

West Virginia Field Office
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Memorandum

To: Assistant Regional Director, Ecological Services

From: Acting Field Supervisor, West Virginia Field Office, Elkins, WV

Subject: Biological Opinion for issuance of the Incidental Take Permit (ITP) for the take of the endangered West Virginia northern flying squirrel, (*Glaucomys sabrinus fuscus*) (WVNFS), in the Camp Wilderness Habitat Conservation Plan (CWHCP).

This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) completed in accordance with section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. § 1531 et seq.) (ESA), and its implementing regulations at 50 CFR 17, regarding the subject ITP for take of the WVNFS. The Service's approval of an ITP application is a Federal action subject to intra-Service consultation under section 7(a)(2) of the ESA. The issuance of this ITP is based upon submission of a Habitat Conservation Plan (HCP) prepared by BHE Environmental, Inc. (BHE) on behalf of the applicants, Snowshoe Mountain, Inc. (SMI) and Intrawest Resorts, Inc. (IRI) (BHE Environmental, 2002), which have proposed to construct Camp Wilderness, a development consisting of approximately 55 buildings and related infrastructure on approximately 50.6 acres of occupied habitat of the WVNFS. Construction of the Camp Wilderness development is anticipated to result in the "take" of the WVNFS as a result of harm through habitat loss. This BO is based on information provided in the CWHCP, the Service's National Environmental Policy Act (NEPA) decision documents (FWS, 2002), the WVNFS amended recovery plan (FWS, 2001), information obtained from the scientific literature, telephone conversations, field investigations, discussions with endangered species staff of the Region 5 office (RO) and Office of the Solicitor (SOL), and other sources of information. All of the aforementioned documents are incorporated herein. A complete administrative record of this consultation is on file in the Service's West Virginia Field Office (WVFO) in Elkins, West Virginia. For further information regarding this project, please contact Mr. Shane Jones, Endangered Species Biologist for Private Lands, West Virginia Field Office.

CONSULTATION HISTORY

The chronological history of the Service's involvement with the CWHCP is summarized below in Table 1.

**Table 1.
Chronological File Record
CWHCP**

| Date | Action (doc sent/received meeting, etc.) | Topic |
|----------|--|---|
| 7/12/00 | Meeting between SMI, WVFO, West Virginia Division of Highways. | Discovery of endangered species at Snowshoe Mountain in proposed alignment for new road construction, approximately three miles south of Camp Wilderness. |
| 8/16/00 | Letter from WVFO to SMI. | Invitation for SMI to work cooperatively with Service to conserve federally-listed species at Snowshoe Mountain. |
| 10/00 | Meeting between WVFO and SMI. | Presentation of HCP process. |
| 5-6/01 | WVNFS surveys at various locations, including Camp Wilderness, at Snowshoe Mountain. | Surveys conducted by Dr. Michael with assistance from BHE and participation of WVFO biologist. |
| 7/26/01 | Report received by WVFO from West Virginia Division of Natural Resources (WVDNR). | "WVNFS Survey at Various Sites of Proposed Development, Snowshoe Mountain, Pocahontas County, West Virginia", prepared by Dr. Edwin Michael. |
| 8/23/01 | Meeting at Snowshoe Mountain Resort. | Several proposed projects at Snowshoe, including proposed Camp Wilderness development plans. |
| 9/12/01 | Letter from BHE to WVFO. | Camp Wilderness revised development plan. |
| 9/19/01 | Letter to IRI from WVFO. | Response to 8/23 meeting, including recommendation to prepare HCP for Camp Wilderness because take is unavoidable. |
| 11/02/01 | Letter to BHE from WVFO. | Suggested Biological Goals for CWHCP. |
| 11/8/01 | Draft CWHCP from BHE. | First draft of CWHCP. |
| 11/28/01 | Letter to BHE from WVFO. | Comments on draft CWHCP. |

| Date | Action (doc sent/received meeting, etc.) | Topic |
|-------------|---|--|
| 12/18/01 | Fax to WVFO from BHE. | Letter to BHE from West Virginia Division of Cultural and History (WVDCH) requiring Phase 1 archeological survey. |
| 12/20/01 | Fax to WVFO from SMI. | Letter from Williamsburg Environmental Group stating that there are no jurisdictional wetlands in CWHCP area. |
| 01/15/02 | Conference call between WVFO, RO, SOL, BHE, IRI, SMI. | NEPA for CWHCP / Gant chart. |
| 01/16/02 | Draft CWHCP from BHE. | Second draft of CWHCP. |
| 01/16/02 | Email from RO and then faxed to BHE. | Archeology report adequate for National Historic Preservation Act (NHPA) Section 106 compliance. |
| 01/18/02 | Report from BHE to WVFO and WVDCH. | Phase I Cultural Resources Survey of Approximately 55 Acres For The Proposed Camp Wilderness Development Located on Southern Cheat Mountain, Pocahontas County, West Virginia”, prepared by BHE. |
| 02/12/02 | Fax from BHE to WVFO. | Concurrence letter from WVDCH verifying satisfaction of Section 106 NHPA requirements. |
| 02/15/02 | Fax to BHE from WVFO. | CWHCP comments originating from RO. |
| 02/21/02 | Fax from SMI to WVFO. | USACE confirmation letter that no jurisdictional wetlands would be impacted by proposed Camp Wilderness development. |
| 04/21/02 | email to BHE from WVFO. | Rehabilitation ideas for CWHCP. |
| 06/17/02 | Letter to BHE from WVFO. | Mitigation ratio determination and habitat quality ranking. |
| 06/26/02 | email to BHE from WVFO. | Determination that only form of take expected from Camp Wilderness development was harm through habitat loss. |
| 07/08/02 | Letter from BHE to WVFO. | CWHCP take analysis and mitigation ratio verification. |
| 07/23/02 | Letter from BHE to WVFO. | Mitigation ratio counter-proposal. |
| 08/15/02 | Letter from WVFO to BHE | Mitigation ratio determination and working relationship. |
| 08/27/02 | Conference call with SMI, IRI, BHE and RO. | Mitigation ratio determination and other CWHCP issues (conservation area and permit duration). |

| Date | Action (doc sent/received meeting, etc.) | Topic |
|-------------|---|--|
| 09/25/02 | Draft CWHCP from BHE to WVFO. | Third draft of CWHCP. |
| 09/26/02 | Meeting with BHE, SMI, IRI, WVFO, RO, WO, Congressman Rahall and staff in Longworth Building, Washington D.C. | Unresolved CWHCP issues including proposed conservation area, permit duration and timing of ITP issuance. |
| 11/15-17/02 | Coordination between WVFO, SOL, BHE IRI and SMI. | Completion of final draft of CWHCP and draft Environmental Assessment (EA). |
| 11/18/02 | Final ITP application forwarded to RO and SOL. | Complete ITP package, including certification memo from WVFO sent to RO and SOL. |
| 11/18/02 | Federal Register Notice of Availability (FRN). | FRN sent from RO to WO. |
| 11/29/02 | FRN published. | Notice of availability of draft CWHCP and EA published in Federal Register for public review and comment. |
| 1/02/03 | Meeting between Fernow Experimental Forest (FEF), SMI, BHE, WVDNR and Service. | Logistics of upcoming winter telemetry survey at Snowshoe Mountain. |
| 1/4-5/03 | Nest boxes hung for Camp Wilderness. | Nest boxes placed in all phases of construction area and proposed conservation area by BHE for CWHCP (37 total). |
| 1/15/03 | Meeting at Snowshoe Mountain Resort. | Meeting between SMI, IRI, BHE and Service (RO and WVFO) to discuss future endangered species management. |
| 1/16/03 | Letter from Judy Rodd, Friends of Blackwater to WVFO. | Request to extend public comment period by 30 days. |
| 1/23/03 | Letter from WVFO to Judy Rodd, Friends of Blackwater. | One week extension to public comment period granted at request of the Friends of Blackwater. |
| 1/28/03 | Public comment period closes. | |
| 1/28/03 | Winter telemetry survey at Snowshoe Mountain. | Survey to study habitat fragmentation and secure nesting sites commences. |
| 02/03/03 | Letter from Ruth Blackwell Rogers to WVFO. | CWHCP/EA comment letter. |
| 02/04/03 | Extended public comment period closes. | Faxed CWHCP/EA comment letter from Friends of Blackwater received in WVFO. |
| 02/05/03 | Letter from Southern Appalachian Biodiversity Project to WVFO. | CWHCP/EA comment letter. |
| 02/06/03 | Letter from Friends of Blackwater to WVFO. | Hard copy letter from Friends of Blackwater received by WVFO. |

| Date | Action (doc sent/received meeting, etc.) | Topic |
|----------|---|--|
| 02/11/03 | Letter from BHE on behalf of IRI and SMI to WVFO. | Faxed response to comments letter from BHE received in WVFO (hardcopy received 02/12/03). |
| 02/19/03 | Letter from Tom Jackson on behalf of IRI and SMI to WVFO. | Faxed letter to supplement original response to comment letter with regard to economic infeasibility of suggested alternatives (Includes confidential business information). |

