

**West Virginia northern flying squirrel (WVNFS), *Glaucomys sabrinus fuscus***  
**Five Year Status Review**  
**Appendix C – Summary of Threats Assessment**

This document summarizes the U.S. Fish and Wildlife Service's (Service) analyses over the last four years, which served as the foundation of the recently completed (May, 2006) 5-year status review for *G.s. fuscus*. Although the 1985 listing rule was for both *G.s. fuscus* and *G.s. coloratus*, the analysis contained herein applies only to *G.s. fuscus*. Initially (2003-2004), Service staff evaluated threats to *G.s. fuscus* through a threats assessment matrix adapted from the Nature Conservancy's (TNC's) model, which allowed assessment of the threats to the taxon, the sources of those threats and restoration potential of the ecosystem. In order to ensure the use of the best available scientific information, the Service held two meetings (September 2003 and January 2004) with government and non-government northern flying squirrel biologists and technical experts. To facilitate an analysis of the squirrel's appropriate status under the ESA, in October, 2003, staff from the Service's West Virginia Field Office and Regional Office ESA policy experts used available information to conduct a threats assessment that conforms to the ESA's perspective of extinction risk, with particular attention to whether *G.s. fuscus* is in danger of extinction, or likely to become endangered in the foreseeable future. The identified threats were categorized in conformance with the five listing factors<sup>1</sup>. The criteria used to establish a relative ranking of individual threats included spatial magnitude, severity, and immediacy. Numerical rankings were then applied to each threat, as follows:

***Spatial magnitude*** (the geographic scope of impact on the species and habitat that currently exists and can reasonably be expected within 10-15 years under current circumstances and the continuation of existing management situations): range-wide = 1, significant geographic extent of the range = 2, localized = 3, extremely localized = 4

***Severity*** (the level of damage to the species or its habitat that occurs or can be expected to occur when and where the species and/or its habitat is exposed to the threat): high = 1, medium = 2, low = 3, negligible = 4, unknown = 5

***Immediacy*** (the temporal nature of the threat): existing = 1, imminent or probable = 2, unlikely = 3, unknown = 4

Table 1 provides an overview of the consensus rankings applied to each threat. It is followed by a short discussion pertaining to ranked threats, based on notes taken during the assessment process, or information assimilated since the 2003 meeting.

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<sup>1</sup> A) The present or threatened destruction, modification, or curtailment of its habitat or range; B) Overutilization for commercial, recreational, scientific, or educational purposes; C) Disease or predation; D) The inadequacy of existing regulatory mechanisms; or E) Other natural or manmade factors affecting its continued existence.

**G.s. fuscus – ESA 5 Factor Threat Assessment**

	<b>Source</b>	<b>Magnitude</b>	<b>Severity</b>	<b>Immediacy</b>
<b>A. Habitat Impacts</b>	Road Construction (Highways)	3	1	2
	Road Construction (Secondary)	3	3	1
	Timbering (clearcut)*	3	2	1
	Timbering (partial cut)	3	2 or 3	1
	Wildfires*	4	1 or 2	3
	Resort Development	3	1 or 2	1
	Wind Power Development	3	1 or 2	2
	Coal Mining	3	1	1
	Natural Gas	3	3	1
<b>B. Overutilization</b>	Pet Trade	N/A	N/A	N/A
	Research	3	3	1
<b>C. Disease or Predation</b>	Disease	N/A	N/A	N/A
	Predation by Pets	3	4	1
<b>D. Inadequacy of Regulatory Mechanisms</b>				
<b>E. Other</b>	Southern Flying Squirrel	2	3	1
	Nematode	2	3	1
	Hemlock Woolly Adelgid	2	5	1 or 2
	Balsam Woolly Adelgid	4	1 or 2	1
	Beech Bark Disease	2	4	1
	Acid Precipitation	1	4 or 5	1 or 2
	Climate Change	1	5	4

\* This threat assessment compares the existing condition to that at the time of listing (1985). Therefore, even though the logging (and subsequent wildfires) during the industrial timber era (1880s-1940s) had a devastating impact on the red spruce ecosystem (i.e. squirrel habitat) it is not factored into this assessment. This ranking pertains to the likelihood of clearcut timber harvest or wildfires to occur now or in the foreseeable future.

