

Appendix 2 – Biological Evaluation



**Biological Evaluation
for
Threatened, Endangered, and Sensitive Species
Threatened, Endangered, & Sensitive Species Amendment**

Green Mountain National Forest
Vermont

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Biological Evaluation for Threatened, Endangered, and Sensitive Species for the Threatened, Endangered, and Sensitive Species Amendment

Introduction

This Biological Evaluation (BE) is prepared in accordance with direction provided in Forest Service Manual (FSM) 2672.42 and Section 7 of the Endangered Species Act (ESA). The purpose of this document is to determine the effects of the proposed Threatened, Endangered, and Sensitive (TES) Species Amendment, and its alternatives, on federally listed threatened, endangered, and proposed species, and USDA Forest Service Regional Forester Sensitive Species (RFSS), within the Green Mountain National Forest (GMNF) of Vermont. The need for the TES Amendment was precipitated by two events: a Biological Opinion (BO) specific to Indiana bat issued by the U.S. Department of the Interior, Fish and Wildlife Service (FWS) that identified 17 specific actions (Terms and Conditions) the GMNF is required to implement to minimize the level of incidental take of the Indiana bat (USDI 2000); and an update of the RFSS list (USDA 2000a). The TES Amendment would update the GMNF Land and Resources Management Plan (Forest Plan) to incorporate new management guidance for the federally listed Indiana bat. The amendment also proposes to include new resource protection and monitoring objectives for RFSS, and to update the information regarding TES species in the Forest Plan.

This BE, therefore, will determine whether the proposed action or alternatives are likely to: (1) affect federally listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; (3) adversely modify proposed critical habitat; or (4) impact Region 9 sensitive species that may occur within the analysis area.

Project Description

A detailed account of the project description, purpose, and need for the TES Amendment is found in the Environmental Assessment (EA) for this project. In summary, new information in the form of FWS-issued Terms and Conditions for the Indiana bat needs to be incorporated into management direction supplied by the Forest Plan. In addition, the process for identifying and evaluating potential RFSS, as well as the RFSS list itself, was recently updated, requiring modification of existing management direction in the Forest Plan.

A total of 5 alternatives were developed as a result of issues raised by the public and National Environmental Policy Act (NEPA) requirements. As described in the following alternatives, the Forest proposes to incorporate changes and additions to appendix E, chapter 4 ("Forest-wide Standards and Guidelines", and "Resource Objectives"), and the monitoring sections (chapter 5 and appendix C) of the Forest Plan. Detailed descriptions are found in the EA and are summarized here:

Alternative 1: No Action Alternative

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. Under this alternative, no amendment would be made at this time, but would be available for consideration in the future. Only those goals, objectives, standards and guidelines currently in the Forest Plan would be used to guide management for Indiana bat and RFSS. The Terms and Conditions defined in the BO (USDI 2000) would not be included in the Forest Plan, and, therefore, would not be required. This alternative is presented purely to satisfy the NEPA requirement for a No Action alternative as a basis for comparison; as it violates the National Forest Management Act (NFMA) and the ESA, it would be illegal to implement.

Alternative 2: Proposed Action Alternative

This alternative incorporates the FWS-issued Terms and Conditions for the Indiana bat (USDI 2000) into the Forest Plan. It also reorganizes and clarifies TES information in the Forest Plan, and adds additional resource protection and monitoring objectives for Region 9 sensitive species.

Within chapter 4, Forest-wide Standards and Guidelines, the following standards and guides for compliance with the Indiana bat Terms and Conditions will be added (see the EA for exact location within the Forest Plan) or modified (additions are shown in bold italics; deletions are shown in bold strikethroughs):

- **Den Tree** - A live **or dead** tree ~~at least 15" dbh~~ of any diameter containing a natural cavity **or exfoliating bark** used by wildlife for nesting, brood rearing, hibernating, **roosting**, daily or seasonal shelter and escape ~~from predators~~.
- **All shagbark hickory trees will be reserved, unless they pose direct threat to human health and welfare.**
- **Reserve potentially suitable bat roosting trees; trees that exhibit exfoliating bark (e.g., shagbark hickory, trees with sloughing bark), either dead or alive and greater than 4" dbh.**
- **Protect all known Indiana bat roost trees on the GMNF until such time as they no longer serve as roost trees (e.g., loss of exfoliating bark or cavities, blown down or decayed).**
- **Protect 1/3 of all large diameter (≥ 12 inches dbh) post-harvest snags by retaining live residual trees adjacent to these snags. Such reserve trees shall be located in groups and along intermittent drainages to provide foraging corridors into harvested areas, and where available, shall be Class 1 or Class 2 trees (as identified by Romme *et al.* 1995), to other trees exhibiting or likely to develop characteristics preferred by Indiana bats (e.g., exfoliating bark). This standard applies to the non-hibernation period only, which is from May 15 through August 30, except near hibernacula where fall swarming may occur through September into October.**
- **In the event that it becomes absolutely necessary to remove a known Indiana bat roost tree, the FWS shall be consulted and such a removal will be scheduled during the hibernation season. Trees identified as immediate threats to public safety may be removed at any time following consultation with the FWS.**
- **Determine an area of influence for an occupied Indiana bat hibernaculum that is on or adjacent to lands managed by the GMNF. The area of influence will be an approximate five-mile radius centered on the hibernaculum unless it is determined, based on best science available, that a larger radius is necessary.**
- **In cooperation with the FWS and the Vermont Department of Fish & Wildlife, develop a management strategy on or before February 16 of 2002 that will minimize impacts on Indiana bats occurring on lands managed by the GMNF within the area of influence for all occupied Indiana bat hibernacula on or adjacent to the GMNF.**
- **Consider occupied Indiana bat hibernacula as smoke-sensitive areas when planning for prescribed burns to be conducted from October to May. If hibernacula are in the vicinity of the area proposed for burning, wind direction, speed, mixing height, and transport winds will be considered to minimize drifting in or near occupied hibernacula.**
- **Newly located bat hibernacula will be assessed for potential threats to bats utilizing respective sites. Each hibernaculum will have its own, specifically designed management plan developed and implemented to insure continued bat use and protection.**
- **If monitoring activities result in the discovery of maternity sites on the GMNF, roost trees used by a maternity colony will be protected by establishing a zone centered on the maternity roost site. The actual area will be determined by a combination of topography, known roost tree locations, proximity to permanent water and a site-specific evaluation of the habitat**

characteristics associated with the colony. Protective measures shall be established by developing a management strategy, in cooperation with the FWS and the Vermont Department of Fish & Wildlife, immediately upon discovery.

- If the Forest Service determines that activities on a project level are likely to adversely affect the Indiana bat, further consultation will be necessary.
- Formal consultation must be reinitiated if an individual project, or if the annual projected total of proposed projects, will result in exceeding the total of 300 acres annually affected by tree removal or disturbance during the non-hibernation season. However, site-specific projects proposed for the non-hibernation season may be surveyed for Indiana bat according to FWS protocols. If Indiana bats are not detected, it will be assumed that bats may be present in such low numbers that the project is not likely to adversely affect the Indiana bat. In this case, project acres will not be included in the annual allowable treatment of 300 acres.
- Design skid trails to avoid the need to fell suitable Indiana bat roost trees (as identified by Romme et al. 1995). This standard applies to the non-hibernation season only, which is from mid-May through the end of August, except near hibernacula (within approximately 5 mile radius) where fall swarming may occur through September into October.
- Prior to the employment of any prescribed fire, provide the FWS's New England Field Office with the opportunity to review burn plans that could potentially affect Indiana bats.
- The Forest Service and Fish & Wildlife Service recognize the limitations on available Indiana bat information. The following procedures, designed to promote both conservation and recovery, will serve to gather new information:
 1. Habitat use at all sites where Indiana bats are documented on the GMNF should be characterized and quantified at both the local and landscape levels.
 2. The Forest Service will provide the FWS with compliance reports indicating the project-specific conditions and an effects analysis for all projects that may affect the Indiana bat.
 3. Information about the number of acres of trees harvested during the non-hibernation season must be monitored on an annual basis and shall be provided to the New England Field Office of the FWS no later than April 1 following the previous year's activities.
 4. Care must be taken in handling dead specimens of listed species that are found in the project area to preserve biological material in the best possible condition. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure the evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the FWS to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective. Upon locating a dead, injured, or sick specimen of an endangered or threatened species, prompt notification must be made to the US Fish & Wildlife Service's Essex Junction Division of Law Enforcement, 11 Lincoln Street, Room 105, P.O. Box 649, Essex Junction, Vermont 05453 (telephone: 802-879-1859), or the Region 5 Division of Law Enforcement, 300 Westgate Center Drive, Hadley, Massachusetts 01035-9589 (telephone: 413-253-8343).

Within chapter 5 and appendix C, the following additions and modifications to monitoring requirements will be made to comply with the Indiana bat Terms and Conditions:

- In addition, the GMNF has included other monitoring to see if the anticipated future conditions actually occur, and to see how well our actions actually resolve the management problems outlined in Chapter III. We have listed the monitoring which we would like to accomplish, as well as the monitoring frequency, ~~and~~ expected reliability, **and the terms and conditions of the 2/16/00**

Biological Opinion from Fish & Wildlife Service, which requires monitoring for Indiana bat.
(Appendix C).

- **A plan delineating a monitoring protocol for Indiana bat should be developed in cooperation with the FWS and the Vermont Department of Fish & Wildlife and shall be completed on or before 2/16/02.**
- **Indiana bat monitoring will be designed to promote both conservation and recovery. It will occur annually, using nets, electronic detectors, and radio telemetry, to determine a) their presence or absence, b) their habitat use and movements during the non-hibernation season, c) the location of any potential maternity colonies, d) the major foraging areas used by male Indiana bats near occupied hibernacula during the non-hibernation season.**
- **The number of acres of trees harvested during the non-hibernation season must be monitored on an annual basis in order to comply with incidental take requirements.**

Due to changes in the identification and evaluation process for RFSS, the Forest Plan is out-of-date in regards to these species, and will be updated in the following ways:

- All general and species-specific management direction for RFSS and species of concern will be moved from appendix E into the “Forest-wide Standards & Guidelines” section of the Forest Plan (chapter 4). What will remain in appendix E will be information on the different protected classes.
- The Wildlife and Fish Standards and Guidelines structure in chapter 4 of the Forest Plan will be modified by creating three sections: Federally Listed Endangered, Threatened, and Proposed Species; Regional Forester’s Sensitive Species; and Forest Species of Concern, and by placing the direction for these species in the appropriate categories.
- Appendix E will be rewritten to clarify the distinctions between Federally listed species, RFSS, and Species of Concern, in terms of their respective designation authorities and associated program goals and responsibilities.
- Because of the dynamic nature of these various protected species lists, the proposed action will remove the lists of “Protected Species” in the Forest Plan (Tables E.01 and E.02). Language will be added to the Forest Plan stating that the lists of federally endangered, threatened, proposed, sensitive, and special concern species will be updated periodically, and will be available on the Region’s and GMNF’s website, at GMNF offices, and will be included in our annual monitoring report.
- The proposal updates the list of Species of Concern, removing species where there is clear evidence that such species are not known or likely to exist on the Forest, nor appear to have suitable habitat. The proposal eliminates the Species of Uncertain Occurrence list from appendix E, and replaces it with the following standard and guideline in chapter 4:
 - **Species of concern to us may not presently be known to occur on the National Forest. If these species are encountered, they will be treated according to our general standards and guidelines for sensitive species until the evaluation process for inclusion into the Regional Forester’s Sensitive Species list is complete.**
- “Resource Output Objectives” and “Activities and Outputs to be Monitored” (USDA 1987, chap. 4, sec. D; app. C) regarding RFSS will be modified to reflect more accurate and realistic expectations; this has been a recommendation in past monitoring reports, and will improve our accountability to the public regarding our responsibilities towards RFSS.

