

07/15/2003

Viability Assessment Report For Conifer-Northern Hardwood Habitat Association

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I. Description of Habitat Association

The Conifer-Northern Hardwood Habitat Association is found in the northern tier of states from Minnesota to Maine southward along the Appalachian Mountains to North Georgia. The hemlock-northern hardwood forest is dominated by eastern hemlock and hardwood species associated with cooler, moister conditions. This forest type develops best on cool, moderately wet to somewhat poorly drained sites. Main associates are sugar maple, American beech, red maple, and eastern white pine. Soil tends to be acidic with surfaces consisting mostly of needles and twigs. Hemlocks greatly limit the amount of light reaching the forest floor, which in turn results in sparse understory vegetation. The exception is in early successional stages and in canopy gaps, where abundant understory vegetation exists (USDA Forest Service, 1997). The white pine-northern hardwood forest is closely related to historical fire patterns, largely occupying the drier end of the conifer-northern hardwood complex. Common associates include red maple and northern red oak on dry sites and sugar maple, beech, white ash, and hemlock on moist sites (USDA Forest Service, 1997).

The Daniel Boone National Forest (DBNF) occurs in three ecological sections: Northern Cumberland Plateau, Interior Low Plateau and Highland Rim and Cumberland Mountains. On the DBNF, conifer-northern hardwood habitat occurs in all three of these ecological sections. The majority of the conifer-northern hardwood habitat on the DBNF occurs in the Northern Cumberland Plateau ecological section. In the Northern Cumberland Plateau, conifer-hardwood habitat occurs in the following landtype associations (LTAs) (see USDA Forest Service, 1997a; 1996):

- Southern Middle Breathitt Rugged Hills (221Ha001)
- Big South Fork Plateau (221Hc004)
- Southern Knobstone Escarpment Transition (221Hc002)
- Rolling Low Hills (221He001)
- Central Cliff (221Hb002)
- Central Knobstone Escarpment (221Hb001)
- Northern Rolling Hills (221He003)

- Low Hills-Rugged Transition (221Ha002)
- North Fork Kentucky Cliffs (221Hb003)
- Northern Low Hills/Cliff transition (221Hb005)
- Southern Cliff (221Hc003)
- Rockcastle Hills (221Hc005)
- London-Corbin Plain Transition (221Hc006)
- Northern Escarpment (221Hb004).

Within the Interior Low Plateau and Highland Rim section, conifer-northern hardwood habitat occurs in the following LTA (USDA Forest Service, 1997a; 1996):

- Triplett Creek Knobs (222En002) LTA.

Within the Cumberland Mountain ecological section, conifer-northern hardwood habitat occurs in the following LTA (USDA Forest Service, 1997a; 1996):

- Northern Jellico Mountains (M221Cd001) LTA (USDA, 1997a; 1996).

On the DBNF, the Conifer-Northern Hardwood Habitat Association occurs on mesic to somewhat xeric sites over a broad range of topographic conditions including ravines, valley flats, sheltered low ridges, open north-facing slopes at high elevations, and steep exposed slopes. The conifer-northern hardwood forest is dominated by hemlock and white pine singly or mixed with associated hardwood species. Hemlock may dominate forested ravines and flats along streams at low to intermediate elevations, and at higher elevations, on open north-facing slopes. White pine may share dominance in the low to intermediate elevation forests, or hemlock may be associated with mesophytic hardwoods, particularly yellow poplar. Shrub layers are typically ericaceous, with common occurrence of rhododendron and laurel. The herb layer may include Halberd-leaved yellow violet, foamflower and Christmas fern. White pine seldom forms pure stands, but does mix with hemlock along streams and with oaks such as, northern red oak, white oak, chestnut oak, black oak, and scarlet oak on upland slopes. The shrub layer may be dense, dominated by rhododendron, blueberry, and/or mountain laurel. Herbaceous cover is usually sparse or absent (SAMAB, 1996).

Water on these sites is primarily from surface sources (rainfall). On some sites, limited amounts of ground water help maintain the sites. Sunlight, which drives photosynthesis, is the major source of energy. Decay of vegetation and byproducts of fires, which may pass through the Conifer-Northern Hardwood Habitat Association, also provide energy sources. For conifer-northern hardwood forest, windthrow is a particularly common disturbance on many sites due to high water tables, which limit the downward expansion of roots. This type of disturbance allows for frequent gap phase regeneration. Pit and mound microtopography is also characteristic. Fire has historically had little impact on eastern hemlock. However, the

hemlock woolly adelgid, an exotic insect is causing widespread mortality among eastern hemlocks in the South (USDA Forest Service, 1997). This infestation is not currently a forest health problem on the DBNF.

