable to management of the brown arctic butterfly that are common to Alternatives 2-9 under all Alternatives include:

- Standards and Guidelines for MA 8C Riley Lake Wildlife Area and Moquah Barrens Area (management and enhancement of wildlife area and barrens).

Table J-74. Chryxus Arctic Butterfly: Summary of Effects Analysis Factors for Alternative 1

Chryxus Arctic Butterfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-75. Chryxus Arctic Butterfly Summary of Effects Analysis Factors and Determination

Chryxus Arctic Butterfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	C	D	C	D	D	D	D	
Ecological Judgments CEA*	E	D	D	D	D	D	D	D	
Habitat Quantity	See Table J-74	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality		↔	↔	↔	↔	↔	↔	↔	↔
Population Trend		↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑	↗ ↑
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panels' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of habitat for brown arctic butterfly are expected to remain stable or increase under all alternatives. Brown arctic butterfly prefers barrens habitat. On the Chequamegon-Nicolet National Forests this habitat is found within the Moquah Barrens Area. The Moquah Barrens Area would remain at its present size of 8000 acres under Alternative 1, but would increase by up to 7,000 acres under all other alternatives. Management Area 4C, which provides conditions similar to barrens, may also provide habitat for this species. The amount of acres allocated to MA 4C ranges from no emphasis under alternative 1, to 10,000 acres under Alternatives 2 and 6, and 13,000 acres under the remaining alternatives. Standards and guidelines that protect known locations and maintain habitat would apply in Alternatives 2-9 and the Selected Alternative.

Effects on Populations

Populations of brown arctic butterfly are expected to remain stable or increase because the amount and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution for this species is predicted to remain at its present level under Alternatives 2 and 4, and to decrease to outcome D under the remaining alternatives (Table J-75). The Selected Alternative is likely to have a similar ecological judgment to Alternatives 3, 4,

5, 7 and 9 because they all increase the Moquah barrens area by up to 7,000 acres and all allocate 13,000 acres to surrogate barrens (MA 4C).

Cumulative Effects

The amount and quality of brown arctic butterfly habitat likely would remain stable within the cumulative effects area under all Alternatives. It includes the jack pine barrens that extend from the southwestern corner of Burnett County to southern Bayfield County. Within the cumulative effects area, the likelihood of ecological conditions contributing to long-term species abundance and distribution for brown arctic butterfly is predicted to remain at its present level under all alternatives except Alternative 1 where it decreases to outcome E (Table J-75).

SPECIES: *Phyciodes batesii*

COMMON NAME(S): Tawny Crescent Butterfly

STATUS:

- FWS: Species of Concern
- USFS: RFSS and known to occur on the CNNF
- STATE OF WISCONSIN: SC/N
- RANKING: G4, S3

DISTRIBUTION

This species is found through the Rockies, much of Canada, the northern Great Lake states, the Appalachian Mountains, and scattered locations in the eastern United States. Regionally, it is found in the north half of Minnesota, north half of Wisconsin, and the north half of Michigan. There are three known localities on the Forests.

Key Factors

- Barrens habitat

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the tawny crescent butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Develop and/or maintain barrens communities on appropriate habitat types.
- Standards and Guidelines specific to tawny crescent (protect known locations).

Management area resource protection measures applicable to management of the tawny crescent butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines for MA 8C Riley Lake Wildlife Area and Moquah Barrens Area (management and enhancement of wildlife area and barrens).

Table J-76. Tawny Crescent Butterfly: Summary of Effects Analysis Factors for Alternative 1

Tawny Crescent Butterfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-77. Tawny Crescent Butterfly: Summary of Effects Analysis Factors and Determination

Tawny Crescent Butterfly	Alternative								S.A.
	1	2	3	4	5	6	7	9	
Ecological Judgments CNNF*	D	D	D	C	D	D	D	D	
Ecological Judgments CEA*	C	C	C	C	D	D	D	D	
Habitat Quantity	See	↑	↑	↑	↑	↑	↑	↑	↑
Habitat Quality	Table	↔	↔	↔	↔	↔	↔	↔	↔
Population Trend	J-76	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	BI	BI	BI	BI	BI	BI	BI	BI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal

Listing or Loss of Viability

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of habitat for the tawny crescent butterfly are expected to remain stable or increase under all alternatives. The tawny crescent butterfly prefers barrens habitat. On the Chequamegon-Nicolet National Forests this habitat is found within the Moquah Barrens Area. The Moquah Barrens Area would remain at its present size of 8000 acres under alternative 1, but would increase by up to 7,000 acres under all other alternatives. Management Area 4C, which provides conditions similar to barrens, may also provide habitat for this species. The amount of acres allocated to MA 4C ranges from no emphasis under alternative 1, to 10,000 acres under Alternatives 2 and 6, and 13,000 acres under the remaining alternatives and the Selected Alternative. Standards and guidelines that protect known locations and maintain habitat would apply in Alternatives 2-9 and the Selected Alternative.

Effects on Populations

Populations of tawny crescent butterfly are expected to remain stable or increase under all Alternatives because the amount and quality of habitat are expected to remain stable or increase. The likelihood of ecological conditions contributing to long-term species abundance and distribution for this species is predicted to remain at its present level under alternative 4, and to decrease to outcome D under the remaining alternatives (Table J-77). Likely, the Selected Alternative would receive a similar ecological judgment as the remaining alternatives because of similar allocations to Moquah barrens additions and surrogate barrens (MA 4C) allocations.

Cumulative Effects

The amount and quality of tawny crescent butterfly habitat likely would remain stable within the cumulative effects area under all Alternatives. It includes the jack pine barrens that extend from the southwestern corner of Burnett County to southern Bayfield County. Within the cumulative effects area, the likelihood of ecological conditions contributing to long-term species abundance and distribution for tawny crescent butterfly is predicted to remain at its present level under Alternatives 1-4, and to decrease to outcome D under Alternatives 5-9. Documentation of the Species Viability Evaluation process provides no explanation for this difference. The Selected Alternative is likely to have a similar ecological judgment to Alternatives 5-9 because of similar allocations to barrens and surrogate barrens areas.

SPECIES: *Pieris virginiensis*

COMMON NAME(S): West Virginia White Butterfly

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G3G4, S2

DISTRIBUTION

The range of this species is Ontario and Great Lakes States to Quebec and central New England, and south through the Appalachians to northern Georgia. Although widespread, its distribution is spotty. Wisconsin is at the northern and western edge of the range. Prior to 2002, the Forest had one documented occurrence in Ashland County, nine in Forest County, two in Langlade County, and one in Price County (Riley Lake area). A survey conducted on the Nicolet land base in 2002 documented 17 new records.

Key Factors

- Rich hardwood forests with toothwort

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the West Virginia white butterfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Guidelines specific to the West Virginia white (protect known locations; maintain at least 80% canopy cover at known locations; avoid isolating toothwort populations from larger blocks of interior forest).
- Standards and Guidelines specific to control of undesirable species (non-native invasive species).

Table J-78. West Virginia White Butterfly: Summary of Effects Analysis Factors for Alternative 1

West Virginia White Butterfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-79. West Virginia White Butterfly: Summary of Effects Analysis Factors and Determination

West Virginia White Butterfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	C	C	C	D	C	C	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See Table J-78	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend		↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	NI	BI	BI	BI	BI	BI	BI	BI

The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of West Virginia white butterfly habitat are expected to remain stable or increase under all alternatives. Management Areas 2A, 2B, and 2C all emphasize northern hardwoods which provide conditions most closely associated with the West Virginia white butterfly. The combined amount of MAs 2A, 2B, and 2C ranges from 447,000 acres under alternative 1 to 677,000 acres under alternative 9. The Selected Alternative allocates 646,000 acres to uneven-aged northern hardwoods emphasis (MA 2A, 2B, and 2C) (Fig. J-9). Standards and Guidelines that protect known locations of toothwort, host plant of the West Virginia white butterfly, would apply across Alternatives 2-9 and the Selected Alternative.