The following items will be added under the “Resource Protection Objectives” to replace those under T E & S Species (USDA 1987, Table 4.1):

Result	Expected Amount
Threatened, Endangered & Sensitive Species	
Inventory in potential habitat	2,500 acres/year
New occurrences found	Unknown # of occurrences
Biological evaluations prepared	Unknown # of evaluations
Protection through project mitigation	Unknown # occurrences
Conservation Assessments completed	1 species or group/year
Conservation Agreements signed	Unknown # of species

The following items will be added to the table in appendix C, under Management Problem #3, Wildlife Habitats, page C.07:

Management Problem	Purpose of Monitoring	Item Monitored	Unit of Measure	Frequency of Measure	Expected Precision	Expected Reliability
	Determine population trends of RFSS to evaluate persistence	Plant Population	Population	Every 5 years, unless species strategy dictates a different schedule	High	Moderate
		Peregrine falcon	Habitat & Population	Annual	High	High
		Bicknell’s thrush	Habitat & Population	Annual	Moderate	High
		Common loon	Habitat & Population	Annual	High	High
		Woodland bats	See Indiana bat	See Indiana bat	See Indiana bat	See Indiana bat
		Animals of Stream, Pond, and Pool Habitat	Habitat	Annual	Moderate	High
	Determine status of RFSS and species of viability concern	RFSS & additional species of viability concern	Updated list	Annual	High	Moderate

Alternative 3: Proposed Action with Conservation Measures

In addition to the Proposed Action described above, this alternative includes additional conservation measures found in the draft Indiana Bat Recovery Plan (USDI 1996) that would benefit Indiana bat habitat and habitats for other woodland bat species. These measures would also increase monitoring for bats and bat habitat. In addition we would increase our Education and Outreach efforts related to Indiana bat conservation. Alternative 3 would include the following:

- Retain 5 trees of suitable roosting quality per acre harvested defined as: hard snags over 9” DBH, live trees with exfoliating bark, den trees (>15” DBH with cavity opening), yellow birch and red

maple >26" DBH considered "cull" or unacceptable growing stock. When possible configure trees with roosting qualities in clumps along the edges of openings or riparian corridors. (See Recovery Plan task 3.3)

- Conduct monitoring that will aid in the recovery of the Indiana bat, in addition to that required for minimization of harm. (See Recovery Plan tasks 1.3, 3.3)
- In cooperation with the FWS and the Vermont Department of Fish & Wildlife, develop a plan to assess the number of suitable roost trees and the amount of preferred foraging habitat available to the species. Monitoring efforts should be centered within five miles of all known occupied Indiana bat hibernacula, within $\frac{3}{4}$ miles of any Indiana bat maternity colony or roost tree used by a male Indiana bat, and at selected sites (pre- and post-harvest). (See Recovery Plan task 1.3)
- Provide training for appropriate GMNF employees on bats (including the Indiana bat) occurring on the GMNF. Training should include bat identification, biology, habitat requirements, and sampling techniques (including instructions on applicability and effectiveness of using mist net surveys vs. Anabat detectors to accurately determine the presence of various bat species). The proper training of GMNF biologists on bat identification and reliable methods for counting roosting bats will enable the Forest Service to monitor the status of the species. (See Recovery Plan task 4.1)
- Develop an outreach program specifically directed towards northeastern woodland bat species and their conservation needs. The program might include the development of a slide show, interactive display, and presentations or activities suitable for all ages of the public. (See Recovery Plan task 4.1)

In addition to the new monitoring items in appendix C identified in the Proposed Action, an item will be added that identifies the need to assess number of suitable roost trees and available foraging habitat. This alternative retains the Proposed Action for RFSS changes and Forest Plan clarification.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative removes the need for terms and conditions related to summer timber harvesting by discontinuing timber harvesting during the non-hibernation period (May 15 through August 30), with the exception that the no harvesting period would be longer if harvesting were to occur near hibernacula. In this case, the no harvesting period would extend through the month of October. It should be noted that under standard operating procedures, timber harvesting does not occur during the months of April through July 15, as well as from October through mid November, so as to avoid soil erosion concerns associated with wet ground conditions. Therefore, the total decrease of warm weather harvest opportunities would amount to 6-10 weeks.

This alternative retains the Proposed Action for RFSS changes and Forest Plan clarification.

Alternative 5: Proposed Action, Conservation Measures, and No Summer Timber Harvesting

Standards and Guidelines and General Direction would be as described in Alternatives 3 and 4. This alternative is similar to Alternative 4 in terms of replacing some Terms and Conditions with no summer logging, but it also includes Alternative 3's additional direction to increase available Indiana bat habitat and provide environmental education opportunities.

This alternative retains the Proposed Action for RFSS changes and Forest Plan clarification.

Determination of Species and Habitat Presence

Federally Listed and Proposed Threatened and Endangered Species

Table 1 identifies the federally endangered, threatened, and proposed species associated with the GMNF, their habitat requirements, and present or historic occurrences. Recent review, through the preparation of a programmatic Biological Assessment (BA) of ongoing activities resulting from the continued implementation of the GMNF Forest Plan, determined the potential effects to federally listed and proposed threatened or endangered species and their critical habitat that may occur, as well as what listed species may be present. These findings were reviewed by the FWS and a subsequent BO was issued (USDI 2000).

Table 1. – Review of federally endangered, threatened, and proposed species for the GMNF.

Species	Habitat Requirements	Occurrences (present or historic)
Bald eagle <i>Haliaeetus leucocephalus</i>	Nests in tall trees or on cliffs near large rivers or lakes.	Not known to nest in Vermont or the GMNF. Known to migrate through the Forest.
Gray wolf <i>Canis lupus</i>	Requires large tracts of wild lands in coniferous and mixed northern hardwoods/coniferous forests that have suitable numbers of available wild prey and low human densities.	Extirpated in the Northeast. Not known to be present on the GMNF or in Vermont.
Eastern cougar <i>Felis concolor cougar</i>	Requires large, remote hardwood or mixed forests with an availability of wild prey.	Recently documented in northern Vermont in Orleans County and other non-confirmed sightings in other parts of the State. Not known to be present on the GMNF.
Canada lynx <i>Lynx canadensis</i>	Requires boreal (coniferous) forest and good snowshoe hare habitat.	There are no known occurrences currently in Vermont or on the Forest, although known historically from the Forest.
Indiana bat <i>Myotis sodalis</i>	For winter habitat, this bat hibernates in limestone caves or mines. For summer habitat, it roosts in trees with cavities or exfoliating bark. Riparian areas provide important foraging habitat and travel corridors. Recent evidence indicates that reproductive females are not restricted to riparian areas, either to forage or to roost (Tyrell and Brack 1990).	There is little known about what habitats Indiana bats utilize in Vermont during the summer. Two old mines in eastern New York support large numbers of Indiana bats during hibernation but little is known about where these bats reside in the summer.

The FWS determined that the Gray wolf is not present on the GMNF, having been extirpated from New England. The Canada lynx is considered extirpated from the GMNF and Vermont. The Eastern cougar is considered extirpated from the GMNF, while historic in Vermont. The bald eagle may pass over the GMNF but is not known to nest, forage, or roost overnight on the Forest. For these reasons, the GMNF concluded and the FWS concurred that there would be no effect to these species from implementation of the Forest Plan. As the GMNF and FWS concluded that a “no effect” conclusion was not possible for Indiana bat, which precipitated the need for the proposed amendment, this BE will further address the effects of this amendment and its alternatives on Indiana bat in the Analysis of Effects section.

Since the findings of the BA and concurrence in the FWS BO, changes have occurred in federal listings. These include the delisting of the peregrine falcon and the listing of the Canada lynx as threatened. The

listing of the Canada lynx does not change the original BO as the lynx is still considered extirpated from Vermont and, in addition, the habitat available on the Forest for lynx was considered unsuitable (Burbank 2000). Peregrine falcon will be discussed further under sensitive species. Consequently, we have determined that the original “no effect” determination, contained within the BO, applies to this Forest Plan amendment for Bald eagle, Gray wolf, Eastern cougar, and Canada lynx, regardless of the alternative selected. No further discussion for these species is necessary.

Regional Forester’s Sensitive Species

Table 2 identifies the current RFSS for the GMNF, including habitat requirements and present or historic occurrences (USDA 2000a). The RFSS list is designed to identify species for which population viability is a concern, so that management action may be taken to ensure these species do not become threatened or endangered because of Forest Service actions, and to ensure that “viable populations of these species are maintained in habitats distributed throughout their geographic range on National Forest System lands.” (FSM 2670.22). The list was recently updated, following the process detailed in a supplement to FSM 2670 (Amendment 2600-2000-1).

Recent review, through the preparation of a programmatic Biological Evaluation of ongoing activities resulting from the continued implementation of the GMNF Forest Plan, determined the potential effects to RFSS that may occur, as well as what RFSS are known to or likely to be present (USDA 2000c). This programmatic BE identified a list of RFSS not known or likely to occur in the GMNF, and determined that implementation of the LRMP would have no impact on these species. Such rationale is still valid in the case of this particular amendment, as there is no new information regarding these species to suggest that changes to the Forest Plan would have any unanticipated impact. Consequently, these species are dismissed from further consideration in this BE.

This programmatic BE also identified a list of RFSS that are known or likely to occur in the GMNF, but which were not listed as sensitive for the GMNF. These species were not listed because “either (a) their populations and/or habitat appeared to be viable and sustainable on the National Forest in the context of the Forest Plan, or (b) they were represented by either very old or unverified historic records or did not appear to have suitable habitat on or near NFS lands within the GMNF proclamation boundary. In addition, other state agencies (e.g. VNNHP, VT DFW) or knowledgeable individuals did not consider these species to be at risk within the GMNF.” (USDA 2000c) This programmatic BE determined that while actions implementing the Forest Plan may impact individuals, they would not lead to loss of viability or trend towards federal listing, due to either the common distribution of the species or the lack of occurrences and suitable habitat within the management influence of the current NFS lands of the GMNF. Such rationale is still valid in the case of this particular amendment, as there is no new information regarding these species to suggest that changes to the Forest Plan would have any unanticipated impact. Consequently, these species will not be considered further in this evaluation because extant populations or suitable habitat does not occur within the influence of GMNF management, or their populations do not appear at this time to be at risk of loss of viability or a trend towards federal listing.

In addition to the species identified in Table 2, Table E.01 and E.02 of the Forest Plan lists “protected species” for the GMNF, seven of which are identified as “Recommended Sensitive Species”. These species are: Canada lynx (*Lynx canadensis*); Eastern small-footed bat (*Myotis leibii*); Long-tailed shrew (*Sorex dispar*); New England cottontail (*Sylvilagus transitionalis*); Common loon (*Gavia immer*), Loggerhead shrike (*Lanius ludovicianus*), and Eastern jacob’s ladder (*Polemonium vanbruntiae*). Of those species identified as “recommended sensitive”, Canada lynx has been federally listed as threatened and is discussed in the previous section; Eastern small-footed bat, Common loon, and Eastern jacob’s ladder are on the recently updated RFSS list; and Long-tail shrew, New England cottontail, and Loggerhead shrike are no longer considered Region 9 sensitive species due to lack of known occurrences on the GMNF. The determination in the programmatic BE for these three species indicated that there would be no impact from Forest Plan implementation, as these species do not occur and are not likely to occur (USDA 2000c). Although the proposed action adds a standard and guideline that protects species found but not previously known to occur on the Forest until evaluation for RFSS designation is complete, this proposal does not change the current condition of the habitat for or

occurrences of these species, and so does not change the determination in the programmatic BE. Consequently, these species will not be considered further in this evaluation.

As all of the current GMNF's Region 9 sensitive species (Table 2) are known to occur on the Forest, they have the potential to be affected by the proposed TES Amendment or alternatives. Consequently, all of these species will be carried forward into the Analysis of Effects section of the BE.

Table 2. – Review of Regional Forester's Sensitive Species for the GMNF.

Species	Habitat Requirements	Occurrences (present or historic)
<u>BIRDS</u>		
Peregrine falcon* <i>Falco peregrinus anatum</i>	Requires high cliffs with clear views of surrounding areas for nesting. Can also be found nesting on buildings, bridges, or the ground.	Known from cliff sites on the Forest in Addison and Rutland Counties. Historic occurrence on other cliff sites within the Forest is known.
Bicknell's thrush <i>Catharus bicknellii</i>	Coniferous forests above 3000 feet; spruce-fir krummholtz.	Known from Forest in Addison, Bennington, and Windham counties at high elevations.
Common loon* <i>Gavia immer</i>	Lakes and ponds at least ¼ mile long; nests on water's edge; requires adequate prey base of small fish, amphibians to feed young.	Known to nest within GMNF (Somerset Reservoir, Wallingford Pond, Bourn Pond), and to utilize other GMNF lakes (Branch Pond, Grout Pond)
<u>MAMMALS</u>		
Eastern small-footed bat* <i>Myotis leibii</i>	Requires caves, old buildings, mines, rock crevices, and possibly hollow trees for roost sites. Will use aspen, softwood, pine, upland openings, and wetlands, usually up to 2,000' elevation.	Known from the only hibernaculum on the Forest in Windsor County in the town of Stockbridge. Summer habitat is poorly understood.
<u>AMPHIBIANS</u>		
Jefferson salamander <i>Ambystoma jeffersonianum</i>	Apparently restricted to vernal pools below 1200' elevation. Hides in rodent burrows and beneath leaf litter, logs, and other surface objects. Hibernates underground or in rotting logs.	Known to occur within GMNF boundary; occurrence on NFS ownership is very limited.
<u>REPTILES</u>		
Wood turtle <i>Clemmys insculpta</i>	Lives along permanent streams during much of each year, but in summer may roam widely overland and can be found in a variety of terrestrial habitats adjacent to streams, from deciduous woods, cultivated fields, and woodland bogs, to marshy pastures. Use of woodland bogs and marshy fields is most common in the northern part of the range.	Known to occur within GMNF boundary
<u>MOLLUSKS</u>		
Brook floater <i>Alasmidonta varicosa</i>	Requires firmly packed sand and gravel stream bottoms of small rivers and streams. .	Known from the West River in Windham County along the proclamation boundary of the Forest

Species	Habitat Requirements	Occurrences (present or historic)
Creek heelsplitter <i>Lasmigona compressa</i>	Stream bottoms. The host fish species for the creek heelsplitter is not known.	Known to occur in Otter Creek, nearly to the headwaters in Mt. Tabor.
<u>INSECTS</u>		
Black-tipped darner <i>Aeshna tuberculifera</i>	A large aeshnid inhabiting small upland ponds, which support extensive stands of aquatic vegetation, the larvae clinging to submerged cattails and other aquatic vegetation. Adults are brown with lime green lateral thoracic stripes. Males are normally found patrolling near shore at 1-2 feet above the water.	Known from Lost Pond, Manchester District of the GMNF.
Green-striped darner <i>Aeshna verticalis</i>	A large aeshnid, inhabiting marshy ponds, the larvae clinging to sedges and other aquatic vegetation. Adults are very similar to the much more common <i>A. canadensis</i> , from which it can be distinguished by a browner abdomen and less constricted lateral thoracic stripes. Males often fly from 2-10 feet over marshes. This species is the wariest of the aeshnas.	Known from Grout Pond, Manchester District of the GMNF.
Lilypad clubtail <i>Arigomphus furcifer</i>	A medium-sized gomphid inhabiting lily ponds typically within 200 km north of the eastern glacial terminus front, from Iowa to New Hampshire. The larvae burrow relatively deeply into the soft mud of bogs, ponds, and lacustrine bays. Adults are distinguished from related species by the extensive green markings on the front of the thorax and the grayish blue eyes.	Known from Lost Pond, Manchester District of the GMNF.
Superb jewelwing <i>Calopteryx amata</i>	Large damselflies inhabiting fast-flowing mountain rivers and streams. The light brown wing apices and elongate metallic green bodies distinguish adults.	Known for the Deerfield River and from Stamford Stream, Manchester District of the GMNF.
Cobblestone tiger beetle <i>Cicindela marginipennis</i>	Inhabits cobble areas along river shores, but primary habitat is cobble islands. Plants associated with this species are <i>Salix</i> spp., <i>Apocynum</i> spp., and occasionally <i>Prunus pumila</i> . In NH and VT, it is found on islands large enough to support full sized trees.	Known from the Connecticut River. Not within GMNF proclamation boundary
Harpoon clubtail <i>Gomphus</i> [= <i>Phanogomphus</i>] <i>descriptus</i>	A medium-sized gomphid inhabiting streams and small rivers, larvae burrowing in the soft mud of pool areas. Adults are distinguished from related species by the narrow bright green markings on the front of the thorax. Males typically perch on streamside vegetation along riffle areas.	Known from the Deerfield River, Manchester District of the GMNF.
Mustached clubtail <i>Gomphus adelphus</i>	A species having a general Appalachian distribution.	Known from the Deerfield River, Manchester District of the GMNF.