II. Current Status of the Habitat Association on the Daniel Boone National Forest

The conifer–northern hardwood forest types on the DBNF are tracked in the Continuous Inventory of Stand Conditions (CISC) and are represented as hemlock-hardwood (08), white pine–cove hardwood (09), white pine–upland hardwood (10), and upland hardwood–white pine (42). The management codes in this forest type, conifer-northern hardwood, are defined as follows:

(08) = 50 to 69 percent of the dominant and co-dominant basal area is softwood, and plurality of softwood is hemlock;

(09) = 50 to 69 percent of the dominant and co-dominant basal area is softwood, and plurality of softwood is white pine;

(10) = 50 to 69 percent of the dominant and co-dominant basal area is softwood, and at least 50 percent of the softwood is white pine;

(42) = 30 to 49 percent of the dominant and co-dominant basal area is softwood, and at least 50 percent of the softwood is white pine, and the hardwood component consists of greater than 70 percent upland hardwood species (USDA Forest Service, 1992).

On the DBNF, approximately 665,000 acres are in forested land. Of this acreage, approximately 4 percent or 24,852 acres are within the conifer-northern hardwood forest type as described. Refer to Table 1, which shows the conifer-northern hardwood forest types divided by age class and acres (USDA Forest Service, 1998).

Table 1. Forest types within the Conifer–Northern Hardwood Habitat Association by age and acres.

AGE	Hemlock – Hardwood (08)	White Pine – Cove Hardwood (09)	White Pine – Upland Hardwood (10)	Upland Hardwood – White Pine (42)
0-10	70	98	182	76
11-20	264	142	647	428
21-30	851	154	454	247
31-40	856	64	138	70
41-50	343	0	37	78
51-60	463	36	17	66
61-70	1348	91	361	112
71-80	2780	41	437	97
81-90	3063	68	31	144
91-100	3386	36	51	56

AGE	Hemlock – Hardwood (08)	White Pine – Cove Hardwood (09)	White Pine – Upland Hardwood (10)	Upland Hardwood – White Pine (42)
101-110	2367	406	130	0
111-120	1354	81	0	0
121-130	836	17	0	0
131-140	446	177	0	0
141-150+	1155	0	0	0
TOTAL	19582	1411	2485	1374

III. Management Needs: Recommendations for the Conservation of Habitat to Ensure Species Viability

The desired future condition for this habitat association would be to provide amounts of suitable habitat in the proper stages of succession to ensure that the species dependant on the association have a high probability of persistence on the forest. This would involve maintaining a structured age class distribution with emphasis on maintaining a significant component of habitat that contains the habitat modifiers required by various species.

- Manage habitat association by alterations and improvements coordinated through a habitat prescription process (DBNF LRMP, IV-13).
 - *Rationale: Habitat manipulation is a necessary tool in the management of this association.*
- Develop standards and guidelines specifically for the higher elevation conifer – northern hardwood sites. The intent of these guidelines would be to help ensure continued persistence of the unique high elevation forest communities on the DBNF.
 - *Rationale: Several species in this association are strongly linked to the higher elevation sites and their attributes. This habitat is limited on the DBNF and should be managed carefully to ensure continued recruitment of this forest type.*
- Conifer-northern hardwood forest types need to be represented in a range of age classes.
 - *Rationale: Conifer-northern hardwood makes up approximately 4 percent of the forest type on the DBNF. The species identified in this habitat association (plants, amphibian, mammals and birds) require a variety of age classes, elevations and tract sizes. Species from the blackburnian warbler, which requires extensive tracts of high elevation mature forest to the red-breasted nuthatch, which is known to breed at 2500 feet and beyond. A range of age classes, along with their accompanying attributes, is a necessary component of this habitat association. Age distribution management along with implementation of best management practices should ensure continued persistence of the species identified in this habitat association.*

- Where applicable, leave project unit boundaries irregular and with feathered edges.
 - *Rationale: Abrupt habitat changes can create barriers to wildlife passing through the unit.*

IV. Management Needs: Monitoring and Inventory to Ensure Species Viability

Monitoring and inventory of the Conifer-Northern Hardwood Habitat Association will need to be implemented at a level sufficient to provide data to track the current condition of the habitat. The following items are considered necessary to ensure that the association can be properly evaluated and decisions supported.

