

Appendix B - Species Viability Evaluation

Species Viability Evaluation Process

Introduction:

The Huron-Manistee National Forests are required to maintain the viability of all native and desirable non-native species. The Forests ensure that this requirement is met through the Species Viability Evaluation process. Detailed evaluation occurs only for those species, identified on the “Species Viability Evaluation List,” which may have viability concerns.

Purpose:

This appendix summarizes the Species Viability Evaluation process for the Huron-Manistee National Forests' Revised Forest Plan. The process is intended to address the maintenance of viability of existing native and desired non-native species within National Forests to meet the following Forest Plan Revision requirements.

- 36 Code of Federal Regulations (CFR) Part 219.19 - 1982
- Departmental Regulations 9500-4
- 36 CFR 219.9 - 1982

As such, the Species Viability Evaluation process is a structured and reasoned series of judgments about projected amounts and distributions of habitat, and the likelihood that such habitat would allow populations of species that may be at risk to remain well-distributed over the long-term. This process provides an estimate of the likelihood that a population will persist in a given geographic distribution for a given period of time. Specifically, the Species Viability Evaluation is focused on those species and rare landscapes that are at “risk” and need to be addressed in the Revised Forest Plan.

This process is not a quantitative population viability analysis because it does not employ explicit models of genetic or demographic risk to species. However, the Species Viability Evaluation process meets the essential criterion of a population viability analysis.

Process:

The following describes the seven steps followed in the Species Viability Evaluation. A flow chart visually depicting the process is displayed in Figure B-1.

Step 1. Identify Species at Risk:

Species that are: 1) federally threatened or endangered; 2) proposed for or currently on the Region 9 Regional Forester Sensitive Species list; or 3) have global (G), trinomial (T), or national (N) ranks of 1 – 3 by the Nature Conservancy and Nature Serve (see web site:

<http://www.natureserve.org>) are automatically included in the Species Viability Evaluation. Other species are included if there is a documented occurrence within the National Forest *and* the species demonstrate a viability risk due to: 1) low abundance and distribution; 2) a declining population trend; 3) habitat decline; or overall population vulnerability.

Other species of special interest, for example gathering, viewing, sporting and sustainability, that do not have viability concerns will be identified and addressed through other Forest Plan revision processes and planning efforts. The Species Viability Evaluation process is not designed to address these important species.

Step 2. Collect Information on the Species at Risk:

Information on species taxonomy, conservation status, life history, risk factors, limiting factors, population trends, habitat trends and conservation approaches will be collected and stored in a data base. The sources of information are from literature; approved conservation assessments and approaches; US Fish and Wildlife Service consultations and status assessments; and experts. The purpose of collecting information on the species at risk is to establish specific requirements so that species viability can be evaluated in the context of Forest Plan direction.

Step 3. Assigning Forest Ranks to Species:

In this step, species are ranked according to their relative rarity and severity of threat. This process allows for the quick identification of highest priority species.

Step 4. Group Species at Risk:

This is the grouping of species to effectively and efficiently evaluate their viability. Species groups may be established based on occurrences, similar vegetative community/habitats, limiting factors, threats, guilds, sensitivity or broad scale ecological considerations.

Step 5. Compare Species Needs to 1986 Forest Plan, as Amended:

Species habitat needs are compared against the 1986 Forest Plan, as amended, to evaluate the extent to which current management direction provides habitat to maintain viability of at-risk species. This preliminary evaluation identifies where the 1986 Forest Plan, as amended, does not provide for species viability. The outcome is the identification of changes to the 1986 Forest Plan, as amended, that may be necessary to meet the Revised Forest Plan species viability standards.

Step 6. Development of Conservation Measures:

Specific conservation measures, focused on key risks or species limiting factors, are developed to provide for species viability. These conservation measures will be used to develop proposed objectives or specific Standards and Guidelines.

Step 7. Incorporation of Conservation Measures into Forest Plan Revision Alternatives:

Landscape scale management area direction and/or Standards and Guidelines are incorporated into Forest Plan Revision alternatives to provide for species viability.

Additional Information:

Additional information on the species addressed in the Species Viability Evaluation process is available from the following:

Environmental Documentation:

The Biological Evaluation and Biological Assessment documents describe the environmental effects of the alternatives and their consequences for Species Viability Evaluation species.

