

## SPECIES PROFILE

# Spruce Grouse

*Falcapennis canadensis*

Federal Listing: Not listed

State Listing: Not listed

Global Rank: G5

State Rank: S3

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### ELEMENT 1: DISTRIBUTION AND HABITAT

#### 1.1 Habitat Description

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 spruce grouse (Greenwald 1984); tree species commonly associated with spruce grouse habitat in New England include black spruce, tamarack, and balsam fir (Bryant and Kuropat 1980, Allen 1985). 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). New Hampshire natural communities associated with spruce grouse habitat include high-elevation spruce-fir, high elevation balsam fir, black spruce-red spruce, lowland spruce-fir, and peatlands.

#### 1.2 Justification

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). Anecdotal evidence (limited chick and female sightings) suggests that spruce grouse are declining in New Hampshire. High market demands 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 common in Coos County 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 (Silver 1957).

#### 1.3 Protection and Regulatory Status

Spruce grouse are a species of conservation concern but are not listed in New Hampshire. Spruce grouse cannot be hunted in New Hampshire (RSA 209:4). 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).

#### 1.4 Population and Habitat Distribution

Spruce grouse are distributed throughout the northern United States and Canada. In the East, the southern range limit includes northern Minnesota, Wisconsin, Michigan's Lower Peninsula, New York, Vermont, northern New Hampshire, and eastern Maine (AOU 1983).

According to Silver (1957), spruce grouse were historically common as far south as the Berkshire Hills and Worcester County, Massachusetts. Today, spruce grouse in New Hampshire can be found in and north of the White Mountains. 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).

## 1.5 Town Distribution Map

Figure 1.

## 1.6 Habitat Map

*See the high elevation spruce-fir map.*

## 1.7 Sources of Information

Information on spruce grouse habitat was derived from the high elevation spruce-fir map. Information on population distribution and status was collected from recent 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).

## 1.8 Extent and Quality of Data

Data on New Hampshire's spruce grouse populations are limited. There are few historic or recent data on distribution and abundance, particularly data collected in a systematic manner. 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.

## 1.9 Distribution Research

New Hampshire needs a systematic assessment of spruce grouse populations and habitat.

## ELEMENT 2: SPECIES CONDITION

### 2.1 Scale

Spruce grouse primarily occur in three areas: Connecticut Lakes, Mahoosuc-Rangeley region, and the White Mountains (Figure 1). Habitat polygons within subsections will be aggregated to form planning units.

### 2.2 Relative Health of Populations

**Connecticut Lakes region:** Historically, spruce grouse were likely abundant in the Connecticut Lakes region 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 may be isolated and unstable (Keppie 1997). High elevation spruce-fir habitat is more common and likely maintains spruce grouse populations in the region.

**Mahoosuc-Rangeley region:** Historically, spruce grouse were likely abundant within the Mahoosuc-Rangeley region, especially along the Androscoggin River Valley in lowland spruce-fir forests and bogs. Spruce grouse persist in low elevation habitats, but populations may be isolated and unstable (Keppie 1997). They may be more abundant at higher elevations where forest cutting has not been as intense.

**White Mountains region:** Historically, spruce grouse were abundant in the White Mountains wherever spruce-fir habitat occurred (low and high elevations). Spruce grouse persist in isolated high elevation habitats, but preliminary data suggest that productivity may be low and populations may be unstable (Keppie 1997, Todd 2003). Furthermore, spruce grouse in high elevation habitat may be subjected to longer and colder temperatures, resulting in late breeding and decreased annual production (Todd 2003).

### 2.3 Population Management Status

In the Connecticut Lakes and Mahoosuc-Rangeley regions, NHFG has placed signs showing the difference between spruce grouse and ruffed grouse at locations where hunters/hikers may encounter both species. Observation data come from interviews with NHFG personnel. High elevation bird surveys are periodically conducted in the White Mountain National Forest (last survey 1993-1997). Past research projects on spruce grouse have also concentrated on habitat found in the White Mountain subsection (Todd 2003).