BIOLOGICAL OPINION

I. Description of the Proposed Action

As previously mentioned, the proposed Federal action requiring formal intra-Service consultation under section 7 of the ESA is issuance of an ITP, pursuant to section 10(a)(1)(B) of the ESA. The ITP applicants, IRI and SMI, propose to construct Camp Wilderness. The proposed development consists of approximately 55 buildings containing privately-owned residential units, a community building, other community facilities, a shuttle terminal, and a ski trail. Associated amenities (e.g., playground, an excavated man-made pond and artificial stream, recreational trails) and infrastructure (e.g., streets and parking lots) also are planned. The proposed construction boundaries of Camp Wilderness encompass approximately 50.6 acres. Proposed residential buildings will be constructed on lots averaging 0.2 acre in size. The ski trail will be between 40 and 60 feet wide, approximately 2,143 feet long, and will connect Camp Wilderness with existing ski runs near Snowshoe Village. New recreational trails will be paved or mulched, and will be no more than 5 feet wide. Roads within the project area will consist of a paved surface from 12 to 16 feet wide with gravel shoulders from 2 to 4 feet wide, with a maximum total width of 20 feet. IRI is the developer of Camp Wilderness. SMI will own the land within the Conservation Area associated with the development. Construction of this development is anticipated to result in take of the WVNFS in the form of "harm" through habitat loss. In order to avoid a violation of the "take" prohibitions described in section 9 of the ESA, the applicants submitted an HCP with an application for an ITP, which would exempt the incidental take.

The WVFO, IRI, and SMI developed biological goals and objectives designed to protect WVNFS in the Camp Wilderness area. These goals and objectives were developed in accordance with the recovery strategy described in the Appalachian northern flying squirrel recovery plan and the best available data. Biological goals for the WVNFS at Camp Wilderness are summarized below.

- Establish a permanent Conservation Area that preserves suitable habitat for WVNFS.
- Provide habitat corridors that facilitate movement of WVNFS and avoid creating barriers to movement.
- Provide artificial den sites to minimize impacts of transition to new habitat and monitor use of the area.
- Manage habitat to favor the WVNFS over the southern flying squirrel.
- Avoid lethal take of young, immobile WVNFS by restricting removal of potential nest trees (any live or dead hardwood or conifer tree with diameter at breast height (d.b.h.) 6 inches or greater, or any tree with a d.b.h. of less than 6 inches if a cavity is present) to the period between September 15 and April 1.
- Reduce the likelihood of lethal take of WVNFS by people and pets.
- Minimize potential predation on WVNFS by minimizing night-time illumination of the forest canopy.

Up to an approximate maximum of 39.8 acres of forested habitat would be cleared for the proposed development; 1.6 acres of non-forested area would be converted to infrastructure, and 9.2 acres would remain forested (Table 2).

Table 2. Camp Wilderness Development

| | Acres |
|---|---------------------------------------|
| Maximum area to be cleared | 39.8 [22.5 permanent; 17.3 temporary] |
| Area to remain forested | 9.2 |
| Currently non-forested area converted to infrastructure | 1.6 |
| Total | 50.6 |

Construction of Camp Wilderness is expected to be completed in approximately three years, but may take up to 20 years, depending upon economic conditions. Development of Camp Wilderness will occur in six phases with the year of construction of each phase dependant upon economic conditions (Table 3).

Table 3. Camp Wilderness Phases

| Phase | Acres |
|--------------|--------------|
| 1 | 18.6 |
| 2 | 6.1 |

| | |
|--------------------|-------------|
| 3 | 7.1 |
| 4 | 7.3 |
| 5 | 7.7 |
| 6 | 3.8 |
| Total Acres | 50.6 |

Site Preparation

Within the proposed project boundaries, earth grading and permanent tree clearing will occur on up to 22.5 acres within the footprint of the buildings, roads, and parking lots, and along the ski trail (Table 4). This permanently cleared area is referred to as the construction zone (CZ). The proposed ski trail will be constructed during Phase 1 of the Camp Wilderness development. The planning area in which the ski trail will be built is between 105 and 150 feet wide, and covers approximately 5.9 acres. The ultimate location of the trail within this planning area will be based on final engineering surveys. While the entire 5.9 acres of forest will not be completely cleared, these acres are included in the total 22.5 acre CZ. This assumption was made in order to estimate the maximum potential loss of WVNFS habitat due to the ski trail. Due to the amount of cut-and-fill that will be required because of the steep slope, an area between 80 and 100 feet wide will be cleared during construction of the trail. Trees and shrubs will be allowed to regenerate in portions of the trail outside the final width of 40 to 60 feet.

Table 4. Camp Wilderness Clearing Areas

| | Acres |
|---|--------------|
| Permanently cleared construction zone (converted to infrastructure) (CZ) | 22.5 |
| Temporary Construction Zone (cleared temporarily and allowed to regenerate) (TCZ) | 17.3 |
| Total Clearing | 39.8 |

Approximately 17.3 acres of the project area consists of a 25-foot wide temporary construction zone (TCZ) around buildings, roadways, and other infrastructure (Table 4). The TCZ refers to the area surrounding the infrastructure which will be partially cleared in order to facilitate construction activities.

Human Occupancy

The privately-owned residences will consist of 151 condominium units comprising two, three or four unit townhouses. In order for the Service to gauge the magnitude of disturbance associated with human habitation of the proposed development, SMI and IRI have generated occupancy projections for the proposed Camp Wilderness development for ten years after construction. The projections are based on the following assumptions: a 10% growth rate for the ten year period; 5 people per unit per stay; 1.5 cars per unit per stay; and an immediate total build out. This approach likely overestimates occupancy

of Camp Wilderness while the development is being constructed, and is protective of the WVNFS. Camp Wilderness will be developed, and occupied by human inhabitants in phases over time.

Ski Trail Maintenance

Construction of the ski trail also includes activities required to maintain the trail, in particular snow grooming, and snow-making activities. The ski trail will not be lighted, but the snow will be groomed nightly during the season. Snow-making will occur at the beginning of, and periodically throughout, the ski season (November – March). The snow guns used to make artificial snow are portable and will be moved along and across the ski trail as needed. The guns will be connected via hoses to water and compressed air hydrants that will be installed along the trail during the initial construction. The compressed air used in the snow-making process will be generated in an existing closed compressor house located at the base of the ski area. The water and compressed air will be routed into pipes connecting the hydrants to the compressor house.

Minimization and Mitigation of Impacts

Based on the mitigation ratio developed by the Service for the CWHCP (Appendix A), permanent habitat loss will be compensated at a ratio of 3:1, while the habitat temporarily degraded and/or lost (temporary construction zone) requires a 2:1 mitigation ratio. The mitigation ratio is used in conjunction with the habitat quality ranking (Appendix B) to determine the appropriate type(s) and amount(s) of mitigation required to compensate for lost and/or degraded habitat. Based on the mitigation ratio and habitat quality ranking, a permanent Conservation Area will be established on approximately 85.6 acres surrounding Camp Wilderness. The Conservation Area is designed to provide permanent suitable habitat for WVNFS potentially displaced from Camp Wilderness, and to minimize future reduction of forest within the area occupied by affected squirrels. The forest in the Conservation Area is adjacent to Camp Wilderness and is therefore available to WVNFS in and near the project area. Additional mitigation measures have been incorporated into the project to minimize potential effects on WVNFS by occupants of Camp Wilderness. These include seasonal clearing restrictions of potential nest trees; minimized tree clearing for construction activities; a policy to keep pets leashed when outdoors; the use of animal proof containers to store garbage, bird seed, pet food and other edible materials; minimization of outdoor illumination in the forest; and development of an environmental education campaign which will include creation of an interpretive trail which addresses the natural history of the WVNFS.

As part of the monitoring program, 37 nest boxes have been placed before construction begins. This included 22 boxes in the proposed conservation area and 15 scattered throughout the remaining forest within the project area.

II. Status of the Species/Critical Habitat

Species/critical habitat description

In 1985, both subspecies of Glaucomys sabrinus found in the Appalachian Mountains, the Carolina northern flying squirrel, Glaucomys sabrinus coloratus (CNFS), and the WVNFS were listed as

endangered (50 Fed. Reg. 27002 [1985]).

Currently, the WVNFS inhabits boreal forest habitats, especially transitional areas from red spruce dominant stands to stands of northern hardwoods with a conifer component in seven West Virginia counties: Grant, Tucker, Randolph, Pendleton, Pocahontas, Greenbrier and Webster. The WVNFS also occurs in Highland County, Virginia.