- Inventory should be conducted in each stand (or analysis unit) at least once every 10 years. Stand (or analysis unit) inventory should also be conducted in response to events that have potential to alter the landscape i.e., windstorms, winter storms, and infestations (high priority).
 - *Rationale: Inventory to identify and update baseline data or assess changed conditions after non-prescribed major disturbances. Inventory may be at the stand level or larger units may be used (such as ecological or habitat units) as long as the data is sufficient to assess the required parameters. Current data from past inventory work may need to be supplemented to include additional habitat modifier data. This inventory may be part of the prescription process but should not be limited to project planning efforts.*
- Employ GIS and vegetation management databases to track the condition and composition of the Conifer-Northern Hardwood Habitat Association (high priority).
 - *Rationale: The use of FSVeg (CISC or best available science) in concert with our GIS coverage of stands should be adequate to assess the composition, age class and spatial distribution of the pine habitat and habitat modifiers. This makes the assumption that the inventory data collects the necessary information regarding habitat modifiers.*
- Continue to implement R8 landbird monitoring program (high priority).
 - *Rationale: This monitoring program will help track the persistence of the avian species in this habitat association. This may be a critical element in documenting avian species trends in this association. This monitoring program contains points linked to this association it would be considered an excellent tool for both species-specific and association monitoring.*

- Identify land parcels that may become available for acquisition (moderate priority).
 - *Rationale: In this habitat association, high elevation acreage is limited. Those attributes unique to this association in higher elevations may be a critical element in the persistence of specific species in this habitat association. High elevation acreage is present within the proclamation boundary. Acquiring available land parcels will facilitate and increase management opportunities for these high elevation communities.*

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Attachment A.

Species List: Conifer-Northern Hardwood Habitat Association

Class	Common Name /Species
ANIMALS	
Amphibians	Mountain Dusky Salamander/ <i>Desmognathus ochrophaeus</i>
Birds	Sharp-shinned Hawk/ <i>Accipter striatus</i> Blackburnian Warbler/ <i>Dendroica fusca</i> Wood Thrush/ <i>Hylocichla mustelina</i> Swainson's Warbler/ <i>Limnothylpis swainsonii</i> Red-breasted Nuthatch/ <i>Sitta canadensis</i>
Mammals	Kentucky Red-backed Vole/ <i>Clethrionomys gapperi maurus</i> Cloudland Deermouse/ <i>Peromyscus maniculatus nubiterrae</i> Masked Shrew/ <i>Sorex cinereus cinereus</i> Long-tailed Shrew/ <i>Sorex dispar blitchi</i> Appalachian Cottontail/ <i>Sylvilagus obscurus</i>
PLANTS	
Dicots	Small Enchanter's-nightshade/ <i>Circaea alpina ssp. alpina</i>
Liverworts	Liverwort/ <i>Nowellia curvifolia</i>
Monocots	Spotted Coralroot/ <i>Corallorrhiza maculata</i> Wild Lily-of-the-valley/ <i>Maianthemum canadense</i>
Mosses	Fern Moss or Log Moss/ <i>Thuidium delicatulum</i>

Attachment B.

Conifer-Northern Hardwood Species/Habitat Relationships with References

ANIMALS

Amphibians

Mountain Dusky Salamander – *Desmognathus ochrophaeus* – This species has the broadest altitudinal distribution of any desmognathine salamander, reaching the highest elevations in the eastern United States. These salamanders become more terrestrial at higher elevations, apparently in response to increased humidity (Hairston, 1949; Tilley, 1973). At high elevations, the mountain dusky salamander prefers cool, moist floors of conifer forests (USGS, 2001); at low elevations, this species occurs primarily under rocks, logs or leaves near stream margins, springs, or seepage areas, where the ground is water saturated. Adults will often move far into the adjacent woodlands, particularly during rains. The mountain dusky salamander requires mesic woodlands, usually hardwoods or mixed pine-hardwood, with springs, seeps or rocky streams. In winter, this salamander is known to congregate in springs or seepage areas (USGS, 2001). Wet, mossy, rock faces are preferred by this species. The mountain dusky salamander's diet includes small arthropods and earthworms (Wilson, 1995)