### 2.4 Relative Quality of Habitat Patches

**Connecticut Lakes region:** Conserved land within the Connecticut Lakes region has excellent potential to support spruce grouse. Increasing and improving the amount of spruce-fir within this subsection will improve foraging opportunities for spruce grouse.

Active habitat management will also allow for pre-commercial thinning and release of softwood regeneration to promote the growth of branches extending out near ground level for displaying males. Cover for spruce grouse will be improved by providing closed canopy spruce-fir to provide overhead cover as protection from predators. Small openings, interspersed (patch cuts) will also promote productivity by providing dense cover and feeding opportunities for young.

**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).

## 2.5 Habitat Patch Protection Status

**Connecticut Lakes region:** Within the Connecticut Lakes subsection, the majority of both high elevation spruce-fir and low elevation spruce-fir habitat is protected under conservation easement or fee ownership. The Connecticut Lakes Timber Company currently owns 146,400 acres of working forest that is under easement. NHFG owns in fee 25,000 acres within the subsection. High elevation habitat that remains unprotected includes most of Crystal Mountain and Blue Ridge, as well as Sanguinary and Rice Mountain Ridges. Low elevation habitat that remains unprotected can be primarily found in the Clarksville and Colebrook vicinity. Unincorporated towns have some level of protection through zoned districts.

**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.

**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.

## 2.6 Habitat Management Status

**Connecticut Lakes region:** Under the Connecticut Lakes Headwaters DRAFT stewardship plan, a primary goal is to increase the overall occurrence of spruce-fir in all size classes. Under the stewardship plan for the Connecticut Lakes Natural Area (CLNA, NHFG ownership), a primary goal for the property is to establish and maintain wildlife habitats that provide for game and non-game wildlife species native to the Connecticut Lakes Ecoregion. Specific consideration will be given to the landscape context and habitat availability existing outside the boundaries of the CLNA, with emphasis on those species considered rare or of conservation concern. Boreal forest species are a specific target for this goal. Unincorporated towns located within the subsection have specific zoning for critical wildlife habitat (PD3 zones), high elevation habitat above 2700 feet in elevation (PD6 zones), wetlands (PD7 zones), and unusual areas (PD8 zones).

**Mahoosuc-Rangeley region:** Conserved land within the Mahoosuc-Rangeley subsection includes the Vicki Bunnell preserve, Nash Stream State Forest, Kilkenny section of the WMNF, and the Randolph Town Forest, all of which have specific goals for promoting boreal forest and wildlife species within their boundaries. Unincorporated towns located within the subsection have specific zoning for critical wildlife habitat (PD3 zones), high elevation habitat above 2,700 ft in elevation (PD6 zones), wetlands (PD7 zones), and unusual areas (PD8 zones). The major-

ity of low-lying spruce-fir habitat found within this subsection remains in large landownership and therefore has extreme pressure placed on it for producing softwood timber.

**White Mountain region:** Virtually all of the White Mountains subsection is made up of the WMNF. Under the Proposed Land and Resource Plan for the WMNF (2004), there is an overall objective of increasing softwood (from 12 to 24%) throughout the forest. Furthermore, the age class objectives for softwood is to have 59-63 % of all softwood as mature habitat, and 30% as old habitat. Mature forest structure can be a problem in regions where spruce grouse have declined. Spruce grouse directly benefit from forest management designed to keep pockets of habitat in earlier successional stages (NatureServe 2005). Unincorporated towns located within the subsection have specific zoning for critical wildlife habitat (PD3 zones), high elevation habitat above 2700 feet in elevation (PD6 zones), wetlands (PD7 zones), and unusual areas (PD8 zones).