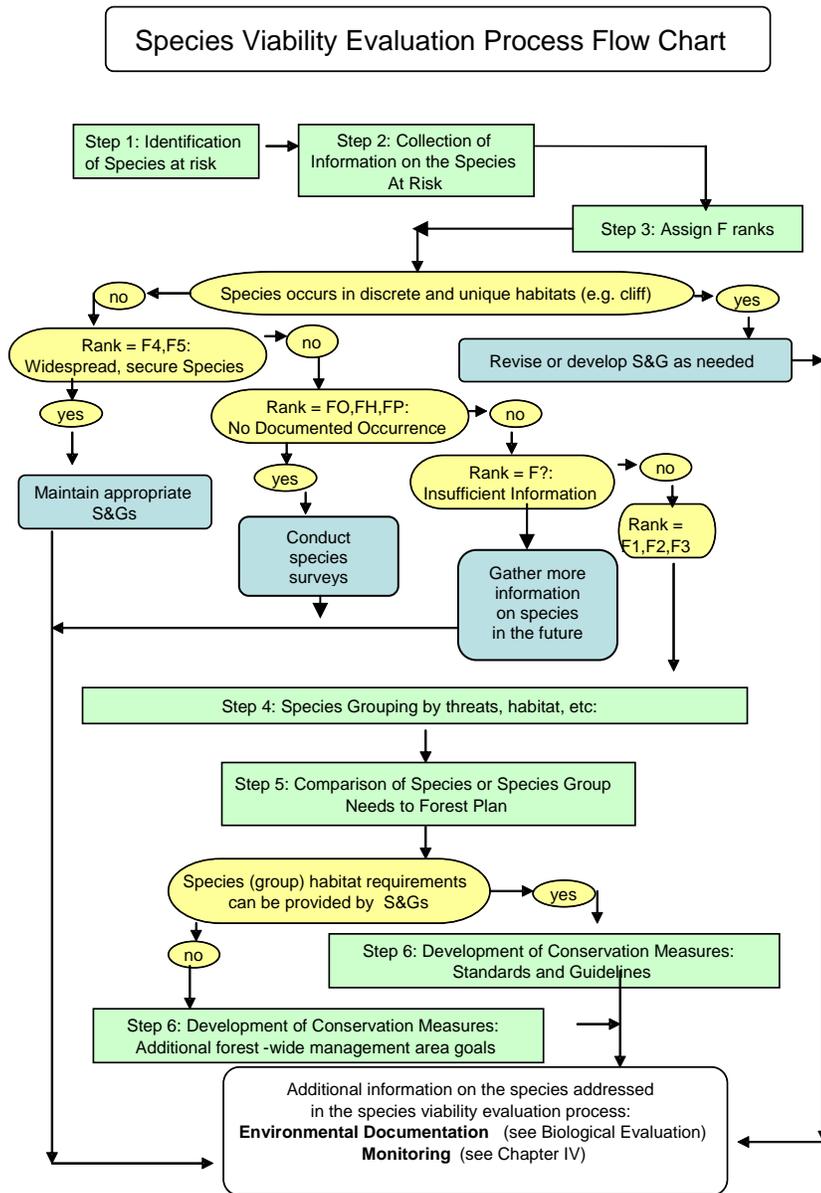
Monitoring:

The Forest Plan (Chapter IV) will include how viability (populations and habitat trends) will be monitored. The process of incorporating the results of monitoring into improved management area direction and Standards and Guidelines to better provide for viability (adaptive management) will also be included.

Species Viability Evaluations Species Narratives

The remainder of this document will describe the Species Viability Evaluation process including development of the Species Viability Evaluation species list, assigning Forest or “F-ranks”, creation of species habitat groups, and selection of focal species for each of the groups. Needs for the habitat groups, focusing on the habitat requirements of the group’s focal species, were evaluated and compared to the 1986 Forest Plan, as amended. Conservation recommendations were developed and proposed when 1986 Forest Plan, as amended, conditions did not appear to provide for long-term species viability. Narratives documenting the evaluations and proposed conservation measures for each species group can be found in the Analysis of the Management Situation.

Figure B-1. Species Viability Evaluation Process Flow Chart



***Huron-Manistee National Forests' Species Viability Evaluation
Species List Criteria:***

The following are the criteria used for developing the list of species specifically evaluated in the Species Viability Evaluation process.

- Species that are federally threatened; endangered, whether proposed or candidate; and species on the Region 9 Regional Forester Sensitive Species list will be included in the Species Viability Evaluation process and need full consideration because of Forest planning landscape considerations. State listed species have been incorporated in the Species at Risk list by means of the Region 9 Regional Forester Sensitive Species list. When the Regional Forester Sensitive Species list was updated, the State's list of Threatened, Endangered, and Species of Special Concern was thoroughly reviewed, and those state species meeting Regional Forester Sensitive Species listing criteria were included in the revised Regional Forester Sensitive Species list. Species with viability concerns identified by recommendation of researchers, experts, Non-Governmental Organizations, resource management agencies and publics may be included in the Species Viability Evaluation process.
- Species not known to occur, with no officially documented occurrences, on National Forests will not be included in the Species Viability Evaluation process. In accordance with Forest Service guidance, surveys will be conducted for Species Viability Evaluation species that have a likelihood of occurring on National Forest Service System lands.
- Species known to occur on the National Forests that have stable or increasing populations will not be carried forward in the Species Viability Evaluation process. By definition these species are not species at risk.
- Species known to occur on the National Forests that are not tracked by Michigan Natural Features Inventory are not included in the process unless their population viability is identified by a downward trend. These may be identified through other regional assessments completed by cooperating agencies or other recognized experts.
- Species that occur in isolated, specific, uncommon habitats will have Forest Plan Standards and Guidelines and will be addressed at the project level.
- Species associated with rare communities will be identified and listed in a table to show the species and the rare community it is associated with. Those rare communities that require restoration and maintenance will be carried forward in the Species Viability Evaluation process.

Species Viability Evaluation Species List:

In accordance with the above criteria, the National Forests in Michigan developed a proposed species at risk list which would be the basis for consideration in Forest Plan revision. This list included federally threatened, endangered, Regional Forester’s Sensitive Species and other species and communities of concern. The list included 212 species which included five mammals, 38 birds, six reptiles, seven fish, 25 insects, four mollusks, 88 plants, six lichens, four mosses, and 29 communities. Of this list developed for the National Forests in Michigan, the Huron-Manistee National Forests’ list included three mammals, 33 birds, six reptiles, seven fish, 19 insects, two mollusks, 54 plants and 18 communities.

These species are shown in the following table. “F ranks” (see step 3 of the Species Viability Evaluation process) were given to the species based on criteria developed by the three Michigan National Forests. The F rank criteria are as follows:

- FN: Federally endangered, threatened, candidate, and/or Regional Forester’s Sensitive Species not otherwise assigned an F rank on the Forest
- F?: Species that are present on the Forest, but abundance information is insufficient to develop Forest rank.
- F1: Species which are extremely rare on the Forest unit.
- F2: Species which are very rare on the Forest unit.
- F3: Species which are rare and uncommon on the Forest unit.
- F4: Species which are widespread, abundant, and apparently secure on the Forest unit.
- F5: Species which are demonstrably secure on the Forest unit.