Birds

Sharp-shinned Hawk – *Accipiter striatus* – During the year, sharp-shinned hawks utilize both hardwoods and conifers and, in general, are most abundant in areas where a mixture of tree types exists. Although they are known to nest in hardwoods, birds in Kentucky seem to prefer evergreens for nesting and over-wintering. The typical nesting site is in the canopy of a large, mature pine or hemlock within an extensive tract of forest. Sharp-shinned hawks are also observed (e.g., when foraging) within areas having a mix of forested and semi-open habitat; however, they more frequently occupy heavily forested areas (Hamel, 1992). Thus, year-round, the existence of tracts of mature forest is of prime importance to the species. Sharp-shinned hawks would be expected to occur in this habitat association primarily because of the presence of evergreen conifers that seem to be preferred by this species for nesting. On the DBNF, two nests have been reported, both from conifers (yellow pine and eastern hemlock) (L. Perry, pers. obsv).

Blackburnian Warbler – *Dendroica fusca* – This is a forest interior species of higher elevations, with most of the birds that are recorded in the Cumberland and Southern Appalachians occurring above 3500 feet (Hamel, 1992). A variety of coniferous and mixed forest types are utilized, with deciduous habitat being used to a greater extent in this southern part of the breeding range (DeGraaf et. al., 1991). Extensive tracts of mature forest, with large (> 20" dbh) nesting trees, are required (Hamel, 1992). The blackburnian warbler has a slight preference for forests of hardwoods mixed with hemlocks, spruce and fir (Hamel 1992). This habitat association would represent areas that provide this environment. On the DBNF, this species has only been encountered during periods of migration and would not be expected to breed on the DBNF except in areas where elevations are greater than 3500', of which there are few of.

Wood Thrush – *Hylocichla mustelina* – The wood thrush is found in a wide variety of forest types, provided a well-developed understory is present. Moderately shaded, deciduous and mixed stands of mature trees with a dense shrub and/or sapling understory are typical habitat, particularly when occurring on moist sites. The species frequently occurs in riparian habitat, rich hardwood and bottomland forests being favored; however, drier sites may be used, so long they have the relatively dense shrub layer. Nesting is in shrubs, vines, and small trees. Although the species will tolerate some fragmentation of habitat, it is most common in extensive forest and requires a minimum tract size of 3 hectares (Hamel 1992). This habitat association would be expected to attract nesting and foraging wood thrushes primarily due to the presence of hardwoods when combined with shaded and moist conditions.

Swainson's Warbler – *Limnothlypis swainsonii* – This forest interior species is found within tracts of moist, extensive forest that have dense understory (Palmer-Ball, 1996). Hemlock ravines, having dense growths of rhododendron and laurel, and bottomland forest, with a well-developed understory and/or thickets of small trees, are favored locations. Dense cane breaks are also used. On the DBNF, this bird is often observed in damp, shady hemlock ravines with an understory of rhododendron, near small streams (L.Perry, pers. obs.). Assuming water is nearby, this habitat association would be expected to attract Swainson's warblers primarily due to the shaded and moist conditions usually present in stands of mixed conifers and hardwoods.

Red-breasted Nuthatch – *Sitta canadensis* – Though this nuthatch is dependent on coniferous habitat, its requirements vary considerably between seasons. It generally breeds at elevations above 3500 feet, in dead spruce or fir trees. Occasionally it will nest in hemlock and, rarely, in pine (Hamel, 1992). Suitable snags (dead trees) are greater than 6" dbh (six inch diameter at breast height). Mature stands are favored. The red-breasted nuthatch prefers to over-winter in dense stands of conifers and pine-oak. During that time, the birds are not particular to age class so much as to stand density. On the DBNF, when these birds are encountered in winter, it is almost always while feeding in pines—especially mature Virginia Pines having a lot of cones. Breeding records of this species have only been reported from one site on the DBNF, which is a conifer-dominated stand composed of mature white pines and hemlock and less mature deciduous hardwoods. (L. Perry, pers. obs.). This habitat association would be expected to attract foraging red-breasted nuthatches primarily due to the presence of conifers.

Mammals

Kentucky Red-backed Vole – *Clethrionomys gapperi maurus* – The Kentucky red-backed vole is known to inhabit the higher elevations of the conifer-northern hardwood forest type on the Redbird Ranger District, DBNF. It is found in dense forest habitat, cool damp woodlands with down logs, and shaded rock talus areas usually on north facing slopes. Moss covered rocks are a common occurrence in this species favored habitat. The red-backed vole feeds on a variety of nuts, seeds berries, bark and roots. Its distribution is likely to be controlled, in part, on the availability of free water because this vole is known to drink large quantities.