Species	Habitat Requirements	Occurrences (present or historic)
Southern pygmy clubtail <i>Lanthus vernalis</i>	A small gomphid inhabiting tiny, mud-bottomed, spring-fed streams; the larvae burrowing in the fine silt of pool areas. Adults are distinguished from related species by the thorax laterally light green with a narrow black line. This gomphid is almost exclusively found in association with populations of native brook trout (<i>Salvelinus fontinalis</i>).	Known from Bourn Brook, Manchester District of the GMNF.
Amber-winged spreadwing <i>Lestes eurinus</i>	A large lestid, which inhabits the shrubby borders of bog ponds. Their tinted wings distinguish adults. Although widespread in eastern North America this species is very local in occurrence.	Known from 4 ponds of the Manchester District of the GMNF – Beebe, Lost, Moses and Mud.
Maine snaketail <i>Ophiogomphus</i> [= <i>Ophionurus</i>] <i>mainensis</i>	A medium-sized gomphid inhabiting streams and sometimes rivers; larvae burrow into the sand and gravel between cobble sized rocks. Adult males are distinguished by the large lateral spines of the epiproct, and the female by large anteriorly directed occipital horns. Males are typically found perching on rocks in midstream; they are usually more abundant at streamside near dusk. New populations should be looked for downstream from known <i>Lanthus</i> populations. This species also seems to prefer streams, which drain ponds or small lakes.	Known from the Deerfield River, Manchester District of the GMNF.
Ski-tailed emerald <i>Somatochlora elongata</i>	One of the large holarctic <i>Somatochlora</i> genera.	Known from three locations of the Manchester District of the GMNF – Griffith Lake, Mud Pond and Stamford Stream.
Forcinate emerald <i>Somatochlora forcipata</i>	A medium-sized corduline, which inhabits small bog streams. Adult males can be distinguished by the forcinate terminalia. Males are easily discovered while flying along small streams or over nearby dirt roads.	Known from two locations of the Manchester District of the GMNF – Grout Pond seepage, and a wetland near Lost Pond shelter.
Ocellated emerald <i>Somatochlora minor</i>	A small corduline inhabiting small slow flowing streams. The paired white circular spots on the sides of the thorax distinguish adults. Males are easily discovered while patrolling at about 1 foot above slow flowing streams.	Known from two locations of the Manchester District of the GMNF – two small streams south of Griffith Lake.
PLANTS		
<i>Agrostis mertensii</i> Arctic bentgrass	Alpine meadows on mountaintops in northern Green Mountains.	Known on Forest only from Lincoln.
<i>Aureolaria pedicularia</i>* Fernleaf yellow false-foxtail	Dry hills, woodland character – oaks in southern VT.	Known on Forest only from Salisbury.

Species	Habitat Requirements	Occurrences (present or historic)
<i>Blephilia hirsuta</i> Hairy woodmint	Rich woodland seeps; two of the three extant populations are associated with trailside seepy areas; often hidden under <i>Laportea</i> (nettles); associated with limy soils up to 2500' elevation.	Known in VT only from Forest, in Leicester, Goshen, and Chittenden.
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i> New England northern reed grass	Wet, seepy, limy cliffs, low elevation to subalpine in Green Mountains; possibly limy wetlands at base of limy cliff.	Known on Forest only from Salisbury.
<i>Cardamine parviflora</i> Small-flower bitter-cress	Dry, rocky, sometimes calcareous places at low-mid altitudes.	Known on Forest only from Rochester/Goshen.
<i>Carex aestivalis</i> Summer sedge	Rich-mesic rocky woods, mid-elevations in southern VT.	Known on Forest only from Woodford and Danby.
<i>Carex aquatilis</i> Water sedge	Bogs, fens, wet meadows, pond margins throughout VT.	Known on Forest from Wallingford, Woodford, and Stamford.
<i>Carex argyrantha</i> Hay sedge	Limy cliffs and ledges in western VT.	Known on Forest only from Salisbury.
<i>Carex atlantica</i> Prickly bog sedge	Scattered bogs, wet meadows, and pond margins of VT.	Known on Forest only from Sunderland.
<i>Carex bigelowii</i> Bigelow sedge	Alpine meadows of Green Mountains.	Known on Forest only from Lincoln.
<i>Carex foenea</i> (= <i>aenea</i>) Bronze sedge	Clearings, dry rocks of southern VT (<i>aenea</i>); open sands of western VT (<i>foenea</i>).	Known on Forest only from Salisbury.
<i>Carex lenticularis</i> Shore sedge	Wetlands, shallow marshes, pond margins.	Known on Forest from Danby, Wilmington, and Stamford.
<i>Carex michauxiana</i> Michaux sedge	Shallow and deep marshes associated with high elevation softwater ponds in southern Green Mountains.	Only known occurrences in VT on Forest, in Mount Tabor, Wallingford, Ripton.
<i>Carex schweinitzii</i> Schweinitz's sedge	Calcareous swamps, wet meadows, low woods, wet ditches; Vermont Valley and Taconics.	Not known from Forest, but occurs within the GMNF Proclamation Boundary.
<i>Carex scirpoidea</i>* Bulrush sedge	High elevation calcareous cliffs scattered throughout VT.	Known on Forest only from Rochester/Goshen
<i>Clematis occidentalis</i> var. <i>occidentalis</i> (= <i>verticillaris</i>) Purple clematis	Dry limy woodlands with thin soil or exposed limestone ledges, generally in moderate or full sun, usually in oak woods, generally in western VT.	Known on Forest only from Hancock, historically from Salisbury/Ripton.
<i>Collinsonia canadensis</i> Canadian horsebalm	Rich mesic woods, generally low elevation and southern VT.	Known on Forest only from Bristol.
<i>Conopholis americana</i> Squaw-root	Dry open woods (dry oak-pine, and dry oak-red maple) in southern and western VT.	Known on Forest only from Salisbury and Leicester.
<i>Cryptogramma stelleri</i> Steller's cliffbrake	Shaded cold damp crevices of calcareous cliffs and rocks (limestone or limy schist) scattered throughout VT.	Known on Forest only from Hancock and Mt. Tabor; historic from Dover, Salisbury, Chittenden, and Granville.
<i>Cypripedium parviflorum</i> var. <i>parviflorum</i> Small yellow ladyslipper	Limy swamps with conifers, mostly Champlain Valley and southwestern VT.	Known on Forest only from Goshen.

Species	Habitat Requirements	Occurrences (present or historic)
<i>Cyripedium parviflorum</i> var. <i>pubescens</i>* Large yellow ladyslipper	Fertile, limy woods with rich, moist soil, under maples, mostly Champlain Valley and southwestern VT.	Known on Forest only from Salisbury.
<i>Cyripedium reginae</i>* Showy ladyslipper	Limy wetlands with conifers, including limy sphagnum bogs and fens, limy wooded conifer swamps, and limy shrub thickets adjacent to wooded swamps; low elevations, generally the big valleys (Champlain, Vermont, Connecticut) in VT.	Known on Forest only from Goshen, historic from Hancock.
<i>Desmodium paniculatum</i> Paniculate tick-trefoil	In VT, associated with dry, low altitude, open woods and woodlands, sometimes oak woods, in VT on limestone or limy schists; generally Champlain Valley in VT.	Known on Forest only from Salisbury, historic also from another site in Salisbury.
<i>Draba arabisans</i> Rock whitlow-grass	Cold limestone cliffs, often moist, in full sun or partial shade, in Vermont associated with Champlain Valley and other limestone areas.	Known on Forest only from Salisbury, also historic there.
<i>Dryopteris filix-mas</i> Male fern	Rich, cool woodlands over calcareous bedrock or other limy substrate, mostly between 1300-2300' elevation; in VT seemingly restricted to an area from Brandon to Woodstock.	Known on Forest (AT Corridor) only from Pomfret and Bridgewater.
<i>Eleocharis intermedia</i>* Matted spikerush	Muddy shores of ponds, scattered throughout VT, although only in circumneutral substrates on Forest.	Known on Forest only from Ripton and Wallingford.
<i>Eupatorium purpureum</i> Sweet joe-pye-weed	Limy, moist woods in central and western VT.	Known on Forest only from Salisbury.
<i>Geum laciniatum</i> Rough avens	Rivershores, damp places, in western VT and tends to be in limy areas; associated with <i>Polemonium vanbruntiae</i> .	Known on Forest only from Ripton.
<i>Isoetes tuckermanii</i> Tuckerman's quillwort	Shallow waters on sandy shores of softwater ponds, mostly southern Green Mountains.	Known on Forest only from Wallingford, historic from Stratton and Wilmington.
<i>Isotria verticillata</i> Large whorled pogonia	Acidic, open woods at low elevation in western VT, generally in oak-hardwood forests on escarpment.	Known on Forest only from Salisbury and Leicester.
<i>Juglans cinerea</i> Butternut	Well-drained, circumneutral, gravelly soils in coves, stream benches, terraces, and talus of rock ledges; sometimes dry soil of limestone origin; generally riparian and below 1500'.	Several current sites on Forest.
<i>Juncus trifidus</i>* Highland rush	Alpine tundra and subalpine cliffs, limited to isolated sites in Green Mountains in VT.	Known on Forest only from Goshen/Rochester.
<i>Lespedeza hirta</i> Hairy bush-clover	Dry open woodlands and openings, in southern and western VT.	Known on Forest only from Salisbury.
<i>Listera auriculata</i> Auricled twayblade	Moist, sandy soils along streams with alder, or circumneutral mucky seeps.	Extant only from Warren off-Forest; historic from Hancock and Sunderland.
<i>Littorella uniflora</i>* American shore-grass	Shores or shallow water of ponds, both soft and moderately hard water, scattered in VT.	Known on Forest only from Wallingford and Mt. Tabor/Peru.

Species	Habitat Requirements	Occurrences (present or historic)
<i>Muhlenbergia uniflora</i> Fall dropseed muhly	Wet meadows and shores; assumed to be more common, but poorly documented, in VT;	Known on Forest only from Stratton, historic from Ripton.
<i>Myriophyllum farwellii</i> Farwell's water-milfoil	Softwater ponds, bog ponds, and slow streams, often at high elevations, southern and northern Green Mtns. (not central).	Unconfirmed from Wallingford on Forest, and historic from Wallingford.
<i>Myriophyllum humile</i>* Low water-milfoil	Mudflats of softwater ponds, bog ponds, southern Green Mountains.	Known on Forest only from Stratton, unconfirmed from Wallingford, on private within Forest in Woodford.
<i>Panax quinquefolius</i>* Ginseng	Rich maple woods and coves: sheltered limestone soils with much humus, moist and in deep shade, scattered in VT.	Known on Forest from 9 stations.
<i>Pellaea atropurpurea</i> Purple-stemmed cliffbrake	Limestone outcrops (often sunny but occasionally in woodlands), generally west of Greens in VT.	Known on Forest only from Salisbury.
<i>Peltandra virginica</i> Green arrow-arum	Shallow water, mud in bogs or lakeshores, in southern and western VT.	Known from Forest only from Woodford/Stamford.
<i>Phegopteris hexagonoptera</i> Broad beech fern	Warm, rich maple or maple-oak woods, generally light, moist soils, on limestone, western VT and lower CT River Valley.	Known on Forest only from Leicester; historic from Salisbury.
<i>Platanthera orbiculata</i> Round-leaved orchis	Either fertile oak woods, usually limy, dry, and low elevation, OR boreal conifer woods, generally moist and mossy, up into subalpine, scattered in VT.	Known on Forest only in Granville and Leicester, with several Forest historic sites.
<i>Polemonium vanbruntiae</i>* Eastern jacob's ladder	Wetlands and seeps, between 350'-1800' elevation; natural seeps with circumneutral muck over sandy sediments;	Extant (and extensive) on Forest only in Ripton, Lincoln.
<i>Potamogeton biculpatus</i>* Snail-seed pondweed	Acid waters, southern VT.	Known on Forest only from Stratton, also in Proclamation Boundary in Jamaica.
<i>Potamogeton confervoides</i>* Tuckerman's pondweed	Shallow water of isolated soft-water lakes, ponds, or shallow depressions.	Known from 7 ponds in Manchester District.
<i>Potamogeton hillii</i> Hill's pondweed	Small, cold, slow, highly alkaline streams and occasionally ponds; in association with limy bedrock, primarily Vermont Valley and Taconics.	Not known from Forest, but occurs within the GMNF Proclamation Boundary.
<i>Prenanthes trifoliolata</i> Three-leaved rattlesnake-root	Cliffs, open woods.	Only extant on Forest and in VT from one site in Salisbury.
<i>Pyrola chlorantha</i> (= <i>virens</i>) Green pyrola	Limy woods, moderate elevations, and limy swamps at lower elevations, scattered in VT.	Known on Forest only from Leicester.
<i>Ribes triste</i> Wild red currant	Limy softwood swamps, and subalpine woods and ravines, especially on lime, scattered in VT.	Known on Forest only from Goshen, historic from Wilmington, Mt. Tabor, and Stratton.
<i>Saxifraga paniculata</i> (= <i>aizoon</i>) White mountain saxifrage	Cold, high elevation limestone cliffs, only 5 isolated sites in VT.	Known on Forest only from Rochester/Goshen.