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation.

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Mammals							
American Marten (<i>Martes Americana</i>)						X	
Eastern Pipistrelle (<i>Pipistrellus subflavus</i>)							X
Indiana Bat (<i>Myotis sodalis</i>)							X
Birds							
American Bittern (<i>Botaurus lentiginosus</i>)						X	
Bald Eagle (<i>Haliaeetus leucocephalus</i>)			X				
Black-billed Cuckoo (<i>Coccyzus erythrophthalmus</i>)				X			
Black Tern (<i>Chlidonias niger</i>)						X	
Black-backed Woodpecker (<i>Picoides arcticus</i>)							X

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation (Continued).

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Birds							
Black-crowned Night-heron (<i>Nycticorax nycticorax</i>)							X
Bobolink (<i>Dolichonyx oryzivorus</i>)						X	
Canada Warbler (<i>Wilsonia canadensis</i>)					X		
Cerulean Warbler (<i>Dendroica cerulea</i>)						X	
Common Loon (<i>Gavia immer</i>)						X	
Connecticut Warbler (<i>Oporornis agilis</i>)	X						
Eastern Meadowlark (<i>Sturnella magna</i>)					X		
Golden-winged Warbler (<i>Vermivora chrysoptera</i>)					X		
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)						X	
Henslow's Sparrow (<i>Ammodramus henslowii</i>)							X
King Rail (<i>Rallus elegans</i>)							X
Kirtland's Warbler (<i>Dendroica kirtlandii</i>)				X			
Migrant Loggerhead Shrike (<i>Lanius ludovicianus</i>)							X
Northern Goshawk (<i>Accipiter gentilis</i>)					X		
Northern Harrier (<i>Circus cyaneus</i>)						X	
Olive-sided Flycatcher (<i>Contopus cooperi</i>)							X
Piping Plover (<i>Charadrius melodus</i>)							X
Prairie Warbler (<i>Dendroica discolor</i>)						X	
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)					X		
Red-shouldered Hawk (<i>Buteo lineatus</i>)					X		
Sharp-tailed Grouse (<i>Tympanuchus phasianellus</i>)							X
Short-eared Owl (<i>Asio flammeus</i>)	X						
Spruce Grouse (<i>Falcipennis canadensis</i>)						X	
Trumpeter Swan (<i>Cygnus buccinator</i>)					X		
Upland Sandpiper (<i>Bartramia longicauda</i>)						X	
Whip-poor-will (<i>Caprimulgus vociferus</i>)					X		
Wood Thrush (<i>Hylocichla mustelina</i>)				X			
Yellow Rail (<i>Coturnicops noveboracensis</i>)							X

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation (Continued).

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Reptiles							
Blanding's Turtle (<i>Emydoidea blandingii</i>)					X		
Eastern box turtle (<i>Terrapene carolina</i>)						X	
Eastern Massasauga (<i>Sistrurus catenatus catenatus</i>)						X	
Kirtland's Snake (<i>Clonophis kirtlandii</i>)							X
Spotted Turtle (<i>Clemmys guttata</i>)							X
Wood Turtle (<i>Glyptemys insculpta</i>)					X		
Fish							
Channel Darter (<i>Percina copelandi</i>)					X		
Greater Redhorse (<i>Moxostoma valenciennesi</i>)					X		
Lake Sturgeon (<i>Acipenser fulvescens</i>)						X	
Pugnose Shiner (<i>Notropis anogenus</i>)							X
Redside Dace (<i>Clinostomus elongatus</i>)							X
River Redhorse (<i>Moxostoma carinatum</i>)						X	
River Darter (<i>Percina shumardi</i>)							X
Insects							
Culvers's Root Borer (<i>Papaipema sciata</i>)							X
Doll's Merolonche (<i>Merolonche dolli</i>)							X
Douglas Stenelmis Riffle Beetle (<i>Stenelmis douglasensis</i>)							X
Dusted Skipper (<i>Atrytonopsis hianna</i>)						X	
Frosted Elfin (<i>Incisalia irus</i>)						X	
Henry's Elfin (<i>Incisalia henrici</i>)						X	
Hill-prairie Spittlebug (<i>Lepyronia gibbosa</i>)						X	
Imperial Moth (<i>Eacles imperialis pinii</i>)							X
Karner Blue (<i>Lycaeides melissa samuelis</i>)						X	
Lake Huron Locust (<i>Trimerotropis huroniana</i>)						X	
Michigan Bog Grasshopper (<i>Appalachia arcana</i>)						X	
Ottoe Skipper (<i>Hesperia ottoe</i>)							X
Persius Duskywing (<i>Erynnis persius</i>)						X	
Phlox Moth (<i>Schinia indiana</i>)							X
Poweshiek Skipperling (<i>Oarisma poweshiek</i>)	X						
Regal Fritillary (<i>Speyeria idalia</i>)							X
Southern Grizzled Skipper (<i>Pyrgus wyandot</i>)	X						
Spartina Borer Moth (<i>Spartiniphaga inops</i>)	X						
Sprague's Pygarcic (<i>Pygarcic spraguei</i>)							X

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation (Continued).

