

## Appendix A: Birds

### Spruce Grouse

*Falciennis canadensis*

Federal Listing	N/A
State Listing	SC
Global Rank	G5
State Rank	S3
Regional Status	Very High



Photo by Len Medlock

#### Justification (Reason for Concern in NH)

Although spruce grouse habitat in the East is naturally patchy, anthropogenic destruction of spruce-fir habitat has further contributed to extreme isolation of spruce grouse populations (Keppie 1997). Additionally, spruce fir habitat types are the most likely to experience negative effects from climate change (NHFG, Climate Adaptation Plan 2013) as well as impacts from pest outbreaks such as spruce budworm and balsam woolly adelgid. Anecdotal evidence (limited chick and female sightings) suggests that spruce grouse are limited in New Hampshire. High market demand for spruce and fir has led to extensive cutting of mature softwood habitat at lower elevations. In New Hampshire, Weeks (quoted in Silver 1957) stated that spruce grouse were once common in New Hampshire at the time of settlement, but by 1880, they were seldom seen. Habitat loss, market hunting, and susceptibility of populations to harvest were thought to be the primary causes of decline (Silver 1957).

#### Distribution

Spruce grouse are distributed throughout boreal forests of North America. In the East, spruce grouse are at the southern extent of their range in northern Minnesota, Wisconsin, Michigan's Lower Peninsula, New York, Vermont, New Hampshire, and Maine (AOU 1983). Spruce grouse are listed in other states/provinces, including Vermont (endangered), New York (endangered), Nova Scotia (Uncommon), Minnesota (Uncommon), Wisconsin (Threatened), and Michigan (Uncommon) (Lumsden and Weeden 1963). In New Hampshire spruce grouse are found primarily within the White Mountain National Forests and isolated habitat fragments throughout Coos County and are a species of special concern.

In most cases, there is very little overlap between spruce grouse and ruffed grouse habitat. Common densities of spruce grouse in suitable habitat are around 12-24 grouse/mi<sup>2</sup>, as opposed to 80 or more ruffed grouse/mi<sup>2</sup> in suitable habitat (Johnsgard 1983, Greenwald 1984, Robinson 1980).

#### Habitat

Spruce grouse prefer dense conifer forests and low-elevation bogs (Boag and Schroeder 1992, Smith 1994). Forest structure, rather than specific tree species, greatly influences habitat use by spruce grouse (Greenwald 1984). Structural components important to spruce grouse include forest openings, bog edges, trees with live branches extending to the ground, and sparse ground cover with optimum forage such as *Vaccinium* (Robinson 1980). In the winter, spruce grouse feed entirely on short conifer needles (NatureServe 2005). Tree species commonly associated with spruce grouse habitat in New England include black spruce, tamarack, and balsam fir (Bryant and Kuropat 1980,

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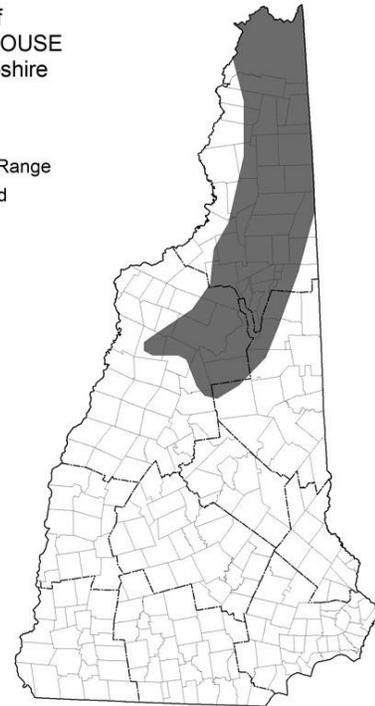
Allen 1985).

### NH Wildlife Action Plan Habitats

- Lowland Spruce-Fir Forest
- High Elevation Spruce-Fir Forest

Distribution of  
SPRUCE GROUSE  
in New Hampshire

■ Current Range  
▨ Localized



Distribution Map

### Current Species and Habitat Condition in New Hampshire

Historically, spruce grouse were abundant in Coos County due to the extensive spruce-fir habitat. Overall, spruce-fir habitat has declined due to current and historic land use. Spruce grouse may persist sporadically throughout low-elevation spruce forests, but populations are likely isolated and unstable (Keppie 1997). High elevation spruce-fir habitat is more contiguous and susceptible to natural stand dynamics which supports continual availability of spruce grouse habitat. As a result this area likely supports more stable spruce grouse populations (Siren 2015). This is especially true in the White Mountain National Forest where natural stand dynamics (e.g. fir waves) are producing a continuous supply of maturing spruce fir habitat over time. Todd (2003) suggests that spruce grouse in high elevation habitat may be subjected to longer and colder temperatures, resulting in late breeding and decreased annual production. As result high elevation populations would have limited ability in maintaining spruce grouse populations in some of the more contiguous better habitat in New Hampshire.