## **Factor A**

### *Road Construction*

#### Highway

Corridor H has (and continues to be) the only major highway project proposed since the time of listing. The highway traverses the Allegheny Highlands along the northernmost edge of the squirrel's range. While it is expected to eliminate segments of the squirrel's habitat within its footprint and may isolate habitat patches to the north, the magnitude of this threat was considered localized because it is the only highway project currently proposed in the squirrel's range. Severity was considered medium to high because, where the highway is constructed, habitat will be lost to revegetation by exotic plant species, concrete, rock and other infrastructure. In addition, the footprint of the highway may be up to twice the width of the roadway itself, and this area will not become suitable habitat again in the foreseeable future. Immediacy was considered imminent or probable as the Federal Highway Administration and Service are in the final stages of formal consultation under Section 7 of the ESA. No other large scale highway projects within the squirrel's range are expected in the foreseeable future.

#### Secondary Roads

There are secondary roads scattered throughout the squirrel's range. However, the road density throughout the range of the squirrel is relatively low because of the rural and generally forested nature of the landscape. Secondary road construction, especially associated with home development, timber management, wind power, etc. is anticipated to continue at a localized spatial magnitude, especially on private lands.

### *Timber Management*

#### Clear cut

Clearcut logging was defined as forested areas that are clearcut and allowed to revegetate. Magnitude was considered local, based on existing Monongahela National Forest (MNF) practices of restricting clearcuts to less than 40 acres, the infrequent use of this technique on the MNF, and recovery plan guidelines (recently memorialized in the Monongahela National Forest planning) restricting clearcuts within suitable squirrel habitat. Severity was considered medium, because although habitat would be unsuitable in the cut area for several generations after cutting, the plasticity of the squirrel's habitat use (e.g., it survived the earlier severe logging) indicates that the subspecies is able to survive outside of the cleared areas (also see literature from Pacific Northwest).

#### Partial cut

Selective cutting includes timber management that is not clearcutting, such as thinning and site preparation. These activities alter forest composition, and, if the cutting is designed for commercial harvest, the forest character as squirrel habitat may be degraded; conversely, selective logging can be prescribed that alters the forest in ways beneficial to the squirrel. Magnitude was considered to be localized or significant portion of the squirrel's range, as this type of forest modification is not occurring everywhere at a given time but can occur across a wider landscape than clear cutting. A low to medium ranking for severity combined with a ranking of existing for immediacy.

### *Wildfires*

The geographic scope of wildfires is considered extremely localized because this forest type is not prone to fire because of the wet, cool environment. While the risk of fire, especially that caused by humans, cannot be eliminated, the immediacy is considered unlikely. See footnote re: source of habitat degradation from industrial logging era.

#### *Resort Development*

Immediacy was ranked as existing due to the clearing taking place and being proposed in localized areas targeted for resort development on private lands (e.g., Snowshoe and Canaan Valley). However, as described in the 5-year review, areas available for resort development are limited due to the limited amount of squirrel habitat privately owned and managed.

#### *Wind Power Development*

For wind power development, the effects of all phases of the development process were considered, including effects such as changes to the microclimate at the tower and access road sites, presence of the access road, and the turbines themselves. The magnitude of this activity across the squirrel's range is localized, because few areas within suitable squirrel habitat have high enough wind resource to attract large-scale projects and no large-scale projects have been proposed on the MNF. Severity was ranked as medium based on comparison of the effects of wind farm development with the Corridor H proposal. Immediacy was ranked as existing or probable, because one project is completed and operating, while other projects are in various stages of planning.

#### *Coal Mining*

Mining include ongoing threats such as active strip mining in Grant County and past mining on Cheat Mountain and other areas. The spatial extent of these activities is localized, but where they occur the severity is high. For instance, the strip-mining process removes soil and vegetation, blasts and exposes bedrock, and alters the hydrologic patterns and regime of an area; recovery from these landscape alterations extends beyond the foreseeable future. These activities are occurring now, leading to an immediacy ranking of existing. A mitigation measure to reduce long-term adverse affects is red spruce reclamation. **STOPPED HERE ON 7/27 ve factor**

#### *Natural Gas*

, and natural gas drilling and exploration.

#### **Factor B**

##### *Pet Trade*

##### *Research*

#### **Factor C**

##### *Disease*

##### *Predation by Pets*

#### **Factor D**

##### *Federal and non-federal*

#### **Factor E**