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Mollusks							
Creek Heelsplitter (<i>Lasmigona compressa</i>)					X		
Snuffbox (<i>Epioblasma triquetra</i>)							X
Plants							
Pale Agoseris (<i>Agoseris glauca</i>)							X
Purple Milkweed (<i>Asclepias purpurascens</i>)							X
Western Silver Aster (<i>Aster sericeus</i>)							X
Canadian milkvetch (<i>Astragalus canadensis</i>)							X
Ternate grapefern (<i>Botrychium rugulosum =ternatum</i>)						X	
Sideoats Grama Grass (<i>Bouteloua curtipendula</i>)							X
Schweinitz's sedge (<i>Carex schweinitzii</i>)							X
Hill's Thistle (<i>Cirsium hillii</i>)					X		
Wild comfrey (<i>Cynoglossum virginianum (=boreale) var. boreale</i>)						X	
Ram's Head Orchid (<i>Cypripedium arietinum</i>)							X
False Violet (<i>Dalibarda repens</i>)						X	
Goldie's fern (<i>Dryopteris goldiana</i>)							X
Purple Spikerush (<i>Eleocharis atropurpurea</i>)							X
Engelmann's spikerush (<i>Eleocharis engelmannii</i>)							X
Three-ribbed spikerush (<i>Eleocharis tricostata</i>)							X
Upland Boneset (<i>Eupatorium sessilifolium</i>)							X
Rough Fescue (<i>Festuca scabrella</i>)					X		
Umbrella-grass (<i>Fuirena squarrosa</i>)							X
Dwarf-bulrush (<i>Hemicarpha micrantha</i>)							X
Northern Fir-moss (<i>Huperzia selago</i>)							X
Gentian-leaved St. John's-wort (<i>Hypericum gentianoides</i>)							X
Butternut (<i>Juglans cinerea</i>)						X	
Small Headed Rush (<i>Juncus brachycarpus</i>)							X
Vasey's rush (<i>Juncus vaseyi</i>)							X
False Boneset (<i>Kuhnia eupatorioides</i>)							X
Leggett's Pinweed (<i>Lechea pulchella</i>)							X
Furrowed Flax (<i>Linum sulcatum</i>)						X	

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation (Continued).

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Plants (continued)							
Purple Twayblade (<i>Liparis liliifolia</i>)							X
Northern Appressed Clubmoss (<i>Lycopodiella subappressa</i>)							X
White Adder's-mouth (<i>Malaxis brachypoda</i>)							X
Fascicled Broomrape (<i>Orobanche fasciculata</i>)							X
Ginseng (<i>Panax quinquefolius</i>)						X	
Bog Bluegrass (<i>Poa paludigena</i>)							X
Cross-leaved Milkwort (<i>Polygala cruciata</i>)							X
Waterthread Pondweed (<i>Potamogeton bicupulatus</i>)							X
Alleghany Plum (<i>Prunus alleghaniensis v. davisii</i>)					X		
Baldrush (<i>Psilocarya (=Rhynchospora) scripoides</i>)							X
Pine-drops (<i>Pterospora andromedea</i>)							X
Whorled Mountain Mint (<i>Pycnathemum verticillatum</i>)							X
Hairy Mountain Mint (<i>Pycnathemum pilosum</i>)	X						
Meadow-Beauty (<i>Rhexia virginica</i>)						X	
Tooth-cup (<i>Rotala ramosior</i>)						X	
Hall's Bulrush (<i>Scirpus hallii</i>)							X
Torrey's Bulrush (<i>Scirpus torreyi</i>)							X
Few-flowered Nut-rush (<i>Scleria pauciflora</i>)							X
Tall Nut-rush (<i>Scleria triglomerata</i>)							X
Atlantic blue-eyed-grass (<i>Sisyrinchium atlanticum</i>)	X						
Blue-eyed-grass (<i>Sisyrinchium strictum</i>)	X						
Yellow Ladies'-tresses (<i>Spiranthes ochroleuca</i>)							X
Prairie Dropseed (<i>Sporobolus heterolepis</i>)							X
False Pennyroyal (<i>Trichostema brachiatum</i>)							X
Bastard Pennyroyal (<i>Trichostema dichotomum</i>)							X
Purple Sand Grass (<i>Triplasis purpurea</i>)							X

Table B-1. Forest Ranks (F ranks) for Species Considered in the Species Viability Evaluation (Continued).

Species	Forest Rank						
	F?	FN	F5	F4	F3	F2	F1
Natural Communities							
Cedar Swamp						X	
Coastal plain marsh						X	
Dry sand prairie							
Great Lakes barrens							X
Great Lakes marsh							X
Hardwood-conifer swamp							
Interdunal wetland							X
Intermittent wetland						X	
Mesic sand prairie							X
Northern fen							X
Northern wet mesic prairie							X
Oak barrens							X
Oak-pine barrens							X
Open dunes					X		
Pine barrens							X
Poor fen							X
Southern floodplain forest						X	
Wooded dune and swale complex						X	

Species Groups:

Following development of the species list by National Forest in Michigan, the Species Viability Evaluation species database and Forest ranks, Species Viability Evaluation species were grouped by associated habitats and a focal species was selected for each of these habitat groups. The following table describes the habitat groups, their constituent Species Viability Evaluation species, and the group's focal species.

Table B-2. Aquatic Species Groups. (The group's focal species is in bold.)

Species Group	Description	Species
Aquatic Species Group 1	Large river species	Lake Sturgeon River Redhorse Greater Redhorse Snuffbox Mussel
Aquatic Species Group 2	Small fish that prefer deep, fast flowing riffle sections with gravel/cobble substrate in medium to large sized streams; year-round residents	Channel Darter River Darter
Aquatic Species Group 3	Species that prefer clear, cool headwaters of river systems	Redside dace Creek heelsplitter Douglas Stenelmis Riffle beetle
Aquatic Species Group 4	Sand and mud habitats in clear vegetated lakes and vegetated pools and runs of creeks and rivers	Pugnose shiner

Table B-3. Species Viability Evaluation – Terrestrial Wildlife Habitat Groups. (The group's focal species is in bold.)