While it has been found in highly variable habitats, favorable habitat for the WVNFS in the absence of old-growth red spruce dominated forests, appears to consist of a northern hardwood/red spruce forest with many old-growth features. Old-growth conditions include stands with large, mature or over-mature trees (both healthy and decadent) consisting of various age and size classes, resulting in a multi-layered canopy with dead trees and relatively large amounts of decaying coarse woody material and an abundance of lichen and fungi. Despite the lack of large spruce trees, the relative abundance of natural cavities in old hardwoods and their resistance to windthrow (compared to many conifers) may account for the WVNFS' preference for mixed hardwood and spruce forest (FWS 1990). Due to their proximity to the spruce forest, these transitional areas between red spruce and northern hardwood forest also provide habitat that is somewhat comparable to that of a boreal forest.

No critical habitat has been designated for the WVNFS anywhere within its range.

Life History

A total of 24 sub-species of the northern flying squirrel, *Glaucomys sabrinus*, occur in boreal coniferous and mixed coniferous/hardwood forest of the northern United States and Canada, the mountain ranges of the western United States, and certain highland areas of the southern Appalachian Mountains. The core of the range (*Glaucomys sabrinus sabrinus*) occurs across the extreme north central United States and eastern and central Canada. As previously mentioned, there are two sub-species which are federally-listed and occur in the southern Appalachians, the CNFS and the WVNFS. The pre-settlement distribution of *Glaucomys sabrinus* in the Southeast is unknown, but fossil remains indicate a much larger range during the late Pleistocene and early Holocene (Kurten and Anderson, 1980; Lundelius et al., 1983; and Semken, 1983 in FWS 1990). The disjunct distribution of these sub-species in the southern Appalachians and their great distance from the center of the species' range in the northern United States and Canada suggest that they are relicts which have become isolated in small patches of suitable habitat by changing climatic and vegetational conditions since the last ice age (FWS 1990).

The southern flying squirrel, *G. volans volans*, is much more common than the WVNFS throughout West Virginia and occurs primarily in hardwood forest. However, in several instances, including the Camp Wilderness area and elsewhere at Snowshoe Resort, the range of the southern flying squirrel overlaps that of the WVNFS. The WVNFS may be displaced by the more aggressive southern flying squirrel in certain overlapping ecotone habitats, and it may transmit the parasite *Strongyloides robustus*, which may be fatal to WVNFS (FWS, 1990). However the Stewart Knob population of WVNFS have coexisted with southern flying squirrels for nearly 20 or more years with no apparent deleterious effects to either sub-species.

Predators of the WVNFS may include weasel, fox, mink, owl, hawks, bobcat, skunk, raccoon, snakes and fisher.

Greater than 75% of the known habitat of the WVNFS occurs in West Virginia on the Monongahela National Forest (MNF). A small amount of habitat (one to two percent) is located in Virginia on Allegheny Mountain, which is adjacent to the MNF on the George Washington/Jefferson National Forest in Virginia (FWS, 2001). The northern flying squirrel is also present in southwestern Virginia. The taxonomic status of the northern flying squirrel in southwestern Virginia is not adequately determined. The CNFS is known to occur in the higher elevations of North Carolina and Tennessee. In order to use the best available information, research pertinent to the WVNFS was used when available, and vice-versa. These two sub-species are similar enough that the Appalachian Northern Flying Squirrel Recovery Plan (1990) pertains to both sub-species. If data was lacking for both sub-species, then information pertinent to other G. sabrinus sub-species was utilized.

The two endangered sub-species of the northern flying squirrel, CNFS and WVNFS, are small, nocturnal, gliding mammals 10-12 inches in total length and 3-5 ounces in weight. Because of their rarity, nocturnal and secretive habits, and the remoteness of their habitat, little was known of the ecology of northern flying squirrels in the southern Appalachians prior to their listing (Weigl 1977 in USFWS, 1990). By virtue of geographic location and limited access because the majority of habitat is found on the MNF, human encroachment has not been an issue for this sub-species in the past. Therefore, little is known about the WVNFS with respect to human encroachment. However, in other locations, northern flying squirrels seem unperturbed by human activity (Carey, pers. com, 2002; Higgelke and MacLeod, 2000).

Several authors have noted the acrobatic nature of flying squirrels in flight, with long glides including banking and turning to avoid objects in the flight path (Dolan and Carter, 1977 and Nowak, 1999 in Vernes 2001). In a study by Vernes (2001), the horizontal glide distance of the northern flying squirrel varied between 10 and 148 feet, with the majority of the glides ranging from 16 to 82 feet. In this study, the most common landing tree was red spruce, although hardwood species were more readily available. Despite their dominance in the stand, nonconiferous trees were used infrequently as landing points, probably because flying squirrels have difficulty maintaining traction on the smooth, flaky bark of hardwoods such as yellow birch. For longer glides, gliding mammals usually select vertical tree trunks (Caple et al. 1983 in Vernes 2001). In Tucker County, West Virginia, a WVNFS was captured on one side of a cleared, vegetated power line right-of-way approximately 142 feet wide and recaptured on the other side a couple of weeks later (Michael unpublished). Mature red spruce trees were present along both edges of the forest adjacent to this cleared power right-of-way.

Northern flying squirrels use tree cavities as dens but are also known to utilize nests constructed of lichen, twigs, moss and shredded bark, known as dreys (Maser et al., 1986; Carey et al., 1997) on the boles or branches of trees (Rosenburg and Anthony, 1992; Waters and Zabel, 1995; Carey et al.

1997; Menzel, 2000). It is thought that northern flying squirrels may show a preference to live trees because of the shelter and hiding cover offered by the overhead branches and because live trees may persist for a longer period of time than snags (McDonald, 1995; Carey et al., 1997).

The northern flying squirrel has been known to select the option of building a drey in close proximity to high quality foraging areas rather than occupying a tree cavity located far from necessary food resources (Carey et al., 1997).

Availability of suitable nest sites may limit the number and distribution of the WVNFS. This species typically occupies natural tree cavities, dreys and also nests in man-made boxes (USFWS, 2001). During the cooler months, the WVNFS commonly occupies tree cavities and woodpecker holes (Baker, 1983 in USFWS, 1990; Booth, 1963 in Wells-Gosling and Heaney, 1984). In the summer, the northern flying squirrel is known to construct and use dreys, upon conifer branches or in hardwood foliage (USFWS, 1990, Stihler et al. 1995; Weigl et al., 1999; Cowan, 1936 in FWS, 1990; Urban 1988). Five WVNFS tracked with radiotelemetry used cavity nests primarily in birch trees, and dreys in spruce trees (Menzel et al. 2000). Nest sites commonly were located on north-facing slopes with dense tree canopy (Menzel et al. 2000). Of trees occupied by nesting WVNFS, the minimum d.b.h. of deciduous trees was 4.3 inches, and the minimum d.b.h. of spruce was 5.5 inches. While the WVNFS shows a high plasticity in nest tree selection, nest trees appear to be larger and taller than the surrounding trees (Menzel unpublished) In North Carolina, the CNFS occupied cavity nests in trees with d.b.h. ranging from 8.3 inches to 39.4 inches (Weigl, unpublished). In Alaska, Glaucomys sabrinus yokonensis have been observed using up to 34 alternate den trees (Mowrey and Zasada, 1982). Individual CNFSs are known to have more than 3 active nests at a given time (Weigl et al., 1999). WVNFS are known to have multiple den sites at any given time, utilizing up to 12 den sites per month in fragmented habitat (Menzel, 2000).

Although the northern flying squirrel may utilize dens year-round, denning sites chosen by females change during the breeding season (Kiggelke and MacLeod, 2000; Michael pers. comm, 2002). The transition to a new den for birthing may be a result of the presence of parasites in a used den. In the Pacific Northwest and Alberta, female northern flying squirrels have used downed logs for natal dens (Carey et al., 1997; Kiggelke and MacLeod, 2000). This could be a result of the inter- and intra-specific competition for cavities high in the canopy (Carey et al., 1997). Because of the general lack of large downed woody material in potential WVNFS habitat, the use of downed wood for natal dens is not thought to be significant. However, the presence of downed woody material is thought to be an important component of good WVNFS foraging habitat.

Generally northern flying squirrels produce one litter per year and mate in late March through May, with young usually born in late May through June (Wells-Gosling and Heaney, 1984). Research conducted on the CNFS suggests it reproduces opportunistically with the time of reproduction linked to the health of females and available food resources (Weigl et al., 1999). Research in Virginia suggested that, based on enlarged testes, males became reproductively active in December and stayed that way

through the spring (Reynolds et. al., 1999). This pattern of reproductive readiness corresponded to that reported in North Carolina (Weigl et. al., 1999). Female reproductive activity was first reported in March based on lactating females and presence of neonates (Reynolds et. al., 1999). There were no reproductively active females in December, while all adult females captured in May were either pregnant or lactating. While there is a limited amount of information on the breeding ecology of the WVNFS, capture data (WVDNR unpublished, 1990-2003) suggests breeding activity occurs in the late spring and early summer and only a single litter per year is reared, similar to that of other subspecies of the northern flying squirrel (USFWS, 1990).