Species	Habitat Requirements	Occurrences (present or historic)
<i>Scheuchzeria palustris</i> ssp. <i>americana</i>* Pod-grass	Sphagnum bogs and boggy margins of ponds, often limy, primarily southern and western VT.	Known on Forest only from Winhall, several historic from Wallingford and Sunderland.
<i>Scirpus subterminalis</i> Incomplete bulrush	Softwater ponds and sphagnum bogs, to moderate elevations, scattered in VT;	Known on Forest only from Mt. Tabor/Peru, Jamaica within Proclamation Boundary, and historic from Stratton.
<i>Sedum rosea</i>* Roseroot stonecrop	Subalpine limestone cliffs and rocks, exposed or shaded, often wet.	Only known from two sites in VT, one on Forest in Rochester/Goshen.
<i>Selaginella rupestris</i> Rock spikemoss	Dry, warm rocks, usually schist or quartzite, occasionally lime, in full sun or partial shade, generally low elevations in oak zone; mostly Champlain and lower CT River Valleys.	Known on Forest only from Wallingford, unconfirmed from Bristol, and historic from Salisbury.
<i>Sisyrinchium angustifolium</i>* Narrow blue-eyed grass	Wet meadows, low woods and thickets, damp shores, scattered in VT.	Known on Forest only from Lincoln.
<i>Sisyrinchium atlanticum</i>* Eastern blue-eyed grass	Meadows (damp or dry), swales, marshes, low woods, historic in southern VT; may be overlooked.	Only extant station in VT is on Forest in Hancock, historic in Stratton.
<i>Solidago squarrosa</i> Stout goldenrod	Open to partial shade (e.g. woodlands), dry soil, convex landforms, or outcrops of weathered, disintegrating rocks (e.g. slates, sandstones, granites), scattered in VT.	Known on Forest only from Rochester/Goshen.
<i>Sorbus decora</i> Northern mountain-ash	Subalpine woods, often with lime, generally in Green Mtns in VT.	Known on Forest from Rochester/Goshen, Lincoln, Sherburne, and Mendon.
<i>Sparganium fluctuans</i>* Floating bur-reed	Tannic water ponds scattered in VT.	Known on Forest from sites in Wallingford, Mt. Tabor, Weston, Peru, Sunderland, unconfirmed at Stamford and Woodford.
<i>Torreyochloa pallida</i> (=<i>Glyceria fernaldii</i>) Fernald alkali grass	Pools, marshes bordering streams, floating bog mats on softwater ponds, scattered in VT.	Known on Forest only from Ripton and Sunderland.
<i>Utricularia geminiscapa</i>* Hidden-fruited bladderwort	Softwater ponds, in Green Mountains.	Known on Forest from Sunderland, Winhall, within Proclamation Boundary in Woodford, Searsburg.
<i>Utricularia resupinata</i>* Northeastern bladderwort	Sandy, muddy, or peaty shores of mountain softwater ponds; scattered in VT.	Known on Forest only from Stratton, historic from Jamaica
<i>Uvularia perfoliata</i> Perfoliate bellwort	Rich, dry, calcareous woodlands, generally in western VT.	Known on Forest only from Salisbury.
<i>Vaccinium uliginosum</i> Alpine bilberry	Alpine and subalpine ledges, scattered on isolated mountaintops in northern VT.	Known on Forest only from Lincoln.

Species	Habitat Requirements	Occurrences (present or historic)
<i>Woodsia glabella</i> * Smooth woodsia	Cold, limestone cliffs, partial sun or shade, often wet and sheltered; also in limy talus at top of ledges, scattered, isolated cliffs in VT.	Known on Forest only from Rochester/Goshen.

* Species currently found in Tables E.01 or E.02 of Forest Plan.

Analysis of Effects

Threatened and Endangered Species

Indiana bat (*Myotis sodalis*)

Affected Environment

A discussion of the general affected environment for this amendment can be found in the “Ecological Context” section in chapter 3 of the EA for this amendment. The BA further discusses the affected environment specific to Indiana bat (USDA 1999).

During the summer of 1999, the GMNF prepared a programmatic BA to evaluate the effects of ongoing management practices on five federally listed and one proposed threatened and endangered species known to occur or which may occur on the GMNF. The Forest presented the BA to the FWS on September 21, 1999, and FWS initiated formal consultation on October 20, 1999.

The BA determined, and the FWS concurred, that implementation of activities outlined in the Forest Plan would lead to “No Effect” for three species (Bald eagle, Eastern cougar, Gray wolf); would “Not Likely to Adversely Affect” one species (American peregrine falcon); and would “Not Likely to Jeopardize the Continued Existence” of a fifth species (Canada lynx). The remaining species (Indiana bat) received a “May Affect – Likely to Adversely Affect” determination. Only the Indiana bat was carried forward into formal consultation, because of the “May Affect – Likely to Adversely Affect” determination, and so is carried forward here in the analysis of effects of the proposed amendment and alternatives.

Direct and Indirect Effects

Alternative 1 – No Action: This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. Terms and Conditions as defined in the BO would not be incorporated into the Forest Plan. Short and long-term effects, as well as direct and indirect effects of implementation of the Forest Plan, as they relate to federally listed species, are detailed in the August 27, 1999 GMNF programmatic BA. However, because the Terms and Conditions would not be incorporated into the Forest Plan, this alternative is a direct violation of the ESA and the NFMA, and is not considered a viable alternative. The effects to Indiana bats are summarized below.

Indiana bat populations have continued to decrease in Vermont since the mid-1930s, and range-wide in the past two decades.

Indiana bats hibernate in one cave within the GMNF proclamation boundary (owned by The Nature Conservancy). This hibernaculum has not been designated as critical habitat; however, the cave is gated and is closed seasonally to minimize disturbance during the hibernation period. To date, no maternity colonies are known to occur on the GMNF. Additionally, summer survey efforts in 1999 and 2000 have failed to capture any Indiana bats on GMNF lands.

About 95% of the GMNF is currently forested, with 83% mature trees (USDA 1999, 17). Forest communities on about 141,000 acres are prescribed for timber management; the remaining acreage (approximately 230,000) of the GMNF is subject primarily to natural forces (USDA 1999, 16). Since 1987, about 12,630 acres (less than 0.3% of the total GMNF acreage/year) of dense, mature forest have been commercially thinned, regenerated, or selectively harvested to create the more open forest canopies

which provide quality habitat for Indiana bats (USDA 1999, 51). Standing dead trees and large, overmature trees which Indiana bats may use as roost trees are abundant across the forest.

The risk of removing an occupied Indiana bat roost tree or a traditional maternity roost tree is extremely small considering: (1) the small amount of the GMNF affected annually by tree removal; (2) the fact that most of this removal occurs during the bat hibernation when they are not roosting in trees; and (3) the vast number of suitable roost trees (both living and dead) available for a relatively small number of bats. Although the possibility of take still exists, the BO concluded that implementation of the Forest Plan, as proposed in the BA, was not likely to jeopardize the continued existence of the Indiana bat.

While there is still no scientific agreement over the principal causes of the continued decline of this species, under this alternative the GMNF will implement existing guidance in the Forest Plan that offers incidental protection for Indiana bats, such as those activities outlined below. Efforts that protect and manage existing habitat; create and maintain additional habitat where possible, educate the public concerning the plight of this species; search out the best information available for this species, and collect information about this species' use of the GMNF would be considered, although not required.

Forest and Forest Plan actions that have contributed to habitat protection and management for Indiana bats from 1987 to the present include:

Public Education

- Presentations to area schools and organizations
- Development of public exhibit of bats of the northeast
- Development and distribution of fact sheet specific to Indiana bat statistics and management situation

Habitat Improvement

- Gating of the one known bat hibernaculum owned by the GMNF
- Construction and installations of bat roost boxes throughout GMNF

Monitoring

- Annual hibernacula surveys in GMNF and Vermont
- Summer surveys in 1999 and 2000 for bats using GMNF
- Annual review of post-treatment snag and den tree retention
- Annual review of tree mortality

Management of late-successional and old growth woodland habitats

- Forest Plan direction provides for old-growth values on 63% of GMNF

Assessment of Potential Habitat

- Approximately 5,000 acres assessed annually, on site-specific basis, to determine suitability for Indiana bats
- Development of GMNF protocol to assess potential relationship between projects and Indiana bat habitat

Alternative 2 – Proposed Action: This alternative formally integrates all Term and Conditions (T&C) of the FWS BO. These T&Cs are designed to minimize the likelihood of incidental take (death) of Indiana bats during implementation of the GMNF's Forest Plan. As discussed in this BO, the integration of these terms and conditions into our Forest Plan through the amendment process, will:

- “minimize the level of the incidental take identified for the Indiana bat on both a programmatic and site-specific scale”;
- “minimize the potential effect of smoke on occupied Indiana bat hibernacula or roosting bats during fall swarming”;
- “help the Service (U.S. Fish and Wildlife Service) to assess the efficacy of the standards and guidelines and the terms and conditions in protecting the Indiana bat on the GMNF”; and
- “ensure compliance with the terms and conditions, as well as determine the level of incidental take on a project level”.

At a Forest level, however, incorporation of these T&Cs is unlikely to remove all chance for incidental take.

Alternative 3 – Proposed Action with Conservation Measures: This alternative adds measures designed to better improve habitat conditions for Indiana bats – through retention of additional potential roost trees, training, public outreach, and habitat assessment. By implementing these additional conservation measures, we anticipate:

- An increase in habitat suitability (over the proposed alternative) for roosting at a landscape level, through the retention of additional suitable roost trees during timber management activities;
- Greater ability to monitor the status of all woodland bats, through “proper training of GMNF biologists on bat identification and reliable methods of counting bats”;
- Enhanced knowledge of roost tree suitability and availability, and the availability of preferred foraging habitat; and
- Potential growth of woodland bat conservation throughout New England, through greater citizenry understanding of woodland bats and their conservation.

While this alternative does work towards Indiana bat recovery through integration of GMNF’s conservation program, it is equivalent to Alternative 2 in reducing the potential for incidental take.

Alternative 4 – Proposed Action with No Summer Timber Harvest: This alternative differs from the proposed action (Alternative 2) in that no timber harvest would be conducted during the non-hibernation period for Indiana bats. The non-hibernation period is considered to be from May 15th through August 30th in areas distant from hibernacula, and from April 1st through October 31st in areas near hibernacula - approximately 5 miles radius from hibernacula (USDI 2000, 37).

This alternative removes the need for two summer harvest-related Standards and Guidelines (S&G) proposed by Alternative 2; as any S&G specific to summer harvest operation would not be needed. Specifically the two S&Gs are:

- Design skid trail to avoid the need to fell suitable roost trees (as identified by Romme et al. 1995)
- Protect 1/3 of all large diameter (≥ 12 inches dbh) post-harvest snags by retaining live residual trees adjacent to these snags. Such reserve trees shall be located in groups and along intermittent drainages to provide foraging corridors into harvested areas, and where available, shall be Class 1 or Class 2 trees (as identified by Romme et al. 1995), or other trees exhibiting or likely to develop characteristics preferred by Indiana bats (e.g., exfoliating bark).

During formal consultation, the FWS identified reasonable and prudent measures, and terms and conditions to minimize the take of Indiana bats and documented these conditions in the BO. Eliminating summer timber harvest, in theory, further reduces potential for incidental take of Indiana bats – through the reduction in number of potentially occupied roost sites that are disturbed. Given that two years of monitoring for woodland bats (including Indiana bats) has not revealed if and where Indiana bats are roosting on the GMNF, and lacking any additional Forest-specific information, it is difficult to determine the degree of benefit achieved through this further reduction. Therefore, our analysis concludes that reducing the chances of incidental take are not likely to be different from those in Alternative 2.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: This alternative seeks to “package” conservation efforts designed to reduce potential for incidental take, improve habitat conditions, enhance our knowledge, and broaden citizenry awareness – as applied to Indiana bat conservation and recovery, and compared to the Proposed Action. The difference between Alternative 4 and 5 is that Alternative 5 would retain the standards and guidelines that would be deleted through adoption of Alternative 4 (see preceding discussion). Retention of these two S&Gs furthers conservation actions specific to habitat suitability for Indiana bat.

Implementation of these two S&Gs would further enhance habitat suitability (over all alternatives) for roosting at a landscape level, through the retention of additional suitable roost trees during all timber management activities. Still, as applied across the Forest, opportunity remains for incidental take.

Cumulative Effects

Alternative 1 – No Action: The Forest Plan as currently written and implemented provides quality habitat for Indiana bat, but there is still a chance that specific Forest activities could result in incidental “take” as defined by the ESA. By not incorporating the mandatory terms and conditions from the BO, we effectively will be using existing Forest Plan guidance and incidental standards and guidelines as we develop and review individual projects. Consequently, the chance for incidental take would still remain. There are also long-term repercussions of implementing this alternative in terms of the illegality of such an action under the ESA, and the negative effects on relationships with partner species conservation agencies and organizations.