GREAT LAKES MARSH	BEACH/DUNE	RIVER/STREAMS	PONDS/LAKES	MARSH	BOGS/FENS	SHRUB/SCRUB WETLANDS	RIPARIAN/LOWLAND HDWDS/Floodplain
	Piping Plover	Larger	Larger	American Bittern		Black-billed Cuckoo	Mid - Late
	Prairie Warbler	Wood Turtle	Common Loon	Northern Harrier	Olive-sided Flycatcher	Golden-winged Warbler	Indiana Bat
	Lake Huron Locust	Spotted Turtle	Trumpeter Swan	King Rail	Spotted Turtle	Canada Warbler	Eastern Pipistrelle
			Bald Eagle	Yellow rail	Michigan Bog Grasshopper	Kirtland's Snake	Bald Eagle
			Black-crowned Night Heron	Black-crowned Night Heron			Cerulean Warbler
			Black Tern	Black Tern			Canada Warbler
			Smaller	Blanding's Turtle			Red-shouldered Hawk
			Blanding's Turtle	Spotted Turtle			Wood Turtle
			Spotted Turtle	Eastern Massasauga			Eastern Box Turtle
							Early-Mid
							Golden-winged warbler
							Eastern Massasauga
							Kirtland's Snake

LOWLAND CONIFER/BOREAL	OAK/PINE	MIXED HARDWOODS	ASPEN/BIRCH	RED/WHITE PINE/SPRUCE
Mid-Late	Late	Late	Early	
American Marten	Indiana Bat	American Marten	Golden-winged Warbler	American Marten
Northern Goshawk	Cerulean Warbler	Red-shouldered Hawk	Whip-poor-will	Bald Eagle
Spruce Grouse	Red-headed Woodpecker	Northern Goshawk	Late	Northern Goshawk
Black-backed Woodpecker		Red-headed Woodpecker	Northern Goshawk	Imperial Moth
Eastern Massasauga	Early-Mid	Wood Thrush	Wood Thrush	
	Whip-poor-will			
	Black-billed Cuckoo			
	Sprague's Pygarrctic			

Table B-3. Species Viability Evaluation – Terrestrial Wildlife Habitat Groups (Continued). (The group’s focal species is in bold.)

JACK PINE	PINE BARRENS	SAVANNAH (Oak Pine Barrens)	GRASSLAND	DRY PRAIRIE
<u>Early-Open</u> Michigan Bog Grasshopper	<u>Large Openlands</u> Sharp-tailed Grouse	<u>Large Openlands</u> Karner Blue Butterfly	<u>Large Openlands</u> Northern Harrier	<u>Large</u> Sharp-tailed Grouse
Prairie Warbler	Kirtland's Warbler		Henslow's Sparrow	Upland Sandpiper
Upland Sandpiper	Prairie Warbler	<u>Large or Smaller</u>	Grasshopper Sparrow	
Sharp-tailed Grouse	Upland sandpiper	Eastern Pipistrelle	Eastern Meadowlark	<u>Large or Smaller</u>
		Black-billed Cuckoo	Bobolink	Culver's Root Borer
		Michigan Loggerhead Shrike	Sharp-tailed Grouse	Hill-prairie Spittlebug
<u>Mid-Successional</u> Kirtland's Warbler	<u>Large or Smaller</u> Migrant Loggerhead Shrike	Red-headed Woodpecker	Upland Sandpiper	Dusted Skipper
Black-billed Cuckoo	Red-headed Woodpecker	Eastern Box Turtle		Ottoo Skipper
Whip-poor-will	Henry's Elfin	Hill-prairie Spittlebug	<u>Smaller Openlands</u>	Karner Blue Butterfly
Olive-sided Flycatcher	Dusted Skipper	Frosted Elfin	Eastern Pipistrelle	Persius Duskywing
	Michigan Bog Grasshopper	Persius Duskywing	Migrant Loggerhead Shrike	Regal Fritillary
<u>Mid - Late Successional</u> Spruce Grouse	Eastern Massasauga	Henry's Elfin	Spotted Turtle	Phlox Moth
Imperial Moth		Regal Fritillary	Eastern Box Turtle	
Black-backed Woodpecker		Dusted skipper	Eastern Massasauga	
American marten		Ottoo Skipper		
		Doll's Merolonche	<u>Large or Smaller</u>	
		Sprague's Pygarcic	Dusted Skipper	
			Henry's Elfin	
			Frosted Elfin	
			Persius Duskywing	
			Sprague's Pygarcic	
			Phlox moth	

Table B-4. Species Viability Evaluation –Botanical Habitat Groups and Communities of Concern.