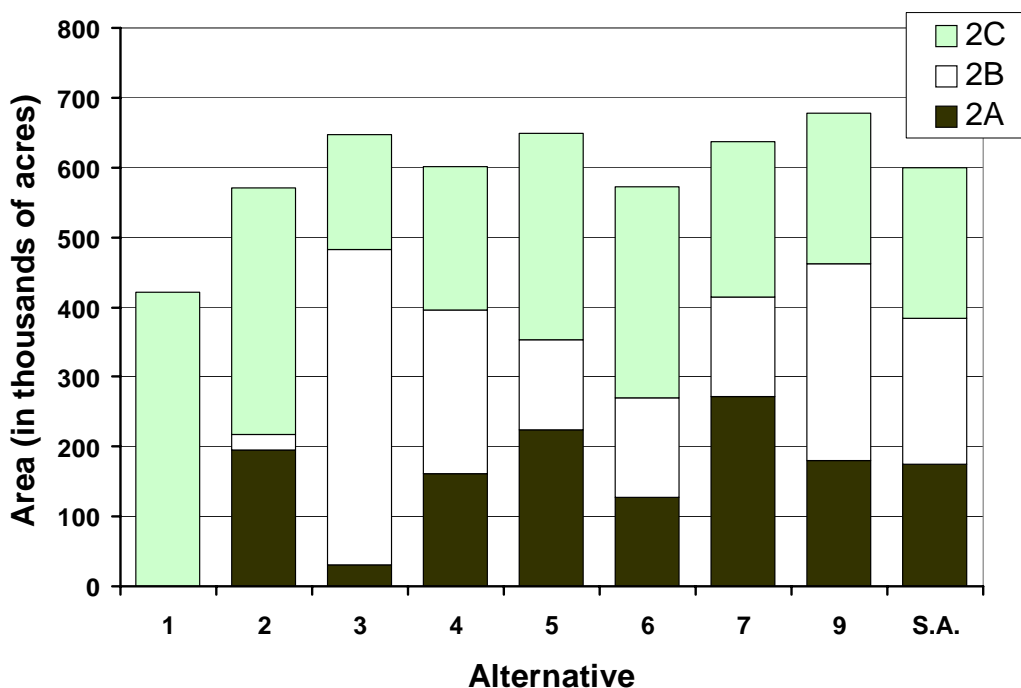


Figure J-9. Uneven-aged northern hardwoods emphasis (MA 2A, 2B, and 2C) by alternative.

Effects on Populations

Populations of the West Virginia white butterfly are expected to remain stable or increase because the amount and quality of habitat are expected to remain stable or increase under all Alternatives. The likelihood of ecological conditions contributing to long-term species abundance and distribution for this species is predicted to remain at its present level under Alternative 1, 2, and 6, and to increase to outcome C under the remaining alternatives (Table J-79). Allocations to northern hardwoods emphasis under the Selected Alternative are likely to lead to improved ecological conditions for this species just as they are expected to under Alternatives 3, 4, 5, 7 and 9.

Cumulative Effects

The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the West Virginia white butterfly is predicted to remain at its current level under all alternatives because it is unlikely that interior hardwood forests will be created and maintained outside the Forest. The exotic herb, Garlic mustard (*Alliaria petiolata*), has been found in several locations on Forest land and poses a threat to both the host plant (outcompetes) and the butterfly (poisons eggs and larvae) but all alternatives provide for aggressive efforts to limit the spread of this NNIS on Forest land and the DNR and other groups combat garlic mustard on other lands.

SPECIES: *Ophiogomphus anomalus*

COMMON NAME(S): Extra-striped Snaketail Dragonfly

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNMF

STATE OF WISCONSIN: Endangered

RANKING: G3, S1, C2

DISTRIBUTION

The species is found from New Brunswick west to Minnesota, and south to Delaware. There are approximately only 25 known occurrences of this species. In Wisconsin, it has been documented just off the Forest in Price, Sawyer and Taylor Counties including sites on the SF and NF Flambeau River, Jump River, Chippewa River, and Yellow River where potential for occurrence is highest.

Key Factors

- Riffles with gravel, sand, or cobble within warmwater rivers
- Forested riparian areas
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the extra-striped snaketail that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management and protection of riparian areas.