Gestation requires 37 to 42 days (Muul, 1969; Soper, 1973 in Wells-Gosling and Heaney, 1984). Young begin walking and emerging from the nest at 40 days of age (Muul, 1969 in Wells-Gosling and Heaney, 1984), and soon begin to eat solid food (Wells-Gosling and Heaney, 1984). While they are weaned by 2 months (Booth, 1946 and Jackson, 1961 in Wells-Gosling and Heaney 1984), young may remain with their mother for some time (Wells-Gosling and Heaney 1984). Normal lifespan is probably less than 4 years (Jackson 1961 in Wells-Gosling and Heaney, 1984).

Food of the northern flying squirrel includes acorns, hazelnuts, beechnuts, and other nuts, conifer and hardwood seeds, buds, staminate cones (Connor, 1960 and Jackson, 1961 in Wells-Gosling and Heaney, 1984), wild fruits and insects (Bailey, 1936, Foster and Tate, 1966 and Jackson 1961 in Wells-Gosling and Heaney, 1984), tree sap (Foster and Tate 1966, Schmidt, 1931 in Wells-Gosling and Heaney, 1984), fungi (both hypogeous and epigeous), lichens (Wells-Gosling and Heaney, 1984; Mitchell, 2001; USFWS 1990; Carey et. al., 1999), and other plant and animal material. Apparently old growth forests with their large trees and many downed logs support larger standing crops of fungi and sporocarps than younger stands (Maser et. al., 1979). Research in northern California suggests that flying squirrel numbers are closely correlated with hypogeous fungus biomass (Waters in Weigl et al., 1999).

While northern flying squirrels consume a variety of foods, fungi, particularly mycorrhizal fungi, were recorded in stomach content surveys as the resource most commonly ingested (Maser et al., 1985; Maser et al. 1986; Hall 1991). Some data suggests that these squirrels are obligate mycophagists (Maser et al. 1986; Maser and Maser, 1988; Hall, 1991), though arboreal lichens are consumed more frequently during the winter when snow covers the ground (Payne et al., 1989; Hall, 1991; Rosenberg and Anthony, 1992). Sporocarps of hypogeous mycorrhizal fungi (truffles) are the major food sources of northern flying squirrels (Loeb et al., 2000). Overall, fungi and lichens comprised between 90 and 100% of the year-round diet (Maser et al., 1978; Maser et al., 1986) for northern flying squirrels in the Pacific Northwest. Fecal samples of WVNFS captured in West Virginia indicate the most common foods eaten were lichens, fungi, mostly hypogeous, pollen (buds) and insects (WVDNR, unpublished). Mitchell (2001) found that in the spring, the WVNFS's diet consisted primarily of tree buds, lichens, and hypogeous fungi. In the fall hypogeous and epigeous fungi, and beechnuts were the most commonly consumed food items. It is not clear what role the WVNFS has on the mychorrhizal fungi in the forest (Mitchell, 2001). Loeb et al. (2000) found that red spruce was significantly more likely to be

present in areas where truffles were found. Therefore, this data suggests that spruce or mixed spruce/hardwood stands, particularly forest with old-growth characteristics, are important foraging sites for northern flying squirrels in the southern Appalachians.

Telemetry studies in the southern Appalachians have provided some data on the WVNFS's and CNFS's activity and use of space. Animals radiotracked during the summer have a marked biphasic activity pattern with peaks between sundown and midnight and 1-3 hours before sunrise (FWS, 1990; Menzel, 2000). During these times squirrels are extremely active in trees and on the ground and enter a number of different nests or refuges (Ferron, 1981; Weigl et. al., 1999; Menzel, 2000). The long periods of time spent on the ground is thought to be associated with foraging on hypogeous fungi. Furthermore, a study in California suggested that although northern flying squirrels search for truffles primarily using olfaction, they may also benefit by searching near downed coarse woody debris as an above-ground cue to truffle locations (Pyare and Longland, 2001). Because locations yielded fruiting truffles in consecutive years, mycophagous animals, such as the northern flying squirrel, may benefit by memorizing fruiting locations and forage at these same locations from year to year (Pyare and Longland, 2001).

Originally, summer telemetry data suggested individual home ranges of 4.9-7.5 acres in North Carolina for the CNFS (Weigl and Osgood, 1974 in FWS, 1990) and 12.3-17.3 acres in West Virginia for the WVNFS (Urban, 1988). The following information is taken from Weigl et al., 1999. Telemetry studies in North Carolina have shown that adult CNFS, particularly males, showed the capacity to move great distances in a relatively short time during the winter, moving a total distance in excess of one mile within three hours after beginning activity. During the summer, squirrels, particularly males, also made rapid movements, but not as noticeable as winter activity. Males tended to move quickly through the habitat more often than females, although both sexes demonstrated the ability to move through an area quickly. The squirrels tracked in North Carolina frequently crossed barriers and habitat boundaries, with documentation of a male crossing a paved road during five separate tracking sessions. The squirrels also commonly moved considerable distances into habitat that differed from that of their nest location. For the CNFS, home range size ranged from 3-56 acres. The summer home range mean was approximately 15 acres, while the winter home range mean was approximately 28 acres.

Telemetry data in West Virginia (Menzel, unpublished) have shown that home ranges are also larger in size than originally thought, with the average home range of females ranging from 24-49

acres, and the average home range for males being over 370 acres. This data has been collected during the summer and fall, up until October. There is no data available to determine squirrel movements during the winter in West Virginia.

The home ranges from Weigl's study (1999) and Menzel's current work (Menzel, pers. comm.) are larger than any previously reported from the east, and even larger than that found elsewhere. While the

reasons for such a larger home range for these two sub-species than originally thought is not yet known, there are several possible explanations. It is likely the interaction of mating and feeding activities, combined with availability of secure nesting sites are the most important factors determining home range size of the WVNFS. Furthermore, a plausible explanation could be related to the quality of habitat and spacing of habitat components necessary for survival. Initial interpretation suggests that the size of home ranges is conversely related to the suspected quality of habitat. In other words, the less fragmented and more mature the forest, the smaller the home range.

Feeding activity is suspected to be one of the main determinants of home range. Conifer parts and hypogeous fungal spores have been observed in nearly all fecal samples taken from CNFS and WVNFS (Weigl et. al., 1999; WVDNR, 1997; Mitchell, 2001). Furthermore, as previously mentioned, Loeb et al. (2000) found that red spruce was significantly more likely to be present in areas where truffles were found. Also, research suggests that coarse woody debris may be an above-ground cue to the northern flying squirrel (Pyare and Longland, 2001) as to the presence of truffles. Therefore, this data suggests that spruce or mixed spruce/hardwood stands, especially those with downed coarse woody debris, are important foraging sites for northern flying squirrels in the southern Appalachians. Assuming fungi and staminate cones are highly localized in these habitats, the squirrels may be traveling great distances to reach areas of foraging habitat, especially during late winter months when food availability is at its lowest. The ability to cover long distances in a short period of time provides an advantage for a small mycophagous mammal such as the northern flying squirrel (Vernes, 2001). The numerous small digs or pits in the forest floor in areas where active squirrels were tracked supports this notion, but cannot be definitively concluded because other small mammals, including the red squirrel also consume hypogeous fungi.

In Weigl's study (1999), all nest sites were located within 330 feet of the ecotone. Most of the drey nests, although found exclusively in red spruce trees, were located in or near ecotonal areas between conifer and hardwood zones. Although the study is ongoing, Menzel's work also suggests that the ecotone is the most utilized habitat type of the WVNFS. Although both hardwood and coniferous trees provide nesting sites, it is apparent that the ecotone, or areas of mixed hardwood forest, with a conifer component, represents the most important habitat type with respect to sheltering. While the WVNFS may frequent the pure conifer forest, it is not dependent on this habitat type for sheltering probably because of the lack of secure nesting sites. Because of the flying squirrel's small size, the climatic severity of its habitat, and abundance of avian and mammalian predators, secure nesting sites represent a critical limiting factor (FWS, 1990).

Social interactions may play a role in home range size. The times of greatest movement and activity by male G. sabrinus correspond to the presumed mating season (late winter). Most occasions where two or more flying squirrels shared a nest were found during winter telemetry work (Weigl et. al., 1999). Numerous cohabitations observed during Weigl's study suggests a complex, though poorly understood, social organization. Thus it is possible that mating activity may influence winter male home ranges. Another important observation from Weigl's study (1999) was the movement by three females to

solitary nests near the end of March. Each of those females had been previously cohabiting with other squirrels that season. This observation suggests the use of natal dens and supports other research that cavities are important for nesting and reproductive success.

Population Dynamics

Monitoring efforts for the WVNFS have focused on determining whether or not potential habitat is occupied via live trapping or nest box monitoring. Furthermore, current research has entailed telemetry work to gain a better understanding of the sub-species' activity patterns and use of space. Nest box monitoring and live trapping results are summarized in Table 5.