## 2.7 Sources of Information

Information on habitat protection and management was obtained from literature review, expert review, consultation (W. Staats, and J. Kanter, NHFG, personal communication), the Draft of the Connecticut Lakes Headwaters Forest Stewardship Plan, the Draft Plan for Connecticut Lakes Natural Area, Zoning Ordinances for Coos County Unincorporated Places and the WMNF Proposed Land and Resource Management Plan.

## 2.8 Extent and Quality of Data

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 in New Hampshire.

## 2.9 Condition Assessment Research

Research could include a systematic assessment of distribution, habitat assessment, survivorship of chicks and juveniles, juvenile dispersal, and population connectivity.

## ELEMENT 3: SPECIES THREAT ASSESSMENT

### 3.1.1 Unsustainable Harvest (Forestry Operations and Management)

#### (A) Exposure Pathway

The exposure pathway is the method and timing of timber harvesting that converts spruce-fir stands to different forest types (specifically deciduous), thus resulting in a direct loss of spruce grouse habitat. Consequently, individual spruce grouse populations become isolated or locally extinct.

#### (B) Evidence

Spruce grouse population isolation is well documented in the WMNF (Todd 2003). Population isolation outside the forest, although not documented, is suspected to be more extensive and severe at some locations (W. Staats, NHFG, personal communication). Preliminary habitat mapping shows a high rate of spruce-fir conversion as well.

### 3.1.2 Unregulated Take (Incidental Take)

#### (A) Exposure Pathway

Upland bird hunters mistaking spruce grouse for ruffed grouse

#### (B) Evidence

Incidental takes that are collected and reported to conservation officers. Currently <1 incidentally shot spruce grouse are reported each year (J. Kelly, NHFG, personal communication).

## 3.2. Sources of Information

Information on threats was taken from Silver (1957), Todd (2003), Keppie (1997), and expert review and consultation (W. Staats, NHFG, personal communication).

## 3.3. Extent and Quality of Data

Scant data exist on the threats to isolated populations, especially outside the WMNF. The current extent of incidental take is localized to the Connecticut Lakes subsection, with suspected occurrence within the Mahoosuc-Rangeley subsection (J. Kelly, NHFG,

personal communication).

### 3.4. Threat Assessment Research

Potential threat assessment research would include collecting information methods for retaining/creating spruce grouse habitat, methods for maintaining large landownership, and studies on juvenile dispersal, population expansion, and habitat recolonization rates. Better data collection and reporting methods are also needed to document incidental takes of spruce grouse.

#### ELEMENT 4: CONSERVATION ACTIONS

##### 4.1.1 Increase the amount of suitable spruce-fir habitat for spruce grouse through habitat management and protection, Restoration and Management

(A) Direct Threat: Unsustainable Harvest (Forestry Operations and Management)

(B) Justification

Increasing the effective population size of spruce grouse in Acadian spruce-fir habitat is directly linked to managing for and promoting spruce-fir at lower elevations. The spatial scale of the action meets the spatial scale of the threat because it is a distribution wide approach to spruce grouse habitat loss.

(C) Conservation Performance Objective

The desired outcome is to increase the amount of Acadian spruce-fir habitat to provide connectivity between spruce grouse populations throughout historic Acadian spruce-fir distribution. This long-term objective will likely take 30 years or more.

(D) Performance Monitoring

Restoration of suitable spruce-fir habitat can be monitored by documenting the amount of spruce-fir statewide and by monitoring spruce grouse populations within these habitats.

(E) Ecological Response Objective

Spruce grouse populations can be monitored to assess the extent and quality of spruce-fir habitat. As effective population size is reached and maintained, the conservation action can be reassessed. Where ap-

propriate, emphasis can be shifted away from habitat protection and toward management for structure beneficial to spruce grouse (e.g., small forest openings interspersed within spruce-fir cover). Successful population restoration will be indicated by greater than 50% of identified potential habitat being occupied by spruce grouse. Most beneficial to spruce grouse would be a large area with a mosaic of even-aged stand of spruce-fir, including an array of different ages classes (Boag and Schroeder 1992).