- Standards and Guidelines pertaining to fisheries habitat management, particularly those concerning management of stream habitat and riparian areas.
- Perform in-stream work after June 30th at documented sites.

Table J-80. Extra-striped Snaketail Dragonfly: Summary of Effects Analysis Factors for Alternative 1

Extra-striped Snaketail Dragonfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-81. Extra-striped Snaketail Dragonfly: Summary of Effects Analysis Factors and Determination

Extra-striped Snaketail Dragonfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	D	D	D	D	D	D	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-80	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of extra-striped snaketail dragonfly habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Extra-striped snaketail dragonfly populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase under all Alternatives. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under all alternatives (Table J-81).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the extra-striped snaketail dragonfly. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the extra-striped snaketail dragonfly is predicted to remain at its current level under all alternatives including the Selected Alternative.

SPECIES: *Ophiogomphus howei*

COMMON NAME(S): Pygmy Snaketail Dragonfly (=Midget Snaketail Dragonfly)

STATUS:

FWS: Species of Concern

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: Threatened

RANKING: G3, S3

DISTRIBUTION

The species is known from eastern North America, primarily from Maine south through the Appalachian Mountains. It is known from Wisconsin on the basis of at least 20 localities, perhaps more than in any other state. There are several known localities for this species on the Nicolet land base: North Branch Oconto River at Bagely Rapids, Peshtigo River at Big Joe Campground, Wolf River (T31N R15E Sec31 near wayside). Off-Forest sites include the Pine River at highway 101 and various locations within the Flambeau, Chippewa and Elk River watersheds. It has not been found on the Chequamegon land base but there is a high probability of occurrence on the East and West Forks of the Chippewa River and the South Fork of the Flambeau River.

Key Factors

- Gravel bottomed streams
- Natural seasonal water fluctuations
- Forested watersheds
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the pygmy snaketail that are common to alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management and protection of riparian areas.
- Standards and Guidelines pertaining to fisheries habitat management, particularly those concerning management of stream habitat and riparian areas.
- Perform in-stream work after June 30th at documented sites.

Table J-82. Pygmy Snaketail Dragonfly: Summary of Effects Analysis Factors for Alternative 1

Pygmy Snaketail Dragonfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-83. Pygmy Snaketail Dragonfly: Summary of Effects Analysis Factors and Determination

Pygmy Snaketail Dragonfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Ecological Judgments CNNF*	D	D	D	D	D	D	D	D	
Ecological Judgments CEA*	D	D	C	C	C	C	C	C	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-82	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of pygmy snaketail dragonfly habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Pygmy snaketail dragonfly populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase under all Alternatives. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under all alternatives (Table J-83).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the pygmy snaketail dragonfly. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term abundance and distribution within the CEA for the pygmy snaketail dragonfly is predicted to increase to outcome C under Alternatives 1 and

2, and remain at its current level under all other alternatives. Documentation of the Species Viability Evaluation process provides no explanation for this difference. The Selected Alternative, which is similar to Alternative 5 with the exception of increased emphasis on MA 2B areas and reduced emphasis on MA 2A areas, would likely experience the same ecological effects as Alternative 5 and would likely have received the same ecological judgment from the SVE panelists.

SPECIES: *Stylurus scudderi*

COMMON NAME(S): Zebra Clubtail Dragonfly

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNE

STATE OF WISCONSIN: SC/N

RANKING: G3G4, S3

DISTRIBUTION

This species is fairly widespread in Great Lake states, and Wisconsin is near the western edge of its range. Its distribution is spotty. Currently, it is known to occur at approximately 60 locations in Michigan, Wisconsin, and Minnesota, with approximately 40 sites in Wisconsin. Waterways on the Forests with known locations are SF Flambeau River, Namekagon River, Peshtigo River, Pine River, and North Branch Oconto River.

Key Factors

- Cool, small streams with sand substrate
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the zebra snaketail that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management and protection of riparian areas.
- Standards and Guidelines pertaining to fisheries habitat management, particularly those concerning management of stream habitat and riparian areas.