Additionally, not incorporating these mandatory terms and conditions will make it difficult to gain understanding of Indiana bat habitat relationships in New England, at the broad-scale, landscape level. This alternative limits assurance that habitat conservation will be coordinated at the GMNF level, and perhaps beyond.

Alternative 2 – Proposed Action: Incorporating the mandatory terms and conditions of the BO, reduces the chance that incidental take will occur. This means there is even less potential to harm individual(s), than under Alternative 1.

Habitat components considered important for Indiana bats will be conserved throughout the GMNF, theoretically improving both local and landscape level conditions for this species.

Alternative 3 – Proposed Action with Conservation Measures: This alternative provides for enhancement of potential roosting habitat throughout the GMNF. It also focuses energies into better understanding bat habitat relationships and in sharing this knowledge with others, Forest employees and neighbors of the Forest. The enhancement to potential roosting habitats is limited to those areas being actively managed, which in itself limits the degree to which this alternative improves on management resulting from Alternative 2 – some, but not a lot. The greater enhancement will be in the broadening and deepening of the knowledge base specific to Indiana bats in New England; that and sharing this information and knowledge with employees and neighbors. This latter effort has the potential to enhance Indiana bat conservation throughout New England, assisting greatly in this species recovery.

Alternative 4 – Proposed Action with No Summer Timber Harvest: In addition to incorporating the mandatory terms and conditions of the BO, thereby reducing the chance that incidental take will occur (see discussion above), this alternative further reduces the chance that incidental take will occur by eliminating all timber harvest during periods when Indiana bats could be present. Without a better understanding of Indiana bat habitat relationship and degree of use of GMNF habitats, it is difficult to determine how beneficial this reduction would be. Because of the measure’s cumulative limitation to strictly GMNF ownership, any enhancement will be constrained to the relatively small acreage the Forest manages for timber. This degree of enhancement is not likely to be detectable to Indiana bat recovery across in range, or even in New England or the northeast.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: The cumulative affect of this alternative is essentially a combination of those projected for Alternatives 3 and 4. Additionally, a small enhancement of potential roosting conditions could occur through the greater retention of potentially suitable roost trees during all timber harvest operations. Again, the significance of this relatively limited addition is difficult to assess – the physical restrictions of GMNF ownership limiting the degree of landscape level enhancement.

Sensitive Species

This section will be divided between general effects on all sensitive species as a group, and those effects that are associated with specific species groups.

All Sensitive Species

Affected Environment

During the spring and summer of 1999, the Eastern Region's (R9) National Forests gathered information and met in a series of sub-regional workshops to initiate review and update of our RFSS and list. The goal of this update was to integrate new information, gathered since the previous update of March 8, 1994, along with newly adjusted designation criteria designed to better address the NFMA viability requirements for respective R9 National Forests. The GMNF evaluated over 200 plant and animal species, including those listed in the Forest Plan as sensitive or species of concern, those on the State of Vermont's threatened, endangered, or rare lists, as well as others identified by concerned citizens. The resulting list of sensitive species was formally updated on February 29, 2000; the GMNF identified 87 species for inclusion on this Regional list, which is broken down by taxonomic group in Table 3. Table 4 displays a comparison between the current Forest Plan classification of protected species, and the classification proposed in the amendment, including the new RFSS list, Forest Species of Concern, and those species presently unknown and unlikely to occur.

During the summer and fall of 2000, a programmatic BE of the Forest Plan for conservation and management of RFSS was prepared, which evaluated the effects of implementation of the Forest Plan on these species (USDA 2000c). This programmatic BE determined that there would be no impact to species not known or likely to occur on the GMNF; that impacts to species known or likely from, but not identified as sensitive for, the GMNF would not lead to loss of viability or trend towards federal listing; and that impacts to those species identified as RFSS for the GMNF would also not lead to loss of viability or trend towards federal listing. However, recommendations were made in this programmatic BE to strengthen the Forest Plan, which are included in this proposed amendment. These proposed changes dictate the need to evaluate their effects on RFSS species on the GMNF, as well as the effects on RFSS of the proposed changes for Indiana bat.

Together, the 87 species designated as RFSS for the GMNF are associated with most habitats found on the GMNF, including ponds, streams, wetlands, openings, rock outcrops, cliffs, caves, alpine areas, spruce-fir forest, northern hardwood forests (including mixed conifer hardwood and rich hardwood variants), and dry oak and hardwood forest variants. Assessment of how well the proposal, action alternatives, and no action alternative provide for protection of known or likely RFSS occurrences can best be made first through a general review of effects that are consistent across all species, and then by grouping these species by the habitats with which they are associated, and then determining how well each alternative guides management of those habitats. Species and habitats have been grouped below following the general effects discussion, and further details regarding affected environment and species impacts are discussed in that context.

Table 3 - Breakdown of GMNF's sensitive Species

Species Group	Number of Sensitive Species
Animals	21
Mammals	1
Birds	3
Amphibians	1
Reptiles	1
Mollusks	2
Insects	13
Plants	66
Ferns and Fern Allies	7
Dicots	28
Monocots	31
Total Number	87

Table 4 – Comparison of species protection designations of the new RFSS list and the proposed action, with the 1994 RFSS list, and the 1987 Forest Plan designations (Tables E.01-E.03).

Scientific Name	Common Name	2000	1994	1987
REGIONAL FORESTER'S SENSITIVE SPECIES				
PLANTS				
Agrostis mertensii	Arctic bentgrass	S		
Aureolaria pedicularia	Fernleaf yellow false-foxglove	S		SC
Blephilia hirsuta	Hairy woodmint	S		
Calamagrostis stricta ssp inexpansa	New England northern reed grass	S		
Cardamine parviflora	Small-flower bitter-cress	S		
Carex aestivalis	Summer sedge	S		
Carex aquatilis	Water sedge	S		
Carex argyrantha	Hay sedge	S		
Carex atlantica	Prickly bog sedge	S		
Carex bigelowii	Bigelow sedge	S		
Carex foenea (=aenea)	Bronze sedge	S		
Carex lenticularis	Shore sedge	S		
Carex michauxiana	Michaux sedge	S		
Carex schweinitzii	Schweinitz's sedge	S	S	
Carex scirpoidea	Bulrush sedge	S		SC
Clematis occidentalis var. occidentalis	Purple clematis	S		
Collinsonia canadensis	Canada horse-balm	S		
Conopholis americana	Squaw-root	S		
Cryptogramma stelleri	Steller's cliffbrake	S		
Cypripedium parviflorum var parviflorum	Small yellow ladyslipper	S		
Cypripedium pubescens (=parviflorum var pubescens)	Large yellow ladyslipper	S		SC
Cypripedium reginae	Showy ladyslipper	S		SC
Desmodium paniculatum	Paniculate tick-trefoil	S		
Draba arabisans	Rock whitlow-grass	S		

Scientific Name	Common Name	2000	1994	1987
<i>Dryopteris filix-mas</i>	Male fern	S		SC
<i>Eleocharis intermedia</i>	Matted spikerush	S		SC
<i>Eupatorium purpureum</i>	Sweet joe-pye-weed	S		
<i>Geum laciniatum</i>	Rough avens	S		
<i>Isoetes tuckermanii</i>	Tuckerman's quillwort	S		
<i>Isotria verticillata</i>	Large whorled pogonia	S		
<i>Juglans cinerea</i>	Butternut	S	S	
<i>Juncus trifidus</i>	Highland rush	S		SC
<i>Lespedeza hirta</i>	Hairy bush-clover	S		
<i>Listera auriculata</i>	Auricled twayblade	S	S	
<i>Littorella uniflora</i>	American shore-grass	S		SC
<i>Muhlenbergia uniflora</i>	Fall dropseed muhly	S		
<i>Myriophyllum farwellii</i>	Farwell's water-milfoil	S		
<i>Myriophyllum humile</i>	Low water-milfoil	S		SC
<i>Panax quinquefolius</i>	American ginseng	S		SC
<i>Pellaea atropurpurea</i>	Purple-stemmed cliffbrake	S		
<i>Peltandra virginica</i>	Green arrow-arum	S		
<i>Phegopteris hexagonoptera</i>	Broad beech fern	S		
<i>Platanthera orbiculata</i>	Round-leaved orchis	S		
<i>Polemonium vanbruntiae</i>	Eastern jacob's ladder	S	S	S
<i>Potamogeton biculpatus</i>	Snail-seed pondweed	S		SC
<i>Potamogeton confervoides</i>	Tuckerman's pondweed	S	S	SC
<i>Potamogeton hillii</i>	Hill's pondweed	S	S	
<i>Prenanthes trifoliolata</i>	Three-leaved rattlesnake-root	S		
<i>Pyrola chlorantha</i> (=virens)	Green pyrola	S		
<i>Ribes triste</i>	Wild red currant	S		
<i>Saxifraga paniculata</i> (=aizoon)	White mountain saxifrage	S		SC
<i>Scheuchzeria palustris</i> ssp <i>americana</i>	Pod-grass	S		SC
<i>Scirpus subterminalis</i>	Incomplete bulrush	S		
<i>Sedum rosea</i>	Roseroot stonecrop	S		SC
<i>Selaginella rupestris</i>	Rock spikemoss	S		
<i>Sisyrinchium angustifolium</i>	Narrow blue-eyed grass	S		SC
<i>Sisyrinchium atlanticum</i>	Eastern blue-eyed grass	S		SC
<i>Solidago squarrosa</i>	Stout goldenrod	S		
<i>Sorbus decora</i>	Northern mountain-ash	S		
<i>Sparganium fluctuans</i>	Floating bur-reed	S		SC
<i>Torreyochloa pallida</i> (=Glyceria <i>fernaldii</i>)	Fernald alkali grass	S		
<i>Utricularia geminiscapa</i>	Hidden-fruited bladderwort	S		SC
<i>Utricularia resupinata</i>	Northeastern bladderwort	S		SC
<i>Uvularia perfoliata</i>	Perfoliate bellwort	S		
<i>Vaccinium uliginosum</i>	Alpine bilberry	S		
<i>Woodsia glabella</i>	Smooth woodsia	S		SC
MAMMALS				
<i>Myotis leibii</i>	Eastern small-footed myotis	S	S	S

Scientific Name	Common Name	2000	1994	1987
BIRDS				
<i>Catharus bicknellii</i>	Bicknell's thrush	S		
<i>Falco peregrinus anatum</i>	American peregrine falcon	S	LE	LE
<i>Gavia immer</i>	Common loon	S		S
AMPHIBIANS				
<i>Ambystoma jeffersonianum</i>	Jefferson salamander	S		
REPTILES				
<i>Clemmys insculpta</i>	Wood turtle	S		
MOLLUSKS				
<i>Alasmidonta varicosa</i>	Brook floater	S	S	
<i>Lasmigona compressa</i>	Creek heelsplitter	S		
INSECTS				
<i>Aeshna tuberculifera</i>	Black-tipped darner	S		
<i>Aeshna verticalis</i>	Green-striped darner	S		
<i>Arigomphus furcifer</i>	Lilypad clubtail	S		
<i>Calopteryx amata</i>	Superb jewelwing	S		
<i>Cicindela marginipennis</i>	Cobblestone tiger beetle	S		
<i>Gomphus (=Phanogomphus) descriptus</i>	Harpoon clubtail	S		
<i>Gomphus adelphus</i>	Mustached clubtail	S		
<i>Lanthus vernalis</i>	Southern pygmy clubtail	S		
<i>Lestes eurinus</i>	Amber-winged spreadwing	S		
<i>Ophiogomphus (=Ophionurus) mainensis</i>	Maine snaketail	S		
<i>Somatochlora elongata</i>	Ski-tailed emerald	S		
<i>Somatochlora forcipata</i>	Forcipate emerald	S		
<i>Somatochlora minor</i>	Ocellated emerald	S		
FOREST SPECIES OF CONCERN				
PLANTS				
<i>Aster ptarmicoides</i>	Prairie goldenrod	SC		SC
<i>Botrychium multifidum</i>	Leathery grape-fern	SC		SC
<i>Dryopteris fragrans</i>	Fragrant fern	SC		SC
<i>Woodsia alpina</i>	Northern woodsia	SC		SC
MAMMALS				
<i>Martes americana</i>	Pine marten	SC		SC
<i>Synaptomys cooperi</i>	Southern bog lemming	SC		SC
BIRDS				
<i>Accipiter gentilis</i>	Northern goshawk	SC	S	
<i>Accipiter cooperi</i>	Cooper's hawk	SC		SC
<i>Ardea herodias</i>	Great blue heron	SC		SC
<i>Asio otus</i>	Long-eared owl	SC		SC
<i>Pandion haliaetus</i>	Osprey	SC		SC
<i>Picoides arcticus</i>	Black-backed three-toed woodpecker	SC		SC
AMPHIBIANS				
<i>Hemidactylium scutatum</i>	Four-footed salamander	SC		SC