(F) Response Monitoring

Areas for potential high elevation habitat monitoring would include the WMNF, Vicki Bunnell Preserve (The Nature Conservancy), Kilkenny section of the WMNF, Nash Stream State Forest (Long Mountain), and a variety of privately owned high mountain ridges. Low elevation locations would include East Inlet (CLNA and TNC), and Bog Branch of Cedar Stream (CLNA, South Bay Bog), Perry Ponds (Pittsburg), CLHW property, Molligewock (Cambridge), Second College Grant (Bennett Brook), Lake Umbagog NWR, Success, and Pondicherry NWR. Baseline data should be developed for each location and monitored on a 2-5 year interval.

(G) Implementation

Increasing effective population size is a long-term process that should be monitored based on the amount and location of spruce-fir restored across the landscape. NHFG, WMNF, the New Hampshire Department of Resources and Economic Development, and the U.S. Fish and Wildlife Service can perform the identified actions at the appropriate and identified locations. Technical assistance can be provided to private landowners to maximize Acadian spruce-fir.

(H) Feasibility: 1.72

##### 4.1.2 Promote education and knowledge of spruce grouse distribution and habitat, especially in popular ruffed grouse hunting locations, Education and Outreach and Regulation and Policy

(A) Direct Threat

Human recreation- incidental take

(B) Justification

Increasing awareness will benefit spruce grouse by in-

fluencing the way that people perceive spruce grouse and their habitat. As a result, people may be more likely to report sightings and pay more attention to the habitat they are in while hunting, and be less apt to incidentally take a spruce grouse. The spatial scale of the action is appropriate for the scale of the threat because the effort will be implemented throughout historic spruce grouse distribution.

(C) Conservation Performance Objective:

Conservation performance objectives will include identifying and placing signs at more locations, encouraging conservation officers to become more interactive with hunters to explain the differences between spruce grouse and ruffed grouse.

(D) Performance Monitoring

The method for monitoring the performance of the education and outreach effort would be a decrease in the number of incidentally taken spruce grouse. Yearly interviews with District 1 Conservation Officers are currently being used to collect this information. If it is deemed that incidental takes are having impacts on local populations, more intensive area posting/signage can be used.

(E) Ecological Response Objective

The desired ecological response of the conservation action is to decrease or eliminate incidental shootings of spruce grouse. A measurable indicator of the desired ecological response is a decrease in the number of birds taken, and a better understanding from the hunting public regarding spruce grouse and their habitat.

(F) Response Monitoring

Response monitoring can be done through field interviews with hunters and interviews with local conservation officers.

(G) Implementation

Signs have already been designed and used at some locations. Prior to 1 October 2005 the signs should be reviewed, finalized, and printed on a durable surface that can withstand outdoor conditions. Interviews with the Conservation Officers are currently done on an informal basis. Providing a summary of some of the information that would be beneficial to the objective may be presented in an interoffice memo prior

to the hunting season. Field interviews at locations where signs are posted may be warranted on a specific location basis depending on the amount of activity or potential for incidental shooting of spruce grouse.

(H) Feasibility: 3.06

This task would be highly feasible. NHFG is currently responsible for most of the tasks, which are ongoing and could be slightly expanded to provide more of an impact. Funding requirements would only be for the cost of sign printing and staff time to place them at specified locations. Local chapters of the Audubon and conservation groups could be used to maintain signage and perform informal interviews.

## ELEMENT 5: REFERENCES

### 5.1 Literature Cited

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## 5.2 Data Sources

- NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life (web application). Version 4.2 NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>.

## Distribution of Spruce Grouse in New Hampshire

**Distribution**  
■ Known  
■ Potential



0 10 20 40 Miles

Known = confirmed breeding observations as reported in the  
NH Natural Heritage Bureau's Element Occurrence Database.  
Potential = non-breeding observations as reported in the  
NH Natural Heritage Bureau's Element Occurrence Database.