Table J-84. Zebra Clubtail Dragonfly: Summary of Effects Analysis Factors for Alternative 1

Zebra Clubtail Dragonfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-85. Zebra Clubtail Dragonfly: Summary of Effects Analysis Factors and Determination

Zebra Clubtail	Alternative								S.A.
	1	2	3	4	5	6	7	9	
Ecological Judgments CNNF*	C	C	C	C	C	C	C	C	
Ecological Judgments CEA*	C	C	C	C	C	C	C	C	
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-84	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

*The SVE expert panelsists' Ecological Judgment outcome score for this species; see introduction to BE for outcome definitions

CNNF—Chequamegon-Nicolet National Forests,

CEA—Cumulative Effects Area,

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of zebra clubtail dragonfly habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Zebra clubtail dragonfly populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase under all Alternatives. The likelihood of ecological conditions contributing to long-term species abundance and distribution is predicted to remain at its present level under all alternatives (Table J-85).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the zebra clubtail dragonfly. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term abundance and distribution within the CEA for the zebra clubtail dragonfly is predicted to remain at its present level under all alternatives including the Selected Alternative.

SPECIES: *Gomphus viridifrons*

COMMON NAME(S): Green-faced Clubtail Dragonfly

STATUS:

FWS: none

USFS: RFSS and known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G3, S3

DISTRIBUTION

Wisconsin is on the western edge of this species' range, which extends to the East Coast of the US. It has been found at 41 locations on 26 streams in the northern half of Wisconsin. There are known locations in Taylor and Price counties.

Key Factors

- Clean sand and gravel substrate in medium sized warmwater streams
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the green-faced clubtail dragonfly that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management and protection of riparian areas.
- Standards and Guidelines pertaining to fisheries habitat management, particularly those concerning management of stream habitat and riparian areas.
- Perform in-stream work after June 30th at documented sites.

Table J-86. Green-faced Clubtail Dragonfly: Summary of Effects Analysis Factors for Alternative 1

Green-faced Clubtail Dragonfly	Alternative 1	
	Chequamegon	Nicolet
Habitat Quantity	↔	↔
Habitat Quality	↔	↔
Population Trend	↔	↔

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing

Table J-87. Green-faced Clubtail Dragonfly” Summary of Effects Analysis Factors and Determination

Green-faced Clubtail Dragonfly	Alternative								
	1	2	3	4	5	6	7	9	S.A.
Habitat Quantity	See	↔	↔	↔	↔	↔	↔	↔	↔
Habitat Quality	Table	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
Population Trend	J-86	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑	↗↑
DETERMINATION	MINT	NI	NI	NI	NI	NI	NI	NI	NI

(↓)—Decreasing, (↔)—Stable, (↑)—Increasing,

(NI)—No Impact, (BI)—Beneficial Impact,

(MINT)—May Impact Individuals but Not Likely to Cause a Trend to Federal Listing or Loss of Viability,

(MILT)—May Impact Individuals and Likely to Result in a Trend to Federal Listing or Loss of Viability

Effects on Habitat

The amount and quality of green-faced clubtail dragonfly habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the

Selected Alternative include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Effects on Populations

Green-faced clubtail dragonfly populations are expected to remain stable because the quantity and quality of habitat are expected to remain stable or increase under all Alternatives (Table J-87).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors important to the green-faced clubtail dragonfly. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin. The likelihood of ecological conditions contributing to long-term species abundance and distribution within the CEA for the green-faced clubtail dragonfly is predicted to remain at its present level under all alternatives.

RFSS Likely To Occur, Not Yet Known From The CNNF

SPECIES: *Myotis septentrionalis*

COMMON NAME(S): Northern Myotis Bat

STATUS:

FWS: none

USFS: RFSS but not known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G4, S4

DISTRIBUTION

This species has a broad distribution in the eastern half of the US and eastern Canada. There are no documented occurrences from the Forests, but inasmuch as it is known from Wisconsin, Minnesota, and the Upper Peninsula of Michigan, it is thought to be resident on the Forests. One was reported from the Minocqua area, and individuals are likely to exist anywhere on the Chequamegon-Nicolet that contains mature forest types. This species has been found in mines in the Iron Mountain, Michigan area. Because individuals can easily travel 50-70 miles in seasonal movements, it is likely that the species occurs at least on the Nicolet land base.