Table 5. WVNFS Range-wide Capture Data (1987-2002)

| Year | Male | Female | Unk. | Adult | Juv. | Nest. | Unk. | Total |
|--------------|------|--------|------|-------|------|-------|------|-------------|
| 07/87-06/88 | - | - | - | - | - | - | - | 24 |
| 07/88-06/89 | 31 | 30 | 8 | 36 | 6 | 6 | 21 | 69 |
| 07/89-06/90 | 37 | 30 | 39 | 70 | 9 | 20 | 7 | 106 |
| 07/90-06/91 | 45 | 34 | 4 | 77 | 2 | 4 | 0 | 83 |
| 07/91-06/92 | 34 | 36 | 23 | 66 | 13 | 6 | 8 | 93 |
| 07/92-06/93 | 25 | 21 | 1 | 40 | 6 | 0 | 1 | 47 |
| 07/93-06/94 | 23 | 34 | 10 | 44 | 7 | 14 | 2 | 67 |
| 07/94-06/95 | 46 | 52 | 26 | 79 | 18 | 27 | 0 | 124 |
| 07/95-06/96 | 19 | 21 | 4 | 40 | 0 | 4 | 0 | 44 |
| 07/96-07/97 | 38 | 46 | 7 | 47 | 22 | 20 | 2 | 91 |
| 07/97-06/98 | 13 | 19 | 8 | 30 | 3 | 6 | 1 | 40 |
| 07/98-06/99 | 18 | 21 | 2 | 26 | 12 | 0 | 3 | 41 |
| 07/99-09/00 | 26 | 24 | 3 | 29 | 5 | 16 | 3 | 53 |
| 10/00-09/01 | 43 | 61 | 3 | 88 | 16 | 2 | 1 | 107 |
| 10/01-09/02 | 9 | 10 | 0 | 16 | 0 | 3 | 0 | 19 |
| Total | 407 | 439 | 138 | 688 | 119 | 128 | 49 | 1008 |

Table 6 summarizes recaptures and sex ratios by year of WVNFS monitoring.

Table 6. WVNFS Range-wide Sex Ratios (1987-2002)

| Year | Total Captures | Sex ratio (male:female) |
|--------------|-----------------------|--------------------------------|
| 07/87-06/88 | 24 | - |
| 07/88-06/89 | 69 | 1:1 |
| 07/89-06/90 | 106 | 1.23:1 |
| 07/90-06/91 | 83 | 1.3:1 |
| 07/91-06/92 | 93 | 1:1.06 |
| 07/92-06/93 | 47 | 1.1:1 |
| 07/93-06/94 | 67 | 1:1.48 |
| 07/94-06/95 | 124 | 1:1.13 |
| 07/95-06/96 | 44 | 1:1.1 |
| 07/96-07/97 | 91 | 1:1.2 |
| 07/97-06/98 | 40 | 1:1.4 |
| 07/98-06/99 | 41 | 1:1.2 |
| 07/99-09/00 | 53 | 1.1:1 |
| 10/00-09/01 | 107 | 1:1.4 |
| 10/01-09/02 | 19 | 1:1.3 |
| Total | 1008 | 1:1.08 |

Status and Distribution

Please refer to the mitigation ratio determination (Appendix A) and habitat quality ranking (Appendix B) for more information with regard to the status of WVNFS habitat. Currently, the primary threat to the WVNFS is loss of suitable habitat caused by forest clearing and fragmentation associated with logging, human development, forest pests (such as the woolly e.g., woolly adelgid), and pollution (FWS 2001). Forest clearing also may influence displacement of the WVNFS by facilitating competition with the more adaptable and aggressive southern flying squirrel.

Analysis of the species/critical habitat likely to be affected

As previously mentioned, no critical habitat has been designated for the WVNFS anywhere within its range. Due to the mobility of the WVNFS and the presence of potential habitat throughout the project area, the entire area is considered to be occupied habitat for the WVNFS.

Status of the Species at Snowshoe Resort

Snowshoe Mountain Resort is located within the proclamation boundary of the MNF. The two Geographic Recovery Areas (GRAs) closest to Snowshoe Mountain Resort are the Cheat Bridge and Cranberry GRAs, both on the MNF and located approximately 15 miles to the north and southwest, respectively. Other GRAs are more distant from Snowshoe Mountain. Potential habitat exists to the north and southwest of Snowshoe Mountain Resort by virtue of Cheat Mountain. Other adjacent areas are unsuitable for the WVNFS because the topographic relief results in pure hardwood forest and a warmer and drier micro-climate. No detailed assessment of habitat suitability for the WVNFS has been conducted within the Snowshoe property boundaries (approximately 11,000 acres), therefore the extent of suitable WVNFS habitat has not been identified. Elevations at the Snowshoe property range from 3,000 feet to 4,848 feet above mean sea level (MSL). While it has not been verified, approximately 3,000 acres of the western and southern portion of the property appears to be unsuitable habitat for the WVNFS. While this portion of the property is greater than 3,000 feet MSL, it appears it does not have the ecological potential to provide potential habitat because the topographic relief results in pure hardwood forest and a warmer and drier microhabitat.

The WVNFS was first discovered at Snowshoe Mountain in May, 2000 during surveys along the proposed alignment for construction of the Snowshoe access road off Route 66 from the southeast. Since that time, a total of 20 WVNFS have been captured at various locations on Snowshoe Mountain (Table 7). Of these captures, five adult WVNFS (2 adult males; 3 adult females) were captured within the proposed Camp Wilderness development in May, 2000 (Table 7). All WVNFS captures at Snowshoe Mountain have been as a result of live-trapping. Nest box monitoring has just begun at Snowshoe Mountain; therefore, there have been no captures to date as a result of nest box monitoring.

Table 7. WVNFS Capture Summary at Snowshoe Mountain Resort (2000-2002)

| Year | Male | Female | Unk. | Adult | Juv. | Nest. | Unk. | Total |
|--------------|-------------|---------------|-------------|--------------|-------------|--------------|-------------|--------------|
| 2000 | 3 | 4 | - | 5 | - | 2 | - | 7 |
| 2001 | 2 | 4 | 1 | 6 | - | - | 1 | 7 |
| 2002 | 2 | 4 | - | 6 | - | - | - | 6 |
| Total | 7 | 12 | 1 | 17 | - | 2 | - | 20 |

III. Environmental Baseline

The environmental baseline is described as the past and present impacts of all Federal, State, or private actions and other human activities in an action area, the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions within the action area, that are contemporaneous with this consultation. In other words, the baseline is a snapshot of the sub-species' status in the action area, at

the time of this consultation.

Description of the Action Area

The action area is described as all areas to be affected directly, or indirectly, by the Federal action, and not merely the immediate areas involved in the action. The action area for this action, issuance of an incidental take permit, has been determined to be the project area and the surrounding area which is the proposed conservation area.

Forest within the action area is composed of deciduous and coniferous species; predominant deciduous (hardwood) species include yellow birch, black cherry, American beech, red maple, and sugar maple. The dominant coniferous species is red spruce, and woody vegetation in the understory is primarily mountain holly, striped maple, and seedlings/saplings of the overstory trees. Forest within the action area generally is characterized by overstory trees with average d.b.h. between 6 and 18 inches. A few trees with d.b.h. greater than 20 inches are present, but extensive logging conducted during the last century likely removed many of the largest trees. In the majority of the action area, canopy cover ranges from 100 percent to less than 40 percent, and the forest floor is covered with organic debris, mosses, and ferns.

Because the Camp Wilderness project is located towards the southern part of the WVNFS’ range, the transitional zone, or ecotone, between red spruce forest and northern hardwood forest, which is preferred by the WVNFS, occurs above 3,500 feet MSL and on southern exposures, above 4,000 feet MSL. This zone is typified by a mixed and highly variable overstory species composition of American beech, yellow birch, black cherry, sugar maple, red spruce and eastern hemlock. For this particular project, the majority overstory hardwood species are American beech and yellow birch. The entire action area is considered to be not only suitable, but potentially occupied by the WVNFS. During December 4–6, 2001, habitat within the project area was evaluated to describe the vegetative composition and structure of the Camp Wilderness area, particularly as it relates to the WVNFS. Appendix B provides a habitat quality ranking of these four forest types found in and around the project area. The purpose of this habitat quality ranking was to provide a “habitat currency” with which exchange rates could be determined between different habitat types. The habitat matrix found in the habitat quality ranking is specific to the habitat found in the Camp Wilderness project area and takes into account the landscape surrounding the action area (project area and proposed conservation area). The amount of the four types of habitat found within the action area are described in Table 8.