<p>Subirrigated Moist Forest/Thicket Purple Twayblade</p> <p>Mesic Sand Prairie/Northern Wet-Mesic Prairie Purple Milkweed, Canadian milkvetch, Kuhnia eupatorioides, Tooth-cup, Prairie Dropseed</p> <p>Swale in Oak/Swale in Pine/ Vernal Pool Engelmann's spikerush, Three-angle Spikerush, Short-fruited Rush, Bog Bluegrass, Blue-eyed-grass, Prairie Dropseed</p>	<p>Wet Exposed Mineral Soils Engelmann's Spikerush, Dwarf-bulrush, Fir Clubmoss, Gentian-leaved St. John's-wort, Short-fruited Rush, Vasey's rush, Northern Appressed Clubmoss, Meadow-Beauty</p> <p>Wet-Mesic Prairie/Meadow Purple Spikerush, Short-fruited Rush, Vasey's rush, Cross-leaved Milkwort, Meadow-Beauty, Tooth-cup, Few-flowered Nut-rush, Tall Nut-rush, Atlantic blue-eyed-grass, Blue-eyed-grass, Yellow Ladies'-tresses, Prairie Dropseed</p>	<p>Riparian - Forested/Southern Floodplain Forest Schweinitz's sedge, Butternut, White Adder's-mouth, Bog Bluegrass</p> <p>Swamp/Southern Swamp/Hardwood Conifer Swamp Ram's Head Orchid, False Violet , White Adder's-mouth, Bog Bluegrass</p> <p>Sub-irrigated Forest False Violet , Purple Twayblade</p> <p>Cedar Swamp Ram's Head Orchid, White Adder's-mouth</p> <p>Riparian- Non-forested Canadian milkvetch</p>	<p>Aquatic Pond-Lake Waterthread Pondweed</p> <p>Lake shorelines - Acid/ Calcareous/Neutral Canadian milkvetch, Umbrella-grass, Dwarf-bulrush, Fir Clubmoss, Short-fruited Rush, Vasey's rush, Leggett's Pinweed, Northern Appressed Clubmoss, Cross-leaved Milkwort, Baldrush, Whorled Mountain Mint, Tooth-cup, Torrey's Bulrush, Few-flowered Nut-rush, Tall Nut-rush, Atlantic blue-eyed-grass</p> <p>Bog</p> <p>Great Lakes Marsh</p> <p>Marsh</p> <p>Northern Fen/Poor Fen</p>	<p>Semi-open Mesic Depression Wild comfrey</p> <p>Great Lakes Barrens/Interdunal Wetland/Open Dunes/Wooded Dune/Wooded Dune Swale Ram's Head Orchid, False Violet, Fir Clubmoss, Northern Appressed Clubmoss, Fascicled Broomrape, Meadow-Beauty, Tooth-cup</p> <p>Hardwood Forest Openings Ternate grapefern</p> <p>Forest with Needleduff Pine-drops</p> <p>Clay-Loam Forest/Rich Mesic Northern Forest Goldie's fern, Ginseng</p>	<p>Barrens (Oak, Oak-Pine, Pine) Pale Agoseris, Purple Milkweed, Hill's Thistle, Ram's Head Orchid, Upland Boneset, Rough Fescue, False Boneset, Alleghany Plum, Hairy Mountain Mint, False Pennyroyal, Bastard Pennyroyal, Sand Grass</p> <p>Dry Sand Prairie Western Silver Aster, Sideoats Grama Grass, Hill's Thistle, False Boneset, Leggett's Pinweed, Furrowed Flax, Bastard Pennyroyal</p>	<p>Open Dry Sand Hill's Thistle, Leggett's Pinweed, Linum sulcatum, Furrowed Flax , False Pennyroyal, Bastard Pennyroyal, Sand Grass</p>	<p>Coastal Plain Marsh/ Intermittent Wetland Purple Spikerush, Engelmann's spikerush, Three-angle Spikerush, Umbrella-grass, Dwarf-bulrush, Gentian-leaved St. John's-wort, Short-fruited Rush, Vasey's rush, Leggett's Pinweed, Northern Appressed Clubmoss, Cross-leaved Milkwort, Waterthread Pondweed, Baldrush, Whorled Mountain Mint, Meadow-Beauty, Tooth-cup, Torrey's Bulrush, Hall's Bulrush, Few-flowered Nut-rush, Tall Nut-rush, Atlantic blue-eyed-grass, Blue-eyed-grass</p>
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Standards and Guidelines for Certain Species and Communities:

Following development of “F” ranks and species groups, an intermediate determination was made as to whether species or communities were found only in discrete and unique habitats. If so, conservation measures were developed to protect species viability without further analysis and incorporated into the Forest Plan Chapters II and III management direction. Conservation measures (Standards and Guidelines or direction) for these species or communities are given in the table below. Community descriptions are provided at the end of this Appendix.

Table B-5. Standards and Guidelines Developed to Protect the Viability of Species or Natural Communities.

Standards and Guidelines	Species or Natural Communities
<ul style="list-style-type: none"> • Protection of coastal plain marshes, intermittent wetlands, mesic sand prairies, northern fens, poor fens and Great Lakes marshes. • Rare wetland communities where fire is a known disturbance – prescribed fire should be used to maintain the community when appropriate. 	Coastal plain marsh, intermittent wetland, mesic sand prairie, Great Lakes marsh, northern fen, poor fen, purple milkweed, Canada milkvetch, purple spike-rush, Engelman’s spike-rush, three-ribbed spikerush, umbrella-grass, dwarf-bulrush, northern fir-moss, Gentian-leaved St. John’s-wort, small headed rush, Vasey’s rush, false boneset, Legett’s pinweed, northern appressed clubmoss, bog bluegrass, cross-leaved milkwort, waterthread pondweed, bald rush, meadow beauty, toothcup, Hall’s bulrush, few-flowered nut-rush, tall nut-rush, Houghton’s goldenrod, yellow-ladies’-tresses, prairie dropseed

Table B-5. Standards and Guidelines Developed to Protect the Viability of Species or Natural Communities (Continued).

Standards and Guidelines	Species or Natural Communities
<ul style="list-style-type: none"> • Generally, new motorized trails will not be constructed in cedar swamps, hardwood conifer swamps and subirrigated forests. However, new motorized trails may be considered through cedar swamps, hardwood conifer swamps and subirrigated forests if there are no other reasonable routes. • Timber harvesting in cedar swamps is excluded except for: • limited salvage of non-living trees after a catastrophic event, and • single-tree, special products gathering administered under permit. • Maintain hardwood and hardwood/conifer swamps. • Minimize disturbance of the forest floor in swamps. • Equipment may be used within swamps and sub-irrigated forests. However, equipment should not be operated within these areas when soils are saturated or when rutting is likely to occur. • Temporary access routes for equipment use within swamps or sub-irrigated forests should be obliterated, stabilized, and restored to natural conditions immediately by using native vegetation appropriate to ecological land type phases. • Manage swamps and sub-irrigated forests with practices consistent with resource conditions and protect hydrologic function. 	<p>Cedar swamp, hardwood conifer swamp, subirrigated forest, ram’s-head lady-slipper, false-violet, lily-leaved twayblade, white adder’s-mouth</p>
<ul style="list-style-type: none"> • Swales¹ in oak and pine forests will be identified and protected through project level surveys. 	<p>Engelman’s spike-rush, three-ribbed spikerush, small headed rush, Vasey’s rush</p>
<ul style="list-style-type: none"> • Maintain a minimum of 60 percent canopy cover and do not allow mechanical disturbance within three tree-lengths of known occurrences of <i>Cynoglossum boreale</i>. • Prescribed fire in the understory that does not harm the overstory may not harm the species provided that it takes place before bolting in the spring or after fruit dispersal in the fall. 	<p>northern wild comfrey</p>
<ul style="list-style-type: none"> • Submit Black River potential Research Natural Area as a candidate Research Natural Area. 	<p>Wooded dune and swale, northern fir-moss, false-violet</p>