Key Factors

- Hibernacula sites, not necessarily limited to mines and caves
- Foraging and roosting sites in large trees
- Proximity of foraging and roosting sites to water

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the northern myotis that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to management of riparian areas, particularly those concerning timber management.
- Reserve snag guidelines for even-aged and uneven-aged managed stands.
- Standards and Guidelines pertaining to upland opening management for upland wildlife.

Management area resource protection measures applicable to management of the northern myotis that are common to Alternatives 2-9 and the Selected Alternative include:

- Reserve tree guidelines for uneven-aged managed stands – MA 1A, 1B, 1C; MA 2A, 2B, 2C; MA 3A, 3B, 3C; MA 4A, 4B, 4C.

Effects on Habitat

The amount and quality of foraging and roosting habitat for northern Myotis bats are expected to remain stable or increase under all Alternatives. Protection of riparian and bottomland forest are likely to benefit this species.

Effects on Populations

Management under all Alternatives is not expected to be detrimental to the species, but unfortunately there are no data existing on the current status of the population(s).

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area of northern Wisconsin over time, and the loss of mature bottomland forest would be detrimental to this species. A limiting factor may be the availability of mines in nearby Michigan that are used as hibernacula. If buildings provide additional hibernacula in the Cumulative Effects Area, some development may benefit the species. However, it may be argued that the Cumulative Effects Area of this species encompasses the area on the Michigan Upper Peninsula with abandoned mines with known or suspected hibernacula. Regardless of the definition of the Cumulative Effects Area for the species, its long-term distribution and abundance may be dependent of the closure of mines in that area and how they are managed, or not managed, as bat hibernacula.

SPECIES: *Pipistrellus subflavus*

COMMON NAME(S): Eastern Pipistrelle

STATUS:

FWS: none

USFS: RFSS but not known to occur on the CNMF

STATE OF WISCONSIN: SC/N

RANKING: G5, S3S4

DISTRIBUTION

This species has a wide distribution over the eastern United States, as well as parts of Mexico and the maritime provinces of Canada. In Wisconsin, the species is at the northern edge of its range and is more common in southwestern Wisconsin than in the north. One hibernating individual was found in the Sudan Mine on the Superior NF and another along the North Shore of Lake Superior, leading some Minnesota biologists to believe that a small population may occur in northeastern Minnesota. It has also been documented in mines on the Upper Peninsula of Michigan in both the Hurley and Iron Mountain areas, within seasonal migrating distances from the CNNF where suitable summer roosting habitat exists.

Key Factors

- Hibernacula sites, probably limited to mines and caves
- Foraging and roosting sites in large trees

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the eastern pipistrelle that are common to Alternatives 2-9 and the Selected Alternative include:

- Reserve tree guidelines for even-aged managed stands.
- Reserve snag guidelines for even-aged and uneven-aged managed stands.

Management area resource protection measures applicable to management of the eastern pipistrelle that are common to Alternatives 2-9 and the Selected Alternative include:

- Reserve tree guidelines for uneven-aged managed stands – MA 1A, 1B, 1C; MA 2A, 2B, 2C; MA 3A, 3B, 3C; MA 4A, 4B, 4C.

Effects on Habitat

The amount and quality of foraging and roosting habitat for eastern pipistrelles are expected to remain stable or increase under all Alternatives.

Effects on Populations

Management under all Alternatives is not expected to be detrimental to the species, but unfortunately there are no data existing on the current status of the population(s).

Cumulative Effects

The Forests will provide mature, large trees that will benefit the species in the summer as foraging and roosting sites, but a limiting factor may be the availability of mines in nearby Michigan that are used as hibernacula. It may be argued that the Cumulative Effects Area of this species encompasses the area on the Michigan Upper Peninsula with abandoned mines with known or suspected hibernacula. Regardless of the definition of the Cumulative Effects Area for the species, its long-term distribution and abundance may be dependent of the closure of mines in that area and how they are managed, or not managed, as bat hibernacula.