Cloudland Deermouse – *Peromyscus maniculatus nubiterrae* – This species is known from cool moist forests at higher elevations in the Black Mountain area of the DBNF. This nocturnal species occurs in both the conifer-northern hardwood and mixed mesophytic forest types with minimum edge. In these areas it is sometimes associated with talus or rock outcrops. Fallen logs,

typical of older growth forest conditions are important components of their habitat. Food habits are about 50 percent insects with fruit and vegetation utilized in the spring and summer and seeds and nuts utilized in the fall and winter.

Masked Shrew – *Sorex cinereus cinereus* – The masked shrew is associated with higher elevations of the conifer-northern hardwood habitat association. They are found in deep, moist woodlands and prefer areas of thick leaf mold and decaying fallen logs. Masked shrews may occur in small populations on the Redbird Ranger District, DBNF. The species may occur in other forested habitats, particularly near stream head seeps, that have the right conditions to support numerous invertebrate food species and moisture conditions. The dens of masked shrews are located in cavities in logs or snags, under logs or in shallow burrows. In streamside areas they may be found in communities dominated by hemlock/rhododendron. The diet of this species consists of a variety of invertebrates and small vertebrate animals. They prefer moist habitats and access to free water may be important.

Long-tailed Shrew – *Sorex dispar blitchi* – The long-tailed shrew is found in the higher elevations of the conifer-northern hardwood forest habitat association on the Redbird Ranger District, DBNF. There the species is found among cool, moist or shady boulder fields or talus slopes often moss covered. The species also has been found near headwater seeps in mature forest areas in this habitat association. Food habits consist of a wide variety of invertebrates associated with mature forest communities. Nest sites are usually associated with natural subterranean tunnels among boulder crevices.

Appalachian Cottontail Rabbit – *Sylvilagus obscurus* - This forest dwelling species occurs on the DBNF in areas ranging from conifer-northern hardwood to mixed mesophytic to dry-mesic oak forest. It is regarded as a forest interior species susceptible to habitat fragmentation. It prefers relatively cool, understory areas of ericaceous vegetation such as mountain laurel, rhododendron and blueberries. Large tracts of contiguous, relatively old forest overstory vegetation are needed to provide viable populations of this species.

PLANTS

Dicots

Small Enchanter's-nightshade – *Circaea alpina ssp. alpina* – This is a northern species with a range extending southward along the Appalachian Mountains. It requires cool, moist conditions. On the DBNF, it is found associated with cold air drainage and narrow sandstone hollows with high shade and humidity. Almost always it is near a stream, but usually out of the floodplain.

Liverworts

Liverwort – *Nowellia curvifolia* – This liverwort is widespread in northern North America, south into the Appalachian provinces, present in the high mountains of Mexico and Central America. It is found almost exclusively on decorticated logs. On the DBNF, it is found almost exclusively on decorticated eastern hemlock and yellow pine logs, usually of 10-12 inch diameter or larger. It requires moderate to heavy shade.

Monocots

Spotted Coralroot – *Corallorhiza maculata* – The spotted coralroot is mostly a northern species with extensions into the Appalachian Mountains. Its habitat is hardwood forest, but occurs under a variety of conditions. In Kentucky, it is known only from Pine Mountain within the DBNF proclamation boundary. It occurs on dry-mesic oak-hardwood forest in rich soil.

Wild Lily-of-the-valley – *Maianthemum canadense* – This is a northern North American species with range extensions south along the Appalachian Mountains. It is found in acid, well-drained sites under eastern hemlock and mixed hardwood forest. It is commonly found on rotten logs or hummocks in wet woods. On the DBNF, it is found on lower slopes and upper terraces in eastern hemlock or mixed mesophytic forest. These sites are cool and shady.

Mosses

Fern Moss or Log Moss – *Thuidium delicatulum* – This moss is a northern US and Canadian species which extends southward in the eastern US to the Gulf coast (and south to northern South America). It is a usually common species in its habitat, which is on moist soil, humus, rocks, or logs in forest or sometimes meadows or fields. On the DBNF, it is most common in mixed mesophytic forest on rocks, logs and soil, but is also found in dry-mesic forest, and rarely in xeric forest. It also occurs on the DBNF in old fields and meadows, sometimes ruderal areas. This species is widely collected for the horticultural industry and in some areas is becoming scarce.