Table 8. Characteristics of four forest types identified within the Action Area

| Forest type | Percent conifer in the overstory | Potential WVNFS den trees per acre | Average d.b.h. of conifers (inches) | Average basal area of conifers (square feet) | Development Area (Acres) | Conservation Area (Acres) |
|-------------------|----------------------------------|------------------------------------|-------------------------------------|--|--------------------------|---------------------------|
| Hardwood dominant | 0 – 25 | 43 | 9.9 | 10.3 | 1.2 | 8.6 |

| Forest type | Percent conifer in the overstory | Potential WVNFS den trees per acre | Average d.b.h. of conifers (inches) | Average basal area of conifers (square feet) | Development Area (Acres) | Conservation Area (Acres) |
|------------------------|----------------------------------|------------------------------------|-------------------------------------|--|--------------------------|---------------------------|
| Mixed hardwood/conifer | 26 – 84 | 17 | 8.1 | 62.9 | 21.3 | 52.6 |
| Conifer dominant | 85 – 94 | 11 | 7.9 | 110 | 7.2 | 19.2 |
| Pure conifer | 95 – 100 | 4 | 6.9 | 112.3 | 10.1 | 5.2 |

Status of the species within the action area

A survey for the WVNFS was conducted within proposed boundaries of Camp Wilderness during June 3 – 22, 2001 (Michael, 2001). Five WVNFS, including two adult males and three adult females, were identified within Camp Wilderness construction boundaries. Of the two males, one was non-reproductive and one was reproductively active. Two of the females were non-reproductive and the reproductive status of the third female is unknown. Three southern flying squirrels also were captured during the survey. The WVNFS trapped in Camp Wilderness generally were captured in the northern half of the proposed project area, while southern flying squirrels were trapped in the southern half. While the proposed ski trail was not included in the survey, forest within the proposed ski trail is considered to be potentially occupied by WVNFS because the habitat is comparable and connected to known occupied habitat. No data exist to determine if WVNFS captured in and near Camp Wilderness were nesting, foraging, or traveling through the area. One adult female WVNFS was captured approximately 1,200 feet north of Camp Wilderness, and one adult male was captured about 650 feet south of Camp Wilderness (Michael, 2001; BHE, 2002).

IV. Effects of the action

In evaluating the effects of the Federal action of issuing a section 10(a)(1)(B) ITP, 50 CFR 402.2 and 402(g)(3) require the Service to evaluate the effects of the action, which include both the direct and indirect effects of the action on the species, together with the effects of other activities that are interrelated or interdependent with the action that will be added to the environmental baseline. Direct effects are those effects that have immediate impacts on the species or its habitat while indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for project justification. Interdependent actions are those actions that have no independent utility apart from the action under consideration.

Direct Effects

Construction activities will include site preparation, development of staging areas, construction of buildings, construction and paving of roads and parking areas, installation of power, water and sewer lines, and other activities associated with the construction of a condominium development.

Potential direct effects include the felling of cavity trees containing squirrel nests. Data is lacking in West Virginia as to the response of a WVNFS if an occupied den tree was disturbed. However, it is assumed that an adult, mobile WVNFS would flee so as to avoid lethal take if a den tree was disturbed. This assumption is supported by Dr. Andrew Carey, a research biologist for the northern flying squirrel in the western United States. According to his experiences (Carey pers. comm., 2002), adult flying squirrels generally flee at any disturbance of an occupied den tree. Disturbances would include pounding an occupied tree with a stick, or cutting it with a chainsaw. Northern flying squirrels are even known to flee as a result of someone trying to quietly climb the tree. As previously mentioned, the northern flying squirrel, including the WVNFS, are known to utilize multiple den sites in a given time. The two methods of data collection for the WVNFS are live trapping and nest box monitoring. Both survey methods involve the release of captured individuals during the day. The normal behavior observed during these releases is for the WVNFS to flee without harm, normally climbing up a nearby tree, gliding to another tree and eventually traveling out of sight. During 2001, a WVNFS was captured at the proposed location of a fire station at Snowshoe Resort. Tree clearing operations for the fire station occurred during the non-breeding season for the WVNFS (late September). The same individual was recaptured in 2002 in remaining adjacent habitat after the clearing had occurred for the proposed fire station. Therefore, it is assumed that an adult, mobile WVNFS would successfully flee from a tree before incurring serious injury or death.

Because of the reasons previously discussed, adults are assumed to escape injury if an occupied den tree were disturbed. However, northern flying squirrel litters have been recovered from falling trees which suggests that very young squirrels may not flee (Carey, pers. comm., 2002). Therefore, if immobile nestlings were present, they may be killed because of the inability to flee. Generally northern flying squirrels produce one litter per year and mate in late March through May, with young usually born in late May through June (Wells-Gosling and Heaney, 1984). Northern flying squirrel young may begin to leave the nest at about 35 days of age, but are not weaned until between 55 and 60 days old (Hamilton and Whitaker, 1979). The majority of young WVNFS and/or pregnant or lactating females encountered during nest box monitoring and/or live trapping support the notion that breeding occurs in the spring and early summer (WVDNR, unpublished). Since young have been documented as late as the end of July, seasonal clearing restrictions have been set as September 15th in order to ensure that young of the year have become mobile. Older data from the WVDNR showed the presence of young later in the year. However, it is not known what the criteria for determining young were in the early monitoring of this sub-species.

All trees within Camp Wilderness that provide potential nest sites (i.e., all trees greater than 6 inch d.b.h., and trees less than 6 inch d.b.h. with a cavity) will be removed only between September 15 and April 1, when both adult and young WVNFS are expected to be capable of avoiding construction

activities. Trees without cavities and with a d.b.h. less than 6 inches (non-nesting trees) may be cleared during the period from April 2 to September 14, as needed for the purposes of constructing and maintaining trails, and other open areas within Camp Wilderness. Additionally, during the construction of each phase of the Camp Wilderness development, non-nesting trees and other vegetation may be cleared from the TCZ during the period from April 2 to September 14, as long as the area cleared within the TCZ during this period does not exceed 35 percent of the total acreage of the TCZ for that phase (Table 9).

Table 9. Clearing Limits Within TCZ

| Phase | Total Size of TCZ (acres) | 35% of total (acres) |
|--------------|----------------------------------|-----------------------------|
| 1 | 4.1 | 1.4 |
| 2 | 2.6 | 0.9 |
| 3 | 3.4 | 1.2 |
| 4 | 3.0 | 1.1 |
| 5 | 2.7 | 0.9 |
| 6 | 1.5 | 0.5 |

Because the period between September 15th and March 31st is considered to be the least likely time for presence of immobile WVNFS, lethal take of immobile young is not anticipated as a result of tree clearing operations for the proposed development during this time period

Site preparation will involve the removal of up to 39.8 acres of known, occupied WVNFS habitat. Because of the phased nature of the project, not all of the habitat will be adversely affected at a given time. All construction activities will occur during the day and the WVNFS are nocturnal. Although approximately 900 potential den trees will be removed, there will be over 1,000 natural potential den sites remaining as a result of the adjacent conservation area. In addition, artificial den sites (nest boxes) have been placed in the surrounding forest to enhance the availability of den sites during relocation.

In conclusion, adult WVNFS without young would most likely escape injury if a occupied den tree was disturbed because individual adult WVNFSs are known to flee when their den tree is disturbed and are also known to utilize multiple den sites. Immobile young are not anticipated to suffer direct mortality because all clearing of potential nest trees will occur during the time of year least likely to encounter young immobile nestlings.

Indirect effects

As described above, indirect effects occur later in time, but are reasonably certain to occur. Potential indirect effects as a result of the proposed activities include: 1) disturbance to WVNFS as a result of garbage, lights, and noise; 2) electrocution of WVNFS from power lines; 3) death of WVNFS as a result of vehicular traffic or snow-grooming; 4) disruption of WVNFS behavior by human habitation in occupied WVNFS habitat; or 5) disruption of WVNFS essential behavioral patterns by the removal of up to 39.8 acres of forested occupied habitat.

Because garbage could attract potential WVNFS predators to the area, garbage and other edible material could impact the WVNFS by making them more susceptible to predators or it could cause them injury or death if they got trapped in uncovered garbage containers. This project includes measures to avoid potential impacts to the WVNFS associated with garbage. In summary, all garbage will be properly disposed of daily during construction and all garbage, pet food, bird seed, and other edible material will be stored in animal proof containers, which will eliminate or minimize the chance of attracting additional predators to the area, and therefore are not likely to adversely affect the WVNFS.

Although the Service is not aware of scientific evidence to support this possible impact, lights illuminating the forest canopy could make the WVNFS more vulnerable to atypical predators, particularly cats, and cause a partial barrier to movement. However, in order to ensure protection of the WVNFS, security lights in the proposed development will be positioned and directed to minimize illumination in the forest. Furthermore, the Camp Wilderness Homeowner's declaration will prohibit cats outdoors and other pets must be kept on leashes. Therefore, any impacts associated with outside lighting have been determined to be insignificant and discountable.

Grooming of the ski slope proposed for Camp Wilderness will take approximately 1 hour per night, but may last up to 1.5 hours. Ski slopes are groomed each evening after the ski runs are closed for the day. The grooming fleet starts at one side of the mountain and moves through the slope system until all grooming is complete. Grooming is typically completed by 11:00 p.m., but might extend until midnight if the start of grooming is delayed while the snow hardens (this occurs only during warm weather). On occasion, limited slope grooming may be conducted during the early morning hours before sunrise. Lights in the forest canopy during snow-making and snow-grooming activities are considered temporary in nature because it will occur intermittently throughout not more than five months of the year (November-March), and have been determined to be insignificant and discountable in terms of impacts to the WVNFS.