SPECIES: *Plethobasus cyphus*

COMMON NAME(S): Bullhead Mussel (= Sheepnose Mussel)

STATUS:

FWS: none

USFS: RFSS but not known to occur on the CNNF

STATE OF WISCONSIN: Endangered

RANKING: G3, S1

DISTRIBUTION

The bullhead mussel was a historically widespread species, known to occur in Wisconsin, Indiana, Ohio, Iowa, Illinois, and Missouri. It is rare throughout its range, and now thought to be nearly extirpated in Wisconsin. In Wisconsin it has been found in Rusk County and the lower portions of the Chippewa and Flambeau Rivers, but it has not been documented on the Forests.

Key Factors

- Changes in water quality (e.g., siltation, sedimentation)
- Stream channel integrity

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the bullhead mussel that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to watershed protection and management.
- Incorporate principles of stream geomorphology and maintain the dynamic stability of stream by designing and implementing in stream channel restoration and enhancement projects.
- Design, construct and maintain stream crossings and dams to minimize disrupting the migration or movement of fish and other aquatic life. Passage may be blocked for a prescribed fish management procedure or if passage is deemed unnecessary.

Effects on Habitat

The amount and quality of bullhead mussel habitat are expected to remain stable or increase under all alternatives. Road and trail crossings have the greatest effect on stream channel integrity. These effects are expected to decline, albeit at different rates, under all alternatives. All alternatives include the use of BMPs that would minimize erosion and sedimentation in the vicinity of water bodies. Alternatives 2-9 and the Selected Alternative would include additional Standards and Guidelines pertaining to watershed protection, stream crossings, and stream channel integrity.

Cumulative Effects

Freshwater mussels as a group have dramatically declined throughout North America because of habitat destruction from dams, dredging, channelization, siltation, and contaminants as well as the expansion of non-native mollusk populations such as zebra mussel (Williams *et al.* 1993). A number of these threats to freshwater mussels also apply within the cumulative effects area. In recent years, the Northern Rivers Initiative and Wisconsin Waters Project, broad-scale efforts to protect water bodies within the state, have been launched. The coordination of public, private, and government interests sought by these efforts offers the best opportunity for the continued existence of many freshwater mussel populations.

SPECIES: *Somatochlora forcipata*

COMMON NAME(S): Forcinate Emerald Dragonfly

STATUS:

FWS: none

USFS: RFSS but not known to occur on the CNNF

STATE OF WISCONSIN: SC/N

RANKING: G5, S2S3

DISTRIBUTION

This is a boreal species, and Wisconsin is on the southern edge of its range. It has a large range to the north of Wisconsin. It is known to occur at 11 sites in Wisconsin in the following counties: Door (1 site), Marinette (4), Vilas (1), Douglas (4) and Forest (1). It is suspected to occur in Bayfield, Iron and Ashland counties. It has not been found within the boundaries of the National Forest, but suitable habitat exists.

Key Factors

- Bogs/acid peatlands or wetlands

Resource Protection Measures—Alternatives 2-9 and the Selected Alternative

Forestwide resource protection measures applicable to management of the forcipate emerald that are common to Alternatives 2-9 and the Selected Alternative include:

- Standards and Guidelines pertaining to protection of wetlands
- Prohibit sphagnum moss collection (permits may be issued for gathering sphagnum moss for scientific purposes)

Effects on Habitat

The amount and quality of forcipate emerald dragonfly habitat are expected to remain stable across all alternatives. No management activities would occur within the sphagnum bog habitat associated with this species.

Cumulative Effects

Division of private lands into smaller ownership parcels, especially along shorelines, is likely to increase within the Cumulative Effects Area over time. Construction of roads to access subdivided property likely will follow. Roads contribute sediment and affect stream channel integrity, factors probably important to the forcipate emerald dragonfly. The removal of dams along some rivers, the advent of the Clean Water Act, and the application of Best Management Practices have helped in the improvement and maintenance of aquatic habitats throughout Wisconsin.

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Date March 3, 2003

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Date March 3, 2003

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Date March 3, 2003

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Date March 19, 2004