### Population Management Status

NHFG uses signage in areas known to have overlap with popular grouse hunting and outdoor recreation that explain the difference between spruce grouse and ruffed grouse.

NHFG has also partnered with ongoing research to look at spruce grouse genetics and the impacts of isolation on genetic diversity (A. Ross, NYDEC 2014). Past research projects on spruce grouse have

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also concentrated on habitat found in the White Mountain subsection (Todd 2003).

### **Regulatory Protection (for explanations, see Appendix I)**

- Possession prohibited

### **Quality of Habitat**

Based on a recent analysis comparing the amount of current low elevation spruce fir (Northern NH Landcover Reassessment 2012) to the potential or historical distribution (WAP 2005), low elevation is currently found in smaller patches and less prevalent on the landscape (Siren 2015). Additionally, the areas that remain spruce fir are younger in age. As a result spruce grouse population have likely been segregated to the larger patches of mid to mature spruce fir stands interspersed with preferred feeding and nesting habitat. The patchy nature of the habitat across the landscape may be contributing to the isolation of some populations.

The majority of the high elevation spruce fir habitat is in public ownership, specifically on the White Mountain National Forest and is in a mature age class. As a result habitat may be localized with little to no connectivity between habitat patches.

Mahoosuc-Rangeley region: Conserved land within the Mahoosuc-Rangeley subsection may also support spruce grouse, but unlike the Connecticut Lakes subsection, most of the conserved habitat is at higher elevations. This may require different research and management objectives. Unconserved land has the highest potential for providing spruce grouse habitat within this subsection. Under timber investment and industrial ownership, historical habitat has drastically declined and continues to be harvested at an accelerated pace.

White Mountain region: Populations currently persist in the White Mountain subsection, but are likely isolated due to fragmentation of habitat patches (Todd 2003).

### **Habitat Protection Status**

Over the past 20 year several large land conservation projects have taken place in Coos County that could help to restore historic lowland spruce fir habitat. Low elevation stands of spruce fir within easement areas may be managed in a way that is more conducive to providing spruce grouse habitat in larger patches as well as with better connectivity between patches. According to Siren (2015), significant portions of the low elevation spruce fir in New Hampshire remains in large private land ownership. Analysis shows that much of this habitat is currently regenerating and not likely providing large blocks of spruce grouse habitat at this time.

Siren (2015) also shows that much of the high elevation spruce fir habitat in New Hampshire is currently in public ownership or has a conservation easement helping to guide management. Again this is likely providing larger areas of mature spruce fir that support spruce grouse at a landscape scale, yet these habitats are isolated in nature (Todd 2003).

Mahoosuc-Rangeley region: The majority of the high elevation spruce-fir habitat in the Mahoosuc-Rangeley subsection is currently protected through easement or title fee. Unprotected high elevation habitat includes Dixville/Mt. Kelsey mountain ridge. Low elevation spruce-fir habitat in the Mahoosuc-Rangeley subsection remains virtually unprotected. Unincorporated towns have some level of protection through zoned districts.

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White Mountain region: High elevation spruce-fir habitat in the White Mountains subsection is entirely protected by the White Mountain National Forest (WMNF). Under the Proposed Land and Resource Plan for the WMNF, wind towers can be considered as well as ski area expansions in designated areas. Virtually all of the low elevation spruce-fir is under federal ownership as part of the WMNF. Unincorporated towns located within the subsection also have some level of protection through zoned districts.

### Habitat Management Status

Conserved land properties contributing to spruce grouse habitat include: The Connecticut Lakes Natural Area, Connecticut Lakes Timber Company, the Vicki Bunnell Preserve, Nash Stream State Forest, Kilkenny National Forest, the White Mountain National Forest, and the Randolph Town Forest and the Errol Town Forest, all of which have specific goals for promoting boreal forest and wildlife species within their boundaries.

Portions of Coos County remain virtually unprotected through easement or conservation ownership. These properties are critical north/south as well as east/west movement corridors between populations and states.

Potentially important ownerships:

Town of Success, no protection

Second College Grant, no protection

Bayroot LLC, no protection

Balsams Resort, partial protection

Perry Stream Land and Timber, No protection

Poor distribution of a variety of age classes in forest structure can be detrimental to spruce grouse abundance. Spruce grouse directly benefit from forest management designed to keep a mix of age classes such as early successional pockets which can be critical areas for chick feeding.