Table B-5. Standards and Guidelines Developed to Protect the Viability of Species or Natural Communities (Continued).

Standards and Guidelines	Species or Natural Communities
<ul style="list-style-type: none"> Management treatments in meadows with known occurrences of <i>Spiranthes ochroleuca</i> should not affect soil moisture or soil structure within approximately 66 feet of the known populations. If it is necessary to conduct maintenance activities to keep the community in a meadow stage, treatment should be done using handcutting or other non soil-disturbing management techniques. 	yellow lady's-tresses
<ul style="list-style-type: none"> Maintain a protection zone no greater than three tree-lengths around occurrences of <i>Pterospora andromedea</i>. 	pine-drops
<ul style="list-style-type: none"> Maintain or create small openings (less than one acre) in stands with known occurrences of <i>Botrychium rugulosum</i>. Maintain a protection zone of approximately 66 feet with no mechanical equipment use and minimal soil disturbance around all known occurrences of <i>B. rugulosum</i>. Hand cutting is permitted. 	ternate grape fern
<ul style="list-style-type: none"> Where populations of dry, open, sand Regional Forester's Sensitive Species are found, management activities will maintain habitat suitable for these species. If possible, when occurrences are found, expand suitable habitat into areas currently being managed for barrens or prairies. 	Leggett's pinweed, furrowed flax, Alleghany plum, false pennyroyal, bastard pennyroyal, Hill's thistle, sand grass
<ul style="list-style-type: none"> Increase habitat management to provide for viability of species in dry prairie settings (Sparta soils) up to historic conditions (not to exceed 1800 acres). 	Dry Sand Prairies

¹ Swale: a seasonally ponded, generally less than one-acre area, located in moderately to well-drained uplands.

Community Descriptions:

These descriptions rely heavily on descriptions established by Michigan Natural Features Inventory.

Coastal Plain Marsh:

Associated Species: Purple Spikerush, Engelmann's spikerush, Three-angle Spikerush, Umbrella-grass, Dwarf-bulrush, Gentian-leaved St. John's-wort, Short-fruited Rush, Vasey's rush, Leggett's Pinweed, Northern Appressed Clubmoss, Cross-leaved Milkwort, Waterthread Pondweed, Baldrush, Meadow-Beauty, Tooth-cup, Hall's Bulrush, Few-flowered Nut-rush and Tall Nut-rush

Description: A coastal plain marsh is a Great Lakes wetland plant community which contains a suite of species commonly found along the Atlantic coastline. Coastal plain marshes occur on sand deposits associated with postglacial lakes and outwash channels which occur in the southwestern portion of the Lower Peninsula in Michigan. This community is grass and rush dominated and is found on the shores of softwater seepage lakes, ponds or wet depressions, where water levels fluctuate seasonally and yearly. Water level fluctuation is critical for maintenance of the suite of coastal plain disjunct plant species found in this community.

Threats: This community is globally imperiled (G2) and state imperiled (S2). Threats include changes in hydrologic function; soil displacement, rutting and compaction from illegal Off-Highway Vehicle use; and fire suppression. Because water levels fluctuate from year to year, coastal plain marshes may be overlooked and/or impacted during temporarily dry conditions. Loss of any single coastal plain marsh may negatively impact population dynamics at other coastal plain marsh sites.

Intermittent Wetland:

Associated Species: Purple Spikerush, Three-angle Spikerush, Dwarf-bulrush, Short-fruited Rush, Vasey's rush, Northern Appressed Clubmoss, Baldrush and Tooth-cup

Description: An herbaceous or herb-shrub wetland found along lakeshores or in depressions which experiences fluctuating water levels seasonally and yearly. This community is similar in species composition to coastal plain marshes; however, it occurs further north and typically contains fewer Atlantic coastal plain disjunct species.

Threats: Intermittent Wetlands have a globally imperiled (G2) and state imperiled (S2) ranking. Threats are the same as those listed above for coastal plain marshes.

Mesic Sand Prairie:

Associated Species: Purple Milkweed, Canadian milkvetch and False Boneset

Description: This community consists of a mixture of species associated with upland and lowland relic prairies and savannahs. These mesic, native grasslands occur on level sandy glacial outwash with sandy loam to sandy soils and experience seasonally high water tables.

Threats: This is a globally imperiled (G2) and state critically imperiled (S1) community. The major threats are fire suppression, plowing or other major soil disruption, recreational vehicle use, including illegal off-highway usage, planting competing vegetation, invasive plants and inherent rarity.

Great Lakes Marsh:

Description: Great Lakes marshes occur along all of the Great Lakes, including Lakes Erie, Huron, Michigan, Ontario, St. Clair and Superior; they are also found along the connecting rivers, including Detroit, Niagara, St. Clair, St. Lawrence and St. Mary's. The historical distribution of Great Lakes marshes is likely similar to the current distribution with regional and local decreases caused by anthropogenic disturbance. This habitat can be found adjacent to the Great Lakes in locations sheltered from open water wave effects. Water levels are generally above the surface during the majority of the growing season to an average depth of up to approximately 6.5 feet.