At the start of the season, snow-making equipment will run almost continuously for about three days, or until the base layer of snow has been laid. Thereafter, the snow-making equipment is expected to be used an average of one night a week throughout the season. Snow-making will occur less frequently if possible, but warm weather may require snow to be created for up to several nights a week. Typically, the snow-making equipment runs from three to eight hours at a time, beginning after the runs are closed for the day (approximately 4:30 p.m.). Unless turned off earlier, the snow-making equipment is usually

shut down once grooming is completed. As previously mentioned, the noise associated with snow-making and snow-grooming will be temporary in nature.

There is little evidence to suggest that WVNFS avoid noise from human habitation, vehicles or other means. Although not conclusive, there is limited anecdotal evidence which indicates WVNFS may tolerate some level of human activities. In 2001, a reproductive female WVNFS was captured twice in a live trap set within 20 feet of a ski trail (Michael, 2001). During the summer when this WVNFS was captured, activities on the ski trail include people walking and biking, and maintenance workers traveling on foot and in vehicles. In 2002, a male WVNFS was captured within 160 feet of condominiums and within 200 feet of a ski trail (BHE, 2002). The male was captured during ski season when many condominiums were occupied, and skiers and snowmobiles were active on ski trails during the day. Snowmaking machines located 240 – 350 feet south of the capture site were operating two and three nights prior to the capture, indicating a tolerance to this noise. Additionally, a lactating female WVNFS was captured approximately 1.5 miles south of Camp Wilderness in a small forested area that was surrounded by active construction sites, condominiums, roads heavily used by construction machinery and other vehicles, and areas cleared of vegetation (Michael, 2002). The investigator even noted significant evidence of children and domestic pets present in the patch where the WVNFS was captured (Michael, 2002). Furthermore, based on nest box monitoring, WVNFS are known to utilize nest boxes adjacent to major roads with truck traffic and also along railroads. Because of their gliding ability and mobile nature, and the temporary and intermittent nature of the disturbance as a result of snow-making and snow-grooming, any potential impacts are not likely to adversely affect the WVNFS.

Although the WVNFS could be electrocuted by power-lines, there are no documented occurrences of such an event. There is documentation of WVNFS crossing a power-line right-of-way. Because all power-lines associated with this project will be buried in the road right-of-way, there will be no impacts to the WVNFS. Because of the availability of potential den sites nearby and the avoidance and minimization measures detailed in the biological goals, indirect effects as a result of lights, noise and garbage associated with this project, along with the possibility of electrocution, are not likely to adversely affect the WVNFS.

Based on projections generated by SMI and IRI, the average daily occupancy of the proposed development will be approximately 53 people for the first year after construction and rise to 68 people after ten years. This will result in approximately 27 vehicles per day for the first year after construction and rise to approximately 34 vehicles per day after ten years. There are no documented occurrences of adverse effects or death of northern flying squirrels, particularly the WVNFS, as a result of impacts of human occupancy. Because of their gliding ability and mobile nature, it appears that the northern flying squirrel, including the WVNFS, is able to withstand a certain amount of pressure associated with forest fragmentation and narrow linear clearings which would perforate habitat, such as roads and powerline corridors (Vernes, 2001).

While the WVNFS is known to occur adjacent to many paved roads, there are no documented occurrences of vehicular strikes of this sub-species, or other G. sabrinus. Foraging habitat for this sub-species is thought to be associated with existing forests and downed woody debris. Therefore, it is not known to forage in or along roadways. In addition, while the WVNFS may spend a significant amount of time on the ground foraging, the primary mode of travel is by gliding or moving through the branches of trees. Because the WVNFS is known to glide at higher heights than a vehicle, the chance of mortality as a result of a vehicle strike is highly unlikely. Therefore, adverse effects in the form of vehicular strikes or through disturbance resulting from human occupancy in WVNFS habitat is considered to be discountable. Squirrels tracked in North Carolina frequently crossed barriers and habitat boundaries, with documentation of a male crossing a paved road during five separate tracking sessions (Weigl et al., 1999). Based on surveys conducted over the last two years, there have been 20 WVNFS captured at and around Snowshoe Mountain Resort. Some of these captures have occurred in very close proximity to human activity, which would suggest the WVNFS is an adaptive sub-species that can tolerate some level of human disturbance. There has been human activity at and around Snowshoe Mountain at all times of the year for the last couple of decades including 24-hour mountain bike races, downhill skiing, archery competition and various other recreational activities. In addition, there are a number of occurrences of the WVNFS frequenting bird feeders near dusk in West Virginia (Stihler pers.comm., 2001) and this is well documented for the northern flying squirrel in Michigan and elsewhere (Wells-Gosling, 1985; Carey pers. comm., 2002).

In total, 39.8 acres within the project area are assumed to be either permanently or temporarily cleared of trees (Table 2). Clearing of the entire TCZ is not expected; however, for the purpose of this analysis it is assumed the entire area will be cleared. A limited amount of earth grading is expected to occur within the TCZ. However, because neither the 17.3-acre TCZ nor the 5.9-acre ski trail will be completely cleared of trees, it is highly likely that less than 39.8 acres will actually be cleared. The analyses in this document assume clearing of the maximum acreage (39.8 acres) in order to ensure adequate consideration of adverse impacts to the WVNFS. Conservation and regeneration of trees in the 17.3-acre TCZ is expected to ultimately increase the amount of forest within the boundaries of the Camp Wilderness project area to at least 26.5 acres (including the 9.2 acres of forest that will be preserved). Because the TCZ will be left to regenerate naturally, and in some cases possibly replanted with native vegetation, the TCZ will be temporarily (several years to decades), but not permanently lost as WVNFS forested habitat.

Under 50 CFR 17.3, “harm” is defined as an act which actually kills or injures wildlife and may include habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Squirrels displaced by the habitat destruction associated with the development of Camp Wilderness are expected to attempt to shift activity patterns to adjacent habitat. This increase in competition due to the loss of foraging and sheltering habitat is anticipated to result in the take of the WVNFS in the form of harm through habitat loss.

While no direct take of adult female squirrels with young is anticipated due to the seasonal clearing restrictions, it is anticipated that affected individuals will migrate to other available habitat in search of available food and shelter. Because the surrounding habitat is known to be occupied by the WVNFS and the southern flying squirrel, inter-specific and intra-specific competition for food and nest sites will increase. Because a critical limiting factor to recovery of WVNFS populations is limited availability of secure nesting sites, actions which would reduce the number of available secure nesting sites, would in turn adversely affect breeding behavior. Therefore, indirect effects of the action are expected to reduce future breeding success by increasing competition of secure nesting sites. In addition, the loss of foraging habitat will increase energy expenditure because of the increase in competition for food. Starvation, particularly of breeding females and young WVNFS may result. This loss may adversely affect future breeding success. If affected WVNFS cannot find adequate cover, predation could increase. Weather-related mortality may result if WVNFS cannot find secure nesting sites. Because the cumulative result of these adverse affects is anticipated to negatively affect the population of the WVNFS at and around the proposed development area, these impacts are likely to disrupt those animals' life functions to the level of harm defined in the ESA.

Cumulative Effects

Cumulative effects include those future State, local, or private actions that are reasonably expected to occur in the action area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Since the limits of the action area for this project are confined to the proposed development area and conservation area, it is not likely that any other actions, besides those discussed below, are reasonably expected to occur within the action area.

In addition to the proposed action, reasonably foreseeable activities within the action area include the development of recreational trails, a ski trail, and a utility right-of-way within the Conservation Area, as described in Article III of the Declaration of Covenants and Restrictions in Appendix G of the CWHCP. Recreational trails for walking, biking, cross-country skiing, and similar activities may be established and used within the Conservation Area. These recreational trails will be developed without removal of trees greater than 6 inches d.b.h., therefore recreational trail development will not result in take of WVNFS. Moreover, there is no evidence to suggest that use of these recreational trails will adversely affect WVNFS. Therefore, establishment and use of recreational trails suitable for walking, biking, cross-country skiing, etc. will not adversely affect the WVNFS.

A single alpine ski trail not more than 1,200 feet long and 30 feet wide, and infrastructure for downhill skiing, may be constructed in the future within the Conservation Area. An area approximately 1,200 feet long and 70 feet wide may be cleared to enable construction of the ski trail. Tree and shrubs will be allowed to regenerate in portions of the trail outside the final 30-foot width. Also, a single utility right-of-way not more than 1,000 feet long and 24 feet wide, resulting in clearing of up to 0.55 acres, may be constructed through the Conservation Area in the future. The utilities would be placed

underground and the right-of-way would be re-vegetated with grasses. The potential habitat loss associated with the alpine ski trail and utility right-of-way is not part of the permitted take associated with the Camp Wilderness development. These potential actions (single alpine ski trail and utility right-of-way) will be subject to the constraints of Section 9 of the ESA. IRI and SMI will work with the Service using the best science available at the time to adequately analyze and mitigate, to the maximum extent practicable, impacts to federally-listed species. If necessary, IRI and SMI will adjust the boundaries of the Conservation Area to ensure potential future activities in the Conservation Area will not reduce the number of Mitigation Units below that required to mitigate for the Camp Wilderness project.