### Threats to this Species or Habitat in NH

*Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a "medium" or "high" score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.*

#### Habitat impacts from retraction of spruce fir habitat (Threat Rank: High)

#### Timber harvesting that results in an imbalance in age structure and loss of spruce fir habitat (Threat Rank: High)

#### Habitat loss or conversion by insect pests (Threat Rank: High)

Outbreaks of insect pests including spruce budworm (native) and balsam woolly adelgid (non-native) can cause widespread decline in fir throughout spruce grouse distribution in NH in a short period of time. Due to the even age nature of softwood stands in NH loss of fir could significantly impact the amount of habitat left for spruce grouse in NH.

#### Habitat impacts from improper habitat management that creates dispersal barriers and isolation (Threat Rank: Medium)

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### **List of Lower Ranking Threats:**

Disturbance from OHRV activity

Disturbance from recreation activity (hiking, climbing, foot traffic)

Mortality from incidental take during grouse season

Habitat conversion and fragmentation from tower and turbine development

Habitat conversion and fragmentation due to the development of ski areas

Species impacts from increased forest road density that increases vulnerability to hunting and road mortality

### **Actions to benefit this Species or Habitat in NH**

#### **Minimize road construction in spruce fir**

**Primary Threat Addressed:** Species impacts from increased forest road density that increases vulnerability to hunting and road mortality

**Specific Threat (IUCN Threat Levels):** Biological resource use

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

#### **Minimize development in high elevation habitats**

**Primary Threat Addressed:** Habitat conversion and fragmentation due to the development of ski areas

**Specific Threat (IUCN Threat Levels):** Residential & commercial development

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

#### **Promote actions to decrease the effects of climate change**

**Primary Threat Addressed:** Habitat impacts from retraction of spruce fir habitat

**Specific Threat (IUCN Threat Levels):** Climate change & severe weather

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

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**Provide technical assistance on importance of sustainable spruce fir management**

**Primary Threat Addressed:** Habitat impacts from improper habitat management that creates dispersal barriers and isolation

**Specific Threat (IUCN Threat Levels):** Biological resource use

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

**Minimize construction in high elevation habitats**

**Primary Threat Addressed:** Habitat conversion and fragmentation from tower and turbine development

**Specific Threat (IUCN Threat Levels):** Energy production & mining

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

**Provide technical assistance on the importance of sustainable spruce fir management**

**Primary Threat Addressed:** Timber harvesting that results in an imbalance in age structure and loss of spruce fir habitat

**Specific Threat (IUCN Threat Levels):** Biological resource use

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

**Increase public awareness on spruce grouse habitat and distribution**

**Primary Threat Addressed:** Mortality from incidental take during grouse season

**Specific Threat (IUCN Threat Levels):** Biological resource use

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

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### **Minimize trails and activity through known spruce grouse habitat**

**Primary Threat Addressed:** Disturbance from recreation activity (hiking, climbing, foot traffic)

**Specific Threat (IUCN Threat Levels):** Human intrusions & disturbance

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

### **Minimize OHRV trails through spruce fir habitat**

**Primary Threat Addressed:** Disturbance from OHRV activity

**Specific Threat (IUCN Threat Levels):** Human intrusions & disturbance

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

### **Early detections and managing stands to be resistant to pests (age class diversity)**

**Primary Threat Addressed:** Habitat loss or conversion by insect pests

**Specific Threat (IUCN Threat Levels):** Invasive & other problematic species, genes & diseases

**Objective:**

**General Strategy:**

**Political Location:**

**Watershed Location:**

## **References, Data Sources and Authors**

### **Data Sources**

Information on spruce grouse population distribution and status was collected from research (Todd 2003), New Hampshire Fish and Game data, public observation records, Audubon bird records, Breeding Bird Survey (BBS) data (Hunt 2005), and Breeding Bird Atlas (BBA) locations (Smith 1994). Information on habitat protection and management was obtained from literature review, expert review, and consultation

### **Data Quality**

Data on New Hampshire's spruce grouse populations is extremely limited. There are few historic or recent data on distribution and abundance.

Current information is based largely on general observations, Audubon bird records, observation records collected from the public, and surveys conducted for the Breeding Bird Atlas for New Hampshire (Smith 1994). BBS survey methods are poor for detecting spruce grouse.

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Systematic assessments include New Hampshire BBA and BBS. Overall, there is little to no information on the distribution, size, and connectivity of local spruce grouse populations and habitat in New Hampshire.

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Jillian Kilborn, NHFG

### **2005 Authors:**

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