Threats: This is a globally imperiled (G2) and state imperiled (S2) community. Great Lakes marshes are susceptible to hydrologic changes—water control structures—invasive species and recreational pressures and are at risk partially because of inherent rarity.

Northern Fen:

Description: A sedge-and rush-dominated community through which alkaline ground water flows. Additionally, this community frequently contains some acid-loving species, typically found on *sphagnum* hummocks.

Threats: This community has a state rank of rare/uncommon (S3). Threats include changes in hydrology including water pH, recreational vehicle use, including illegal off-highway usage, and invasive plants.

Poor Fen:

Description: A grass and sedge dominated community similar to the Northern Fen community but water that is lower in alkalinity; species composition is less rich and contains more bog species.

Threats: This community has a state rank of rare/uncommon (S3). Changes in hydrology including water pH, recreational vehicle use, including illegal off-highway usage, and invasive plants.

Southern Floodplain Forest:

Associated Species: Butternut and Bog Bluegrass

Description: This community is a deciduous forest on the floodplain of major streams or rivers. *Acer saccharinum* (silver maple), *Fraxinus pensylvanica* (green ash), *Quercus bicolor* (swamp white oak) and *Quercus macrocarpa* (bur oak) are fairly reliable indicator species for this community. *Acer rubrum* (red maple), *Fraxinus nigra* (black ash) and *Ulmus americana* (American elm) are common codominants, but are not good indicator species for the community.

Threats: This community has a state rank of rare/uncommon (S3). *Juglans cinerea* viability is threatened by a fungus, for which treatment may be beyond the scope of Forest management.

Cedar Swamp:

Associated Species: False Violet and White Adder's-mouth

Description: A minerotrophic forest dominated by *Thuja occidentalis* (northern white-cedar). These forests are often found adjacent to streams and lakes or in other nutrient-rich areas.

Threats: Deer browse and harvesting—opening of canopy, change in ground temperature, change in species composition and introduction of invasives.

Hardwood-Conifer Swamp:

Associated Species: False Violet and White Adder's-mouth

Description: A swamp dominated more by hardwood species than conifers. Sometimes found as a transitional community between a coniferous lowland and upland hardwoods, but also located in riparian habitats. Dominant species include *Fraxinus nigra* (black ash) and *Thuja occidentalis* (northern white-cedar). Other common tree species may include *Populus grandidentata* (big-tooth aspen), *Betula papyrifera* (paper birch) and *Acer rubrum* (red maple).

Threats: Alteration of hydrologic function, deer browse and harvesting—opening of canopy, change in ground temperature, change in species composition and introduction of invasives.

Subirrigated Forest:

Associated Species: False Violet and Purple Twayblade

Description: Hardwood or hardwood/conifer forests with a high water table that is at or near the surface seasonally.

Threats: Deer browse and harvesting—opening of canopy, change in ground temperature, change in species composition, introduction of invasives.

Interdunal Wetland:

Associated Species: Northern Appressed Clubmoss and Meadow-Beauty and Tooth-cup

Description: Wet depressions with fluctuating water tables located in open dunes. Communities are dominated by grasses, sedges and shrubs.

Threats: This is a globally very rare (G3?), state imperiled (S2) community. Threats include invasive species, recreational pressure, illegal Off-Highway Vehicle use and inherent rarity.

Great Lakes Barrens:

Description: A coniferous savannah of scattered and clumped trees, and often dense low or creeping shrub layer along the shores of the Great Lakes. Dominant canopy species are *Pinus strobus* (white pine), *P. resinosa* (red pine) and *P. banksiana* jack pine. A low shrub layer dominated chiefly by *Juniperus communis* is common.

Threats: This is a globally imperiled (G2), and state imperiled (S2) community. Threats include recreational pressure, invasive species, deer browse and inherent rarity.

Wooded Dune/Swale:

Associated Species: Fir Clubmoss and False Violet

Description: This community is found along Great Lakes shorelines and contains a complex of forest and wetland on alternating ridges and swales. The ridges are generally covered by upland forest species while the swales support northern wet meadow, cedar or conifer swamp species or bog vegetation.

Threats: This community has globally very rare (G3) and state rare/uncommon (S3) rankings. Major threats include timber harvesting, recreational pressure, invasive species and deer browse.

Dry Sand Prairie:

Associated Species: Western Silver Aster, Sideoats Grama, False Boneset, Leggett's Pinweed, Furrowed Flax, Hill's Thistle and Bastard Pennyroyal

Description: This habitat is a special site condition found within dry, level landscapes on outwash sands, sandy glacial lake plains and sandy areas in coarse-textured end moraines. Although this community is sometimes described more broadly, only those areas distinguished by true prairie soils—the Sparta Sand soil type—are included in this community description. Soils are principally loamy sand soils which are more strongly acid than is typical for this prairie soil in other states. As indicated by the high levels of organic material in the soil profile, these areas contain or once contained native grassland communities. Unplowed remnants are often found on slopes.

Threats: This community is ranked as state imperiled (S2) and has a global rank of imperiled/very rare (G2/G3). The main threats to this habitat are fire suppression, plowing or other major soil disruption, recreational vehicle use (including illegal off-highway usage), development, planting competing vegetation and invasive plants.

Species Viability Evaluations for Habitat Groups and Surrogate Species:

Finally, needs for the remaining habitat groups, focusing on the habitat requirements of the group's focal species, were evaluated and compared to the 1986 Forest Plan, as amended. The Species Viability Evaluations included an assessment of historic and current habitat conditions. Conservation recommendations were developed and proposed when the 1986 Forest Plan, as amended, conditions did not appear to provide for long-term species viability. Narratives documenting the evaluations and proposed conservation measures are found in the planning record.