Scientific Name	Common Name	2000	1994	1987
SPECIES UNKNOWN AND UNLIKELY TO OCCUR				
PLANTS				
<i>Asplenium montanum</i>	Mountain spleenwort	U		SC
<i>Astragalus robinsii</i> var. <i>minor</i>	A milk vetch	U		SC
<i>Betula borealis</i>	Northern birch	U		SC
<i>Cardamine pratensis</i> var. <i>palustris</i>	Cuckoo flower	U		SC
<i>Carex bicknellii</i>	Bicknell sedge	U		SC
<i>Carex buxbaumii</i>	Brown bog sedge	U		SC
<i>Carex formosa</i>	Handsome sedge	U	S	
<i>Carex lupuliformis</i>	False hop sedge	U	S	
<i>Carex weigandii</i>	Weigand's sedge	U	S	
<i>Cynoglossum virginianum</i> (=boreale) var. <i>boreale</i>	Northern wild comfrey	U	S	SC
<i>Cypripedium arietinum</i>	Ram's-head ladyslipper	U	S	SC
<i>Eleocharis olivacea</i>	Capitate spikerush	U		SC
<i>Eleocharis ovata</i>	Blunt spikerush	U		SC
<i>Hackelia deflexa</i> var. <i>americana</i>	Northern stickseed	U		SC
<i>Hydrophyllum canadense</i>	Blunt-leaved waterleaf	U		SC
<i>Lycopodium inundatum</i> var. <i>bigelovii</i>	Slender bog-clubmoss	U		SC
<i>Lycopodium selago</i>	Fir clubmoss	U		SC
<i>Malaxis brachypoda</i>	White adder's-mouth	U		SC
<i>Pellaea glabella</i>	Smooth cliff-brake	U		SC
<i>Platanthera hookeri</i>	Hooker orchis	U		SC
<i>Polygala sanguinea</i>	Field milkwort	U		SC
<i>Pyrola minor</i>	Lesser wintergreen	U		SC
<i>Rhexia virginica</i>	Virginia meadow-beauty	U		SC
<i>Vaccinium boreale</i>	Boreal blueberry	U	S	SC
<i>Xyris difformis</i>	Carolina yellow-eyed grass	U		SC
<i>Xyris montana</i>	Northern yellow-eyed grass	U		SC
MAMMALS				
<i>Microtus chrotorrhinus</i>	Rock vole	U		SC
<i>Sorex dispar</i>	Long-tailed shrew	U		S
<i>Sylvilagus transitionalis</i>	New England cottontail	U	S	S
BIRDS				
<i>Ammodramus henslowii</i>	Henslow's sparrow	U		SC
<i>Ammodramus savannarum</i>	Grasshopper sparrow	U		SC
<i>Aquila chrysaetos</i>	Golden eagle	U		SC
<i>Asio flammeus</i>	Short-eared owl	U		SC
<i>Canachites canadensis</i>	Spruce grouse	U		SC
<i>Circus cyaneus</i>	Northern harrier	U		SC
<i>Cistothorus platensis</i>	Sedge wren	U		SC
<i>Dendroica cerulea</i>	Cerulean warbler	U		SC
<i>Ixobrychus exilis</i>	Least bittern	U		SC
<i>Lanius ludovicianus</i>	Loggerhead shrike	U		S
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker	U		SC

Scientific Name	Common Name	2000	1994	1987
<i>Picoides tridactylus</i>	Northern three-toed woodpecker	U		SC
<i>Podilymbus podiceps</i>	Pied-billed grebe	U		SC
<i>Tyto alba</i>	Barn owl	U		SC
REPTILES				
<i>Crotalus horridus</i>	Timber rattlesnake	U		SC
<i>Elaphe obsoleta</i>	Black rat snake	U		SC
AMPHIBIANS				
<i>Bufo woodhousei</i>	Fowler's toad	U		SC
INSECTS				
<i>Argyresthia castaneela</i>	Chestnut ermine moth	U		UO
<i>Catocala marmorata</i>	Marbled underwing moth	U		UO
<i>Cicindela patruela</i>	American tiger beetle	U		UO
<i>Cicindela puritana</i>	Puritan tiger beetle	U		UO
<i>Nicrophorus americanus</i>	American burying beetle	U		UO
<i>Stygobromus borealis</i>	Taconic cave amphipod	U	S	UO
FISH				
<i>Carpionodes cyprinus</i>	River carpsucker	U		UO
<i>Couesius plumbeus</i>	Lake chub	U		UO
<i>Esox masquinongy</i>	Muskellunge	U		UO
<i>Hybognathus hankinsoni</i>	Brassy shiner	U		UO
<i>Margariscus (=Semotilus) margarita</i>	Pearl dace	U		UO
<i>Moxostoma</i> spp.	Redhorses	U		UO
<i>Notropis bifrenatus</i>	Bridle shiner	U		UO
<i>Notropis heterodon</i>	Blackchin shiner	U		UO
<i>Notropis heterolepis</i>	Blacknose shiner	U		UO
<i>Prosopium cylindraceum</i>	Round whitefish	U		UO

Key

S = listed on RFSS list of that year

SC = listed in Forest Plan as "Species of Concern"

UO = listed in Forest Plan as "Species of Uncertain Occurrence"

U = species unknown and unlikely to occur

LT = listed as "Threatened" under ESA

LE = listed as "Endangered" under ESA

Factors that tend to limit these sensitive species, at a species level, are usually environmental, and such factors are discussed below under species habitat groups. However, there are factors that are more administrative that still have the potential to impact species, through their effects on sensitive species as a protected class or group.

The programmatic BE identified three administrative areas that have the potential to limit sensitive species as a group: protection, adaptive management, and inventory/monitoring (USDA 2000c). In the absence of a Forest Plan, these three areas can contribute to loss of viability of some RFSS. However, the programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to those that would not lead to loss of viability or trend to federal listing (USDA 2000c). The proposal in this amendment seeks to reduce the likelihood of these impacts further.

Direct and Indirect Effects

Alternative 1 – No Action: This alternative will continue implementation of the Forest Plan and so the Forest Plan would be organized as it is now, would maintain the outdated list of protected species for the Forest, would fail to address Terms and Conditions and conservation measures for Indiana bat, and would fail to update inventory and monitoring expectations. As the Forest Plan recognizes sensitive species as a protected group, has specific guidelines for some sensitive species, recognizes their designation by the Regional Forester, and provides protection for these species within the management guidelines of the current Forest Plan (1987, 4.35; E.01-E.07), any changes in the RFSS list (including this latest update) will trigger protection for any new sensitive species for the GMNF. Implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in sensitive species habitats. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Not implementing the various proposals to protect Indiana bat will not change the existing language in the Forest Plan regarding RFSS, and so will not affect RFSS beyond what has been identified above for the group. In addition, there are no additional species group effects related to this Alternative for Indiana bat beyond those already addressed for all RFSS here, and so no further discussion of these effects will be made below in the species group sections.

Alternative 2 – Proposed Action:

Effects Related to Indiana bat Terms and Conditions – General effects of implementing this alternative on RFSS as a group appear to be limited. Creating protection zones around potential or actual maternity roost trees is the only area that could conceivably create conflicts with RFSS protection, and then only for species that actually occur in those zones and require disturbance (i.e. such zones would eliminate disturbance within the zone). Disturbance could be needed, for example, in terms of human presence for monitoring, reducing shade for shade intolerant species, introduction of fire for habitat maintenance, or eliminating invasive exotic species. The probability of the coincidence of a known RFSS occurrence with the protection zone of a maternity roost tree is so low at this time (given the current lack of known roost trees on the Forest) as to make the risk nearly discountable. In any case, given the language in the Forest Plan that identifies standards and guidelines for management of sensitive species (1987, 4.35-4.37; app. E), such conflicts would be resolved in ways that attempt to maintain both Indiana bat and the RFSS at issue. We currently do not anticipate any irreconcilable conflicts between Indiana bat guidelines as proposed and RFSS management goals. Although there may be theoretical benefits to species requiring snags, our list of RFSS does not currently include any species with documented requirements for this habitat feature.

We also do not anticipate any impacts to specific sensitive species groups (as defined below), related to the Indiana bat protection measures of this Alternative, that are different from those discussed here. Beyond species groups associated with alpine or spruce-fir habitats (which do not represent Indiana bat habitat and are therefore not affected by any of these proposals), the occurrence of suitable roost or maternity trees could be found with relatively equal probability in any of the habitat groups identified below, and so the impacts described above would apply equally – which is to say no likely impact would occur for species in these groups. Consequently, there will be no further discussion regarding effects of this Alternative on RFSS within the species group sections.

Effects Related to the RFSS Update - As was the case in Alternative 1, species listed as sensitive will be afforded the protection that is defined in the Forest Plan (1987, 4.35-4.37; app. E). In addition, as for Alternative 1, Forest Service policy requires biological evaluations to be completed on all projects with the potential to impact sensitive species. Consequently, sensitive species associated with project areas will be protected under this alternative and are not likely to be lost from the Forest due to actions we take on their behalf or on the behalf of other programs.

For all current Region 9 sensitive species, and those species that remain on the Forest's list of Species of Concern, modification and reorganization of the information regarding these species in the Forest Plan will have little to no impact directly on these species. Information to be included within

the Forest Plan describes the goals of the RFSS program, and references a Regional process that is included within FSM direction, which governs the activities within Region 9 that relate to designation of RFSS, much as many Forest Service activities are governed by manual direction. If there is an impact at all, it will be beneficial, in that Regional goals and GMNF objectives will be more clearly articulated within the Forest Plan, and so will heighten awareness and understanding of the RFSS program and the Forest's responsibility regarding viability of rare species.

This alternative also proposes to maintain the list of protected species on the GMNF website and at each office, rather than in the Forest Plan; it also proposes to produce a yearly list of protected species that will be available to the public and reported on in the annual Monitoring and Evaluation Report. This change will have no negative impact to current RFSS or to Forest Species of Concern. Designations of federally listed and proposed species, and Region 9 sensitive species, are actions undertaken by entities other than the GMNF, and we are therefore required by law, policy, and the Forest Plan to recognize these designations, as frequently as they may change. Maintaining a current list in publicly accessible places and updating it annually will serve the needs of these species more effectively by helping our partners and the public keep up with changes in this dynamic area.

Updates to the RFSS list that identify new sensitive species for the GMNF will automatically trigger the protections inherent in the FSM and Forest Plan. Since designation as RFSS is the first step in a Regional process for developing Conservation Assessments and Strategies for species of viability concern, amending the Forest Plan with species-specific protection measures will usually follow designation as RFSS in several years, as these assessments and strategies are developed.

The proposal eliminates some Species of Concern, removing only those species that are not known to exist nor appear to have suitable habitat on the National Forest. The proposal also eliminates the Species of Uncertain Occurrence list. These actions will have no affect on these species, as they are not known or likely to occur. As the Forest Plan never included language to protect these species if found, the list was essentially meaningless in terms of species conservation. However, the proposal also includes a new standard and guideline that provides protection to any newly discovered species that is of conservation concern (e.g. state listed, RFSS). This ensures that future conservation options for these species are not precluded by inadvertent damage, simply because they were being evaluated and had not yet been designated sensitive.

Changes in what resource outputs and monitoring activities are expected related to RFSS may have the beneficial effect of defining a more realistic set of outputs that the Forest and the public can evaluate in the annual monitoring report. Instituting a more formal monitoring program for RFSS will provide beneficial impacts to RFSS by keeping a closer watch over these populations so that declines in population numbers or vigor can be detected quickly. Having clear expectations in the Forest Plan regarding monitoring, inventory and conservation actions will help us to secure the assistance of volunteers and organizations more effectively. In particular, regular monitoring will help us to determine if populations are stable or declining further, and will be the only mechanism we can use to determine that species are no longer of viability concern.

Alternative 3 – Proposed Action with Conservation Measures: The addition of Conservation Measures for Indiana bat does not add any guidance that changes the effects on RFSS from those described for Alternative 2. In addition, the RFSS update proposed does not change in this alternative from Alternative 2. Consequently, the impacts to RFSS will be the same as for Alternative 2.

We also do not anticipate any impacts to specific sensitive species groups (as defined below), related to the additional Indiana bat protection measures of this Alternative, that are different from those discussed in Alternative 2; consequently, there will be no further discussion regarding effects of this Alternative on RFSS within the species group sections.

As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2.

Alternative 4 – Proposed Action with No Summer Timber Harvest: Beyond the impacts to RFSS described for Alternative 2, the addition of no timber harvesting between May 15 and August 30 will have a minor beneficial effect on this group as a whole. We currently have no indication that any RFSS derives a distinct benefit from harvest conducted between May 15 and August 30, rather than at other times. However, harvest conducted in the summer, during the growing and breeding season for many RFSS, has always had the potential to impact individuals and small populations by way of direct impacts from felling and skidding operations. Because RFSS animals tend not to be stationary, direct impacts tend to be unpredictable and unlikely to contribute to loss of viability of these species. For RFSS plants, however, their stationary existence poses a risk of population loss from such impacts.

Traditionally, potential impacts to RFSS plants from logging are mitigated via language in the Forest Plan requiring site plans where occurrences are found in project areas, and such mitigation has been relatively successful (USDA 2000c). Such plans have included avoidance, as well as recommendations for frozen ground logging. Consequently, while eliminating the summer logging risk altogether will provide a minor benefit to most RFSS species by removing this potential source of conflict, such conflicts have been successfully mitigated, and will continue to be mitigated under the existing Forest Plan and FSM direction. In addition, the alternative does not preclude logging during other times of year, which will continue to require site plans and monitoring per Forest Plan and FSM direction where there are potential impacts to RFSS. Consequently, overall, the benefits of this alternative to RFSS are minor.

We also do not anticipate any impacts to specific sensitive species groups (as defined below), related to the additional Indiana bat protection measures of this Alternative, that are different from those discussed here or in previous alternatives. Species associated with alpine habitats within the rocky habitat group, those associated with spruce-fir, and those associated with open water or open wetland habitats, will not be affected at all as these habitats either do not correspond to Indiana bat habitat, or are not habitats where logging is conducted. For the remaining species, the risk of impact or potential for benefits described above for all sensitive species is distributed with relatively equal probability across these species, and so there are not differences in impacts from those already discussed above. Consequently, there will be no further discussion regarding effects of this Alternative on RFSS within the species group sections.

As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: There are no additional impacts, beyond those discussed previously for Alternatives 2, 3 and 4, on RFSS species as a result of implementing this alternative. This alternative does not add new guidance that is different from the previous alternatives, and there does not appear to be a cumulative benefit or impact to RFSS from combining them. As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2.