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Attachment C.

Conifer-Northern Hardwood Association Matrix

Association	Habitat	Modifier	Class	Common/Species
2-Conifer-N. Hdwd.	Conifer-Northern Hardwood Forest	Acidic Substrate	P-MOS	Fern Moss, Log Moss/ Thuidium delicatulum
		Cold Air Drainage	P-DIC	Small Enchanter's-nightshade/ Circaea alpina ssp. alpina
		Cool Temperatures	AMPHI	Mountain Dusky Salamander/ Desmognathus ochrophaeus
			P-DIC	Small Enchanter's-nightshade/ Circaea alpina ssp. alpina
			P-MON	Wild Lily-of-the-Valley/ Maianthemum canadense
		Dense shrub understory	BIRD	Wood Thrush/ Hylocichla mustelina
				Swainson's Warbler/ Limnothlypis swainsonii
		Downed Logs	MAMM	Kentucky Red-backed Vole/ Clethrionomys gapperi maurus
				Cloudland Deermouse/ Peromyscus maniculatus nubiterrae
				Masked Shrew/ Sorex cinereus cinereus
		Downed Logs (minimum size)	P-LIV	Liverwort/ Nowellia curvifolia
		Elevation (above 2300 ft)	BIRD	Blackburnian Warbler/ Dendroica fusca
				Red-breasted Nuthatch/ Sitta canadensis
		Ericaceous Shrub Associate	MAMM	Appalachian Cottontail/ Sylvilagus obscurus
		Forest Interior (Minimal Edge)	BIRD	Sharp-shinned Hawk/ Accipiter striatus
				Blackburnian Warbler/ Dendroica fusca
		Forest Interior (Minimal Edge)	BIRD	Swainson's Warbler/ Limnothlypis swainsonii
			MAMM	Appalachian Cottontail/ Sylvilagus obscurus
		High Shade	P-MON	Spotted Coralroot/ Corallorhiza maculata
				Wild Lily-of-the-Valley/ Maianthemum canadense
		Large Decadent Trees	BIRD	Sharp-shinned Hawk/ Accipiter striatus
		Mature forest		Sharp-shinned Hawk/ Accipiter striatus
				Blackburnian Warbler/ Dendroica fusca
				Wood Thrush/ Hylocichla mustelina
				Red-breasted Nuthatch/ Sitta canadensis
		Mid-age Forest		Wood Thrush/ Hylocichla mustelina
		Moderate Shade		Wood Thrush/ Hylocichla mustelina
			P-MON	Spotted Coralroot/ Corallorhiza maculata
			P-MOS	Fern Moss, Log Moss/ Thuidium delicatulum
		Moist	AMPHI	Mountain Dusky Salamander/ Desmognathus ochrophaeus
			BIRD	Wood Thrush/ Hylocichla mustelina
			MAMM	Cloudland Deermouse/ Peromyscus maniculatus nubiterrae
				Masked Shrew/ Sorex cinereus cinereus
			P-DIC	Small Enchanter's-nightshade/ Circaea alpina ssp. alpina

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<u>Association</u>	<u>Habitat</u>	<u>Modifier</u>	<u>Class</u>	<u>Common/Species</u>
			P-MOS	Fern Moss, Log Moss/ Thuidium delicatulum
		Old Growth Condition	MAMM	Kentucky Red-backed Vole/ Clethrionomys gapperi maurus
				Cloudland Deermouse/ Peromyscus maniculatus nubiterrae
		Old Growth Condition	MAMM	Long-tailed Shrew/ Sorex dispar blitchi
		Riparian	MAMM	Long-tailed Shrew/ Sorex dispar blitchi
		Rocky/Rocks		Kentucky Red-backed Vole/ Clethrionomys gapperi maurus
				Long-tailed Shrew/ Sorex dispar blitchi
			P-MOS	Fern Moss, Log Moss/ Thuidium delicatulum
		Snags > 6" dbh		Red-breasted Nuthatch/ Sitta canadensis
		Tract Size (Area Sensitive)		Swainson's Warbler/ Limnolophus swainsonii
		Tree and Snags (Cavity Nesters)		Red-breasted Nuthatch/ Sitta canadensis
		Trees > 20" dbh		Blackburnian Warbler/ Dendroica fusca
		Water (Distance Sensitive)	MAMM	Kentucky Red-backed Vole/ Clethrionomys gapperi maurus
				Masked Shrew/ Sorex cinereus cinereus