Conclusion

After reviewing the current status of the WVNFS, both range-wide, and at and surrounding Snowshoe Resort, including the two closest GRAs, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects within the action area, it is the Service's biological opinion that issuance of the incidental take permit for the proposed Camp

Wilderness development and accompanying HCP, are not likely to jeopardize the continued existence of the WVNFS by engaging in an action that would be expected directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of the WVNFS by reducing the reproduction, numbers, or distribution of that sub-species.

No critical habitat has been designated for this sub-species; therefore, none will be affected.

There would be adequate habitat remaining in the immediate vicinity, particularly because the proposed 85.6 acre conservation area is adjacent to the project area. Furthermore, the Recovery Plan assumes an area with a 0.5 mile radius around a capture site is considered occupied where suitable habitat occurs. There were five WVNFS caught in the project area, with approximately 635 acres (537 of which is forested) of occupied habitat when applying the 0.5 mile radius. Following implementation of the proposed action, at least 497 acres of forest will remain. Therefore, the forested area of occupied habitat at and around the site (as defined in the Recovery Plan) will be reduced from 84.5% to 78.3%. Based on recent research, WVNFS are known to have multiple den sites at any given time, utilizing up to 12 den sites per month in fragmented habitat. Therefore, permanent removal of habitat will probably result in squirrels relocating within the immediate vicinity, quite possibly in the conservation area. Due to their nocturnal behavior and gliding capabilities, the chance for lethal take in the form of vehicular strikes or other means due to human occupancy in WVNFS habitat is considered to be discountable. Because over 75% of the known habitat occurs on the MNF, other indirect effects resulting from this project are yet to be learned.

This project would enable the Service and IRI to implement a monitoring program in association with issuance of an ITP, and continue a working relationship to contribute to knowledge of the project's impacts to the WVNFS, particularly as it relates to breeding, feeding and sheltering behavioral patterns.

Studying the effects of modification or loss of WVNFS habitat resulting from timber operations or other developments is identified as a recovery task in the WVNFS Recovery Plan.

There are over 100,000 acres of known potential habitat for the WVNFS. Therefore, the affected area is a fraction of one percent of the overall range of the WVNFS. There have been over 1,000 captures of WVNFS, five of which are in the project area. Because of their rarity, nocturnal and secretive habits, and very few recaptures, the total number of captures likely represents only a portion of the overall population size.

By virtue of over 75% of the known potential habitat occurring on the MNF, over time, effects such as those anticipated from the proposal would not likely result in cumulative habitat losses to the extent that such losses would become significant to the WVNFS. Because the MNF has never had a project which resulted in take of the WVNFS, this area provides a source of refuge for the WVNFS. Furthermore, the amendment to the WVNFS Recovery Plan (2001), promotes more effective recovery of this endangered species on Federal lands by treating potential habitat

as occupied in the absence of live trapping surveys. Parallel to the amended Recovery Plan, the Forest Service is in the process of developing a Forest Plan Amendment which is intended to contribute to recovery of all endangered species, including the WVNFS, on the Monongahela National Forest.

Foreseeable activities in the range of the WVNFS on non-Federal lands include additional HCPs at Snowshoe Resort, Blackwater Canyon and possibly for a wind power generation project on the Allegheny Front in the northern portion of range of the WVNFS. Also, a portion of the WVNFS's range in non-Federal ownership will become enrolled in a Safe Harbor Agreement. In addition, formal consultation for the construction of a four-lane highway in the northern portion of the sub-species' range appears inevitable.

The following can be stated with regard to potential effects to the WVNFS from the proposed Camp Wilderness. Direct and indirect effects, i.e. loss of individuals or conversion of habitat are not more than minor; the affected area is a fraction of one percent of the overall range of the WVNFS; over 75% of the known habitat occurs on the Monongahela National Forest; and there are other foreseeable projects across the range of the WVNFS, on Federal and non-Federal lands, which promote recovery of the species. This project is anticipated to have only minor or negligible effects on the WVNFS. Impacts of this project will not have any significant or long-term effect on the WVNFS in terms of reproduction, numbers or distribution. Service biologists confirm there remains sufficient suitable habitat, including, but not limited to, habitat proposed as mitigation in the HCP, to ensure the individuals would have an opportunity to relocate within the immediate vicinity. Since lethal take of the WVNFS is not anticipated, there would not be significant loss in numbers of WVNFS. Finally, since suitable habitat remains nearby, in the event that the five individuals captured within the boundaries of Camp Wilderness relocate, and no lethal take of the adults is anticipated, it is plausible that no reduction of, or change in distribution of WVNFS would result because of this action.

V. INCIDENTAL TAKE STATEMENT

A. DEFINITION OF INCIDENTAL TAKE

Section 9 of the ESA and the Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in the death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered a prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

B. EXTENT OF ANTICIPATED TAKE

The applicant proposes to perform all clearing and construction activities outside of the WVNFS breeding season. Therefore, no lethal take due to these activities is anticipated since the time-of-year restriction will eliminate the possible direct impacts to a mother WVNFS with young resulting from the clearing activities. The Service anticipates incidental take of the WVNFS will be difficult to detect because of the secretive nature of the sub-species. However, because of the loss of 39.8 acres of occupied habitat, utilized for feeding, sheltering, and possibly breeding, the Service anticipates take of the WVNFS in the form of harm through habitat loss. The habitat matrix found in Appendix B further describes WVNFS habitat found in the action area as it relates to feeding, breeding, and sheltering behavior. As explained in the Effects of the Action section above, the permanent loss of 22.5 acres and temporary loss of 17.3 acres are likely to cause significant disruption in the WVNFS's normal behavior patterns and include disruption of feeding, breeding and sheltering behaviors that may ultimately lead to lead to injury or death. In summary, the Service anticipates the non-lethal take of the WVNFS in the form of harm through habitat loss by the permanent or temporary loss of 39.8 acres of forested habitat. Based on the mitigation ratio determination (Appendix A) and habitat quality ranking (Appendix B) developed by the Service, this will amount to 3,850.3 mitigation units (2,624.7 from permanent habitat loss; 1,225.6 from temporary habitat loss), and all WVNFS associated with the loss of this habitat.

C. EFFECT OF THE TAKE

The Service has determined that the level of take anticipated from the impacts of the proposed action as described above (permanent or temporary loss of 39.8 acres of habitat), is not likely to jeopardize the range-wide population of the WVNFS, nor the population at and surrounding Snowshoe Resort.

D. REASONABLE AND PRUDENT MEASURES

Reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impacts of take on the species. When implemented, the terms and conditions should reduce the amount or extent of anticipated incidental take identified above. However, for ITPs, any terms and conditions deemed necessary to meet the issuance criteria of an ITP are usually incorporated into the HCP itself and reiterated in the permit conditions of the ITP itself. Therefore, these measures are incorporated into the project description and are mandatory requirements of this incidental take authorization. In this case, the amount or extent of incidental take has already been minimized and mitigated to the maximum extent practical through incorporation into the CWHCP in order to satisfy the issuance requirements of the ITP. These minimization and mitigation efforts proposed in the CWHCP represent measures the Service believes are appropriate, reasonable and prudent, as well as necessary to minimize the amount or extent of anticipated take. Therefore, based on the conditions required by the CWHCP and ITP, the Service has determined that the Service and applicant are taking all necessary measures to minimize take from the proposed action, and no additional measures are required.

E. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to: minimize or avoid adverse effects of a proposed action on a listed species or critical habitat; help implement recovery plans; or to develop information. The following recommendations are intended to improve the Service's knowledge about the habitat requirements and behavioral biology of the WVNFS as it relates to the effects of modification or loss of habitat resulting from development, and potential opportunities for habitat enhancement.

SMI and IRI have expressed interest in future coordinated studies to gain a better understanding of endangered species at Snowshoe Resort. The Service should encourage coordinated efforts with the FEF and WVDNR to facilitate a telemetry study during future phases of Camp Wilderness construction to gain a better understanding as to how the WVNFS would react to habitat removal during the non-breeding season. Furthermore, there is an opportunity to facilitate forest regeneration in portions of the TCZ after construction is complete.

F. REINITIATION REQUIREMENTS

This concludes formal consultation on the issuance of the ITP. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained and if: (a) The amount or extent of incidental take (39.8 acres) is exceeded; (b) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (c) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (d) a new species is listed or critical habitat designated that may be affected by the action.

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Appendix A

Appendix B