We also do not anticipate any impacts to specific sensitive species groups (as defined below) related to the cumulative Indiana bat protection measures of this Alternative that are different from those discussed in previous alternatives; consequently, there will be no further discussion regarding effects of this Alternative on RFSS within the species group sections.

As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2.

Cumulative Effects

Alternative 1 – No Action: For the purposes of this alternative to a programmatic amendment, past, present, and reasonably foreseeable future actions are defined by the Forest Plan. As discussed earlier and in detail in the programmatic BE (USDA 2000c), such actions as have been taken to protect RFSS will likely continue, as will partnerships with State agencies and conservation organizations with an interest in rare species conservation. The continued divergence of the Forest Plan language from actual TES policy, objectives and accomplishments will eventually lead to problems with credibility. Credibility

will become increasingly dependent upon the good will relationships of Forest TES program managers with partners. Without more precise goals and objectives in the Forest Plan for RFSS, we will be less accountable to the public for rare species conservation, which has lately been less acceptable than in 1987, and is likely to continue to be of concern. Species may decline without detection, although most likely due to factors beyond GMNF control. Overall, however, the handful of gaps in the Forest Plan are not likely to contribute to loss of viability of any of the RFSS, as we do not anticipate any great changes in Forest Plan implementation or program direction prior to Forest Plan revision.

Alternative 2 – Proposed Action: Updating the Forest Plan to reflect the most current information regarding FS guidance on TES species conservation will serve to improve the Forest's credibility in this program area, and may help to identify conservation actions that could be taken to move beyond simple protection of rare species to improvements in habitat conditions. Such guidance in the Forest Plan will help broaden the potential reservoir of citizens interested in species conservation activities on the Forest, and may ultimately result in reversing real or apparent declines in species populations. Consequently, we anticipate a small cumulative benefit to RFSS as a result of this proposal. There do not appear to be any cumulative impacts to sensitive species related to the proposed Indiana bat changes or additions in this amendment, as there did not appear to be any direct or indirect impacts on which to base cumulative impacts.

Alternative 3 – Proposed Action with Conservation Measures: We do not anticipate any additional cumulative effects from this alternative on RFSS as a group, beyond those discussed for Alternative 2.

Alternative 4 – Proposed Action with No Summer Timber Harvest: Beyond those effects described for Alternative 2, there may be a small cumulative benefit from eliminating summer timber harvesting, simply by reducing over time the likelihood of conflicts with sensitive plant and animals. However, as such conflicts are currently mitigated where possible through Forest Plan and FSM direction, and as such conflicts may still occur at other times of year (and would also be mitigated), the overall benefit is minor.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: We do not anticipate any additional cumulative effects from this alternative on RFSS as a group, beyond those discussed for Alternative 4.

High Elevation, Cliff, and/or Rock Outcrop Dwellers

Affected Environment

This habitat includes cliffs, rock outcrops, ledges, talus, and caves (and associated vegetation) that may occur across the elevational gradient of the Forest, but tends to be associated either with alpine/krummholtz zones at high elevation, or escarpment communities at around 1500' elevation along western edge of the National Forest. Isolated patches of this habitat are widespread across the Forest, and are mapped for the Forest on Ecological Land type (ELT) maps. Known sites documented in the Forest Plan include White Rocks Cliffs, Mount Horrid, Rattlesnake Point, and Mount Abraham. Additional sites of this habitat are recognized by the State of Vermont but currently have no formal recognition in the Forest Plan.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Eastern small-footed bat
- American peregrine falcon
- Bicknell's thrush
- Arctic bentgrass
- Fernleaf yellow false-foxglove
- New England northern reed grass
- Small-flower bitter-cress
- Hay sedge
- Bigelow sedge

Bulrush sedge
Purple clematis
Steller's cliffbrake
Rock whitlow-grass
Highland rush
Purple-stemmed cliffbrake
White mountain saxifrage
Roseroot stonecrop
Rock spikemoss
Stout goldenrod
Alpine bilberry
Smooth woodsia

The programmatic BE (USDA 2000c) identified factors that tend to limit these populations as including patchy habitat distribution, lack of historic disturbance regime, climate change, and activities such as trampling, erosion, harassment of nesting, roosting, or hibernating species, and removal or increase in shade. However, the programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: Much of our current Forest Plan direction for this habitat can be found in chapter 4, under the discussion of Management Prescription 8.1 (Special Areas). Page 4.160 describes protective management at White Rocks cliffs for peregrine falcons; page 4.164 describes the Mt. Horrid community and its management; page 4.169 addresses the alpine/sub-alpine environment of Mount Abraham; and 4.171 gives protective direction for the Rattlesnake Point area. In addition to this guidance, specific guidance can also be found on pages 4.34-4.35 for the peregrine falcon. Guidance for review of vegetation management or road construction in areas considered steep, having shallow soils, or in the alpine zone is located on page 4.22.

Implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in this species habitat group. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group, and related to the Indiana bat terms and conditions, are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Lake and Pond Dwellers

Affected Environment

This habitat includes permanent waterbodies of various sizes and at various elevations. It also includes near-shore habitat that is directly affected by the waterbody, such as the mud shores of bog ponds. Many of these ponds are concentrated in the southern Green Mountains on the Manchester District, both as high elevation ponds and as smaller ponds nested within wetland complexes. Ponds recognized in the Forest Plan as ecologically significant include all of those identified under MA 8.1K (Griffith Lake, Branch, Little, Skylight, Big Mud, Little Mud, Wallingford, Fifield, Little Rock, and Abbey Ponds), as well as Grout Pond, and Lost Pond (within White Rocks NRA). Additional ponds on the Forest have since been identified by the State of Vermont as having ecological significance, but currently have no formal recognition in the Forest Plan. Currently all such pond sites are mapped based on the VNNHP's significant ecological features inventory.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Common loon
- Black-tipped darner
- Green-striped darner
- Lilypad clubtail
- Amber-winged spreadwing
- Ski-tailed emerald
- Water sedge
- Prickly bog sedge
- Shore sedge
- Michaux sedge
- Matted spikerush
- Tuckerman's quillwort
- American shore-grass
- Farwell's water-milfoil
- Low water-milfoil
- Green arrow-arum
- Snail-seed pondweed
- Tuckerman's pondweed
- Hill's pondweed
- Pod-grass
- Incomplete bulrush
- Floating bur-reed
- Fernald alkali grass
- Hidden-fruited bladderwort
- Northeastern bladderwort

The programmatic BE (USDA 2000c) identified several factors that tend to limit these species, including physiographic constraint of habitat distribution, climate change, acidic deposition, beaver activities, poor water quality, loss of shade, noxious weeds, and harassment of nesting birds along shorelines. However, the programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: Much of our current Forest Plan direction for this habitat can be found in chapter 4, under the discussion of Management Prescription 8.1 (Special Areas). Page 4.170 describes protective management for 10 high elevation ponds, in particular Branch and Little Ponds; pages 4.159-4.160 describe management direction for the ponds found in the White Rocks NRA (Lost, Big Mud, Little Mud, Wallingford, Little Rock, and Fifield Ponds, and Griffith Lake); pages 4.161 – 4.162 address the management of Grout Pond; page 4.168 gives protective direction for the Abbey Pond/Beaver Meadows area; and pages 4.117-.4.122 provide the general management philosophy for Wilderness that applies to Skylight Pond. The current Forest Plan also reflects the recognition that water quality is to be protected on the GMNF (1987, 4.19-4.20; 4.25). Page 4.34 displays guidance for management of ponds to “favor natural ecosystems and indigenous species”. Pages 4.35 and E.03 give specific direction for the common loon (the one RFSS “holdover” from this group with species-specific guidance).

Implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in this species habitat group. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed previously for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

River and Stream Dwellers

Affected Environment

This habitat includes large, small, and intermittent streams and rivers, as well as riparian zones associated with such streams. Such habitats are distributed abundantly and widely across the Forest. Often, the streams of interest have certain unique characteristics that make them suitable habitat (e.g. limy or circumneutral pH), but for the most part it's not well known precisely what stream character is desirable for the rare species of this habitat. Although riparian zones often include wetlands in areas of beaver influence, those wetlands and their associated species are considered under the wetlands species group, listed below. Forty-nine streams and stream segments are recognized in the Forest Plan in a protective Management Area (MA 9.4), and management guidance for these streams applies to a corridor ¼ mile from either bank, which would include most of the riparian zone associated with each stream. All of these streams with corridors are mapped within GIS.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Wood turtle
- Brook floater
- Creek heelsplitter
- Superb jewelwing
- Cobblestone tiger beetle
- Harpoon clubtail
- Mustached clubtail
- Southern pygmy clubtail
- Maine snaketail
- Forcipate emerald
- Ocellated emerald
- Rough avens
- Butternut
- Auricled twayblade
- Jacob's ladder

The programmatic BE (USDA 2000c) identified factors tending to limit these species as including physiographic restriction of habitat, climate change, acidic deposition, beaver activities, management on upstream private lands, noxious weeds, poor water quality, reduction of shade, and reduction of instream woody debris. However, the programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: Water quality protection for potential Wild, Scenic or Recreational Rivers was developed and formally incorporated into the GMNF's Forest Plan on 7/25/88; the list of the waterways involved is found in appendix J; Standards and Guidelines can be found in Forest Plan pages 4.180-1 through 4.180-20. In March of 1989, our Forest Plan was amended to incorporate goals for the Rise to the Future (fisheries) initiative. Forest Plan pages 4.73-1 and 4.73-2 give guidance for timbering activities in stream riparian zones, as does pages 4.37-1 and 4.37-2 for management specific for fisheries goals. The current Forest Plan also reflects the recognition that general water quality is to be protected through riparian standards and guidelines on the GMNF (1987, 4.19-4.20). All of these S&Gs seek to protect water quality and stream conditions; and in doing so, will protect RFSS species currently utilizing those "riverine" communities.

The programmatic BE identified specific impacts to wood turtle for this group, while any remaining impacts to the other species were determined to be mitigated by existing standards and guidelines (USDA 2000c). Wood turtle is the only species in this group that is likely to travel from riverine riparian areas – as an adult. Typically, the wood turtle lays its eggs, and hibernates in riparian areas, or the river/stream "proper". Current Forest Plan direction will protect the stream and riparian habitats for the fourteen species that spend their lives in that habitat. We anticipate that individual, adult wood turtles could be adversely impacted by other activities, away from riparian areas. However, the programmatic BE determined that this impact was not likely to lead to loss of viability, or threat of federal listing, of wood turtles on the GMNF, primarily because the impacts would likely be infrequent, random, unpredictable, and not associated with young of the populations.

In the end, implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in this species habitat group. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not

different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Ephemeral Pool Dwellers

Affected Environment

The habitat for this group is associated with vernal pools, which are small, ephemeral waterbodies that hold water in early spring, retaining the water through early summer into July, after which they dry up. These pools provide habitat for many woodland amphibians that live a portion of their lives in water. Such pools are not suitable for fish or other potential aquatic predators, but are for some small invertebrates upon which the young amphibians prey. Vernal pools that have been noted by field workers and partners are noted on project or compartment maps. There has not been an exhaustive survey for vernal pools, although the VNNHP Significant Features inventory included areas deemed potential pool sites.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

Jefferson salamander – *Ambystoma jeffersonianum*

The programmatic BE (USDA 2000c) identified factors that tend to limit these species, including physiographic and soil constraints on habitat distribution, elevation, atmospheric deposition of heavy metals, poor water quality, beaver activity, and activities that can destroy, or remove shade from these areas. The programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: One of the newly identified GMNF RFSS animals depends on the occurrence of vernal (ephemeral) pools for their continued existence – the Jefferson salamander. While our Forest Plan never mentions vernal pools, direction for the protection of and buffers around bodies of water (a vernal pool would “qualify”) can be found on Forest Plan pages 4.19 and 4.20 – this direction includes the management of protective shading. Habitat provision for woodland amphibians can be found on Forest Plan page 4.33; specifically, the retention of dead and down woody material.

The programmatic BE determined that the effects to the Jefferson salamander are quite similar to those for the wood turtle. The Forest Plan gives adequate protection for the habitat component (vernal pool)

that is required for breeding and early larval stages. Once individuals mature and migrate away from their natal pools they become susceptible to direct negative impacts associated with other activities prescribed by our Forest Plan (e.g., skidding, motorized recreation). However, the programmatic BE determined, as with the wood turtle, that these negative effects to individual Jefferson salamanders would not likely to lead to loss of viability or trend towards federal listing for the species, using similar rationale.

In the end, implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in this species habitat group. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Species of Wetland Habitats

Affected Environment

This habitat includes all manner of wetlands, from large extensive beaver meadow complexes, to shrub swamps, to peatlands, to spring seeps, to wet upland meadows and roadside ditches. It includes any forested land that tends to be wet most of the year, and that often doesn't completely freeze up in the winter. It includes both limy and acidic wetland conditions. While it does not specifically include ponds that are embedded within wetland complexes, these wetland areas often provide for habitat needs of some pond and stream species as well (those that are not true aquatic species). Consequently, species associated with this habitat that are repeated in previous groups are those that do not show distinct preferences for aquatic habitat or strong associations with ponds or streams. This habitat type is identified on the Forest in several ways – on National Wetlands Inventory maps of the Forest, on ELT maps (certain ELTs are associated with wet soil conditions), on Compartment maps based on field surveys, and on VNNHP Significant Features maps based on field surveys by VNNHP. A survey of wetland habitats on the Forest based on Compartment data indicated approximately 650 open wetlands in the southern half of the Forest, and approximately 200 wetlands on the northern half (Williams 1996). Many of these wetlands are associated with rivers, but are not considered under the stream dwellers habitat type because they are functionally wetlands.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

Hairy woodmint
Water sedge
Prickly bog sedge
Schweinitz's sedge
Small yellow ladyslipper
Showy ladyslipper
Rough avens
Fall dropseed muhly
Eastern jacob's ladder
Green pyrola
Wild red currant
Narrow blue-eyed grass
Eastern blue-eyed grass

The programmatic BE (USDA 2000c) identified factors that tend to limit these species, including physiography, climate change, elevation, atmospheric deposition, beaver activities, poor water quality, and changes in hydrology due to travelways which pass through these habitats. The programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: Forest Plan guidance for wetland management can be found on page 4.34, stating that wetlands will be managed "...to favor natural ecosystems and indigenous species." In addition, soil and water standards and guidelines (USDA 1987, 4.22-4.25) provide some protection for wetlands, including limits on logging in these areas to frozen ground conditions only; however, harvesting is still allowed in forested stands that are wet. Site-specific protection measures for well-known significant wetlands are found on page 4.159 for Lost Pond Bog, on page 4.168 for Beaver Meadows, and on page 4.172 for Blue Ridge Mountain Cranberry Bog (which is actually a fen).

Implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in this species habitat group. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Species of Enriched Northern Hardwoods

Affected Environment

Enriched northern hardwood forest habitat is represented by northern hardwood forest with a preponderance of sugar maple, white ash, and occasional basswood. The flora is striking in terms of abundance and diversity, with a distinct spring ephemeral flora. Vermont ecologists have come to conceive of these places as some of the highest diversity forests in Vermont. This community generally takes the form of large and small patches, with the smallest and most discrete patches occurring in the Green Mountains at moderate elevations, and the largest patches occurring in the Taconic Mountains, where the community tends to reach its most characteristic development. Often, the community is associated with calcareous substrates, including limestone, marble, dolomite, calcareous schist, and calcareous till. This community can also form in places in the landscape that are moist and tend to pool organic matter (referred to as a composting effect). Landforms such as toe slopes, coves, and colluvial slopes can tend to show these characteristics in places that are mesic and are at elevations dominated by northern hardwoods. In general, however, the form of this community that is most associated with sensitive species tends to be that which occurs with calcareous substrates. Unfortunately, our ability to predict the occurrence of this substrate has proven poor over the past 8 years; we have found far more occurrences of this habitat than would be predicted by any existing data or maps. Bedrock maps do not show the great number of small bands and veins of calcareous bedrock found in the mountains; soil maps do not recognize a limy soil type in the mountains, although such types exist on the ground; and till chemistry is currently not mapped for Vermont, although we have found calcareous till in the mountains. Consequently, we identify the potential habitat for this community currently through a combination of ELTs and stands with records of basswood, butternut, or white ash. In areas that have inadequate or suspicious data, we will generally field survey specifically for this type. In general, the rate of success of finding these sites through field survey is as good as the predictive ability of our existing data, about 5-10%. Sites of this habitat currently recognized in the Forest Plan include The Cape Research Natural Area, which is a site for one of the 12 RFSS associated with the habitat.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Hairy woodmint
- Summer sedge
- Canadian horsebalm
- Large yellow ladyslipper
- Male fern
- Sweet joe-pye-weed weed
- Butternut
- Ginseng
- Broad beech fern
- Round-leaved orchis
- Green pyrola

The programmatic BE (USDA 2000c) identified factors that tend to limit these species, including physiography, elevation, presence of adequate moisture, nutrients, and calcium, land use history, and activities such as removal of shade (or increase for a few), and changes in subsurface hydrology resulting from travelways passing through these habitats. The programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: The Forest Plan currently does not address this habitat specifically. Management guidance for The Cape RNA can be found on pages 4.163 through 4.163-4. Standards and guidelines for wetlands and riparian buffers can apply to wet ground within rich woods. Currently, the best way to describe the way the Forest Plan protects this habitat is to suggest that the variety of MA designations each include some representation of this habitat type. For instance, we know of areas of this habitat within Breadloaf and Big Branch Wildernesses (MA 5.1), The Cape RNA (MA 8.1), among other MA designations. Consequently, insofar as the Forest Plan seeks to balance the needs of all organisms that occupy the Forest, this distribution of different management philosophies across the range of this habitat may ensure that the needs of all of the associated species, including RFSS, are met.

The programmatic BE did identify specific risks associated with this habitat group from activities such as vegetation management and travelway construction. However, most of the conflicts that have arisen between these activities and RFSS in this group have been mitigated by developing site plans that protect the species encountered, and any impacts have had more to do with poor communication rather than lack of Forest Plan guidance or protection measures. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Species of Dry, Low Elevation Woods

Affected Environment

This habitat is a combination of several recognized natural communities, all of which have several things in common, and together comprise The Nature Conservancy's "Oak-Northern Hardwood Forest Formation". This group represents a transition from northern hardwoods to central hardwoods. They occur at low elevations in warm areas, they are dry sites, they tend to be dominated by oaks, pines, and other hardwoods associated with drier sites, and they are most common in the western and eastern sides of Vermont – not the mountains. Most of this habitat on the Forest is associated with the western edge of the Forest along the Champlain and Vermont Valleys, the lower elevations of the Taconics, and warmer stream valleys that extend into the mountains from the west. Variations of this habitat included here are both forest and woodland types, and both acidic and calcareous substrates. However, mesic types that are part of this forest formation are not included here, but are included in enriched northern hardwoods if

they have rich characteristics. This habitat often grades from forest to woodland to open rocks and ledges; however for this habitat type the more open rocky environment is not considered here but earlier in the rocky habitat group. Species duplicated here and under the rocky habitat group are those that do not show distinct affinities towards open rock, but may occur as well in shallow rocky soil within a woodland environment. Deep but sandy soils that are extremely well drained also contribute to this habitat characterization. Consequently, opening edges that occur within this zone are also considered part of this group. This habitat is recognized in the Forest Plan at Rattlesnake Point and Falls of Lana (forested and woodland portions).

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Fernleaf yellow false-foxglove
- Bronze sedge
- Squaw-root
- Paniculate tick-trefoil
- Large whorled pogonia
- Hairy bush-clover
- Round-leaved orchis
- Three-leaved rattlesnake-root
- Green pyrola
- Stout goldenrod
- Perfoliate bellwort

The programmatic BE (USDA 2000c) identified factors that tend to limit species in this habitat, including physiography, elevation, mineralogy of substrate, lack of historic or prehistoric disturbance regimes, land use history, and activities that remove or increase shade (depending on the species), or that trample or remove the surface soil layer. The programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: The Forest Plan does not address this habitat directly, except in addressing Rattlesnake Point and the Falls of Lana (1987, 4.171), and in perpetuating red oak as a member of the oak-hickory type described in the Forest Plan as an “Uncommon Vegetative Type” (1987, 4.30). Standards and guidelines that can be applied to this habitat include those involving protection of shallow soil or steep areas (1987, 4.22), those involving maintenance of oak trees and forests for their wildlife value as mast trees (1987, 4.33), and those involving prescribed fire (1987, 4.86). Currently, the most applicable guidance in the Forest Plan for protection of sensitive species of this habitat involves the guidelines for Rattlesnake Point and the rare plant community guidelines (1987, 4.37).

The programmatic BE did identify specific risks associated with this habitat group from activities such as vegetation management and travelway construction. It also identified some benefits to species in this group from the use of vegetation management to perpetuate northern red oak forests. Fernleaf yellow false-foxglove was also identified as being of particular concern, primarily because an observed decline that cannot, at this time, be associated with any particular cause. However, because this species' occurrence is within the Rattlesnake Point Special Area, there do not appear to be any obvious actions that the GMNF has taken that have contributed to this decline. In general, most of the conflicts that have arisen between Forest Plan activities and RFSS in this group have been mitigated by developing site plans that protect the species encountered. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not

different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Species of Subalpine Spruce-Fir Forests

Affected Environment

This habitat is associated with elevations generally above 2500', and extends to the krummholtz zone for our purposes here (krummholtz was considered part of the rocky habitat dwellers group in this BE). Because krummholtz itself grades into more typical spruce-fir forest at the higher elevation limits of this habitat, Bicknell's thrush, which is associated with krummholtz, is also included in this group. The lower elevation limit is generally defined as the point at which "...the woods are essentially indistinguishable from normal mountain woods" (Jenkins 1981). The lower elevation limit is usually not typified by a sharp type change, but rather grades into northern hardwoods over transition zones of narrow or wide width, and dependent upon physiography and sometimes substrate mineralogy. Forests of this group are predominantly red spruce and balsam fir, with some occurrences of high elevation hardwood forests of beech and yellow birch, and early successional forests of heart-leaved paper birch. While this habitat group is not recognized as an entity at any particular site on the Forest, it is a defining characteristic of most of the Long Trail, and is represented within four of the six designated Wilderness areas on the Forest as well as in White Rocks NRA. It is also a distinct feature of most of the downhill ski areas on the Forest.

Species known to occur in association with this habitat are listed here (specific habitat requirements are detailed in Table 2):

- Bicknell's thrush
- Round-leaved orchis
- Green pyrola
- Wild red currant
- Northern mountain-ash

The programmatic BE (USDA 2000c) identified factors that tend to limit species in this habitat, including physiography, climate, elevation, substrate mineralogy, habitat conversion to ski slopes or trails, and changes in light regime. The programmatic BE determined that the current Forest Plan provides adequate guidance to reduce impacts to a level that would not lead to loss of viability or trend to federal listing for the species in this group (USDA 2000c).

Direct and Indirect Effects

Alternative 1 – No Action: There is currently no direction in the Forest Plan specific to this habitat group (for direction applicable to the krummholtz end of this habitat group, see the discussion for “High Elevation, Cliff, and/or Rock Outcrop Dwellers”). To the extent that this habitat is well defined geographically and is found in most MA designations, from the most protective (e.g. Wilderness), to the least (e.g. Highly Developed Areas), it faces the full range of management guidance the Forest Plan offers. Consequently, the most effective guidelines for protection of sensitive species in these habitats are simply the guidelines specific to rare plant communities (USDA 1987, 4.37).

The programmatic BE did identify specific risks associated with this habitat group, primarily from trail work and ski area development. However, most of the conflicts that have arisen between these activities and RFSS in this group have been mitigated by developing site plans that protect the species encountered. Consequently, we conclude that while there may be impacts to these species, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the programmatic BE (USDA 2000c).

Alternative 2 – Proposed Action: The proposed action does not adjust any protection guidelines for sensitive species of this habitat, and so the impacts of this proposal relative to protective actions are not different from Alternative 1. Most of the differences in effects between this alternative and Alternative 1 for this group are discussed above for all sensitive species as a group.

Alternative 3 – Proposed Action with Conservation Measures: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 4 – Proposed Action with No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Alternative 5 – Proposed Action with Conservation Measures and No Summer Timber Harvest: As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2. Impacts to this group as a result of the Indiana bat proposal were discussed earlier for all sensitive species.

Cumulative Effects

We don't anticipate any additional cumulative effects from any of the alternatives on this group, beyond those discussed above for the entire RFSS group.

Determination for Threatened and Endangered Species

Based on the determinations made by the GMNF in the programmatic BA on the Forest Plan, and concurrences made by the FWS in the BO, no additional determinations are required here for Bald eagle, Gray wolf, Eastern cougar, or Canada lynx. The changes proposed to the Forest Plan in this amendment are recommended by the FWS for Indiana bat conservation, and do not affect the determinations already made for these species in the BA, with which the FWS concurred.

Also based on the determinations and concurrences in the BA and BO, and the analysis of effects contained in this BE, we have determined that this proposed amendment and its alternatives will have **no additional effects** to Indiana bat that were not previously disclosed and evaluated during the programmatic consultation on the Forest Plan, and is therefore not likely to jeopardize the continued existence of the Indiana bat.

Rationale:

The determination of effects of Forest Plan implementation on Indiana bat was documented in the BA (USDA 1999), and was reviewed by the FWS, which issued its concurrence with the BA's determinations in the form of a BO (USDI 2000). Alternatives 2 - 5 amend the Forest Plan to include the Terms and Conditions contained within the BO and other conservation measures, which were identified by the FWS as measures to minimize impacts to Indiana bat. Consequently, the determinations associated with those measures have been made within the BO, and do not require repeating here.

Determinations for Sensitive Species

After reviewing the proposed action and alternatives, the literature and records, and consulting individuals, the following determinations regarding the Proposed Action and alternatives are made (note that there are minor differences in relative benefit and impact among the alternatives, which are discussed in the effects analysis for all sensitive species):

Alternative	RFSS	Impact
1 – No Action	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
2 – Proposed Action	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
3 – Proposed Action with Conservation Measures	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
4 – Proposed Action with No Summer Logging	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
5 – Proposed Action with No Summer Logging and Conservation Measures	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.

Rationale:

Based on the analysis of effects contained in this BE, implementation of all of the alternatives proposed, including the No Action, has some potential, however minor, to impact individuals of any given RFSS, although not leading to loss of viability or trend towards federal listing. It is the nature of the Forest Plan, and the agency's multiple use mission, to balance the benefits derived from the Forest; however, it is also agency policy to avoid or minimize impacts to RFSS, and where impacts cannot be avoided, they may be allowed so long as such impacts do not contribute to a loss of viability or result in the need for federal listing of species (FSM 2670.32). It is also a goal of the current Forest Plan, as amended, to "Protect all threatened, endangered and sensitive species, as well as other species of concern on the National Forest." (1987, 4.05). None of the action alternatives change that goal, and nothing proposed here serves to diminish this goal – in fact, the proposed amendment and other action alternatives seek to add language to the Forest Plan to strengthen our protection, inventory, and monitoring goals for these species.

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