Species Status Assessment

Common Name: Spruce grouse **Date Updated:** January 7, 2025

Scientific Name: *Canachites canadensis* **Updated By:** Angelena Ross

Class: Aves

Family: Phasianidae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

The spruce grouse is a member of the order Galliformes and is included in the genus *Canachites*. The spruce grouse is distributed in a transcontinental band across North America that generally conforms to the extent of the boreal forest biome (Aldrich 1963). In New York, the species is a year-round resident, occurring in isolated patches of lowland coniferous forest patches dominated by black spruce (*Picea mariana*), tamarack (*Larix laricina*), and balsam fir (*Abies balsamea*). The species is found exclusively within the northwestern and northcentral Adirondack Park in St. Lawrence and Franklin counties. The New York spruce grouse population has a metapopulation structure, exhibiting source-sink dynamics, with occupied subpopulations tending to be located closer to other colonizing sources (Fritz 1979). From 2002-2012, the population was restricted to 13 of 32 occupied boreal forest patches that were occupied in 1976, and one additional patches that had never been previously confirmed occupied (Ross et al. 2016). The range contraction from the 1970s to 2012 represented a greater than 50% loss in occupied patch numbers and a 71% reduction in the aerial extent of the species' distribution (Ross et al. 2016). However, since translocations of spruce grouse began in 2013 and have taken place through 2024, there have been an additional eight patches with at least transient occupancy (i.e., at least scat observed), many of which had not been confirmed occupied since the 1980s.

I. Status

a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** no

ii. **New York:** Endangered

b. Natural Heritage Program

i. **Global:** G5

ii. **New York:** S2 **Tracked by NYNHP?:** Yes

Other Ranks:
-NYS 2025 SGCN status: High Priority Species of Greatest Conservation Need
-COSEWIC: Not listed in Canada
-IUCN Red List: Not assessed by IUCN Red List
-Northeast Regional SGCN: Not listed

The spruce grouse is listed as Endangered in New York and Vermont, Threatened in Wisconsin, a Species of Special Concern in Michigan and New Hampshire, and the hunting is closed in Maine (designated at SGCN) and Nova Scotia ("Protected"). Nature Serve 2.0 lists spruce grouse as Imperiled in New York and Michigan, Critically Imperiled in Vermont and Wisconsin, Vulnerable in New Hampshire, Apparently Secure in Quebec, and secure in Ontario. Partners in Flight lists spruce grouse as a Stewardship Species and a Species of Continental Importance.

Status Discussion:

The spruce grouse is common throughout most of its North American continental range. It is regarded as a G5 or globally secure species throughout the main portion of its range in northern Canada (NatureServe 2023). However, recent eBird trends indicate a 21.1% (80% CI = - 24.3 to -16%) range wide decline from 2012-2022 (https://science.ebird.org/en/status-and-trends/species/sprgro/trends-map <accessed: 8 January 2025). Because of low local population densities, hunting is restricted or banned in some states and provinces.

In New York, the spruce grouse is a very rare, local and uncommon resident and breeder in the Adirondack Mountain Region. It is restricted exclusively to lowland boreal forest patches in the northcentral and northwestern section of the Adirondack Region.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Choose an item.	1980-2022		Choose an item.
Northeastern US	Yes	Declining	Declining	1976-2022		Choose an item.
New York	Yes	Declining	Declining	1987-2024	E	Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	Yes	Declining	Declining		E	Yes
Ontario	Yes	Declining	Stable	2012-2022		No
Quebec	Yes	Declining	Stable	2012-2022		No

Column options
Present?: Yes; No; Unknown; No data; (blank) or Choose an Item
Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item
SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*

The New York Spruce Grouse Recovery Plan calls for regular monitoring of historically occupied and new potential sites at three-year intervals. NYSDEC staff surveyed 21 of 32 historically occupied patches in 2011, 28 (+8 not historically occupied) were surveyed at least once during 2013-2016; 22 (+2 not historically occupied) were surveyed in 2017-2019, and 21 (+2 not historically occupied) in 2021-2024; NYSDEC, unpublished data).

The Wildlife Conservation Society has conducted surveys for boreal breeding birds at a number of locations in the Adirondack Park since 2003 (Glennon 2010). The spruce grouse is one of 12 target species; however, the monitoring methods employed in that study are anticipated to capture only incidental spruce grouse observations.

Trends Discussion *(insert map of North American/regional distribution and status):*

New York is at the southeastern edge of the species' range where spruce grouse occur as a disjunct population. From 1976-2012, the Adirondack spruce grouse population had endured a greater than 50% reduction in numbers of occupied sites and a 71% reduction in the areal extent of the species' range (Ross et al. 2016). In 1987, there were an estimated 175 – 315 spruce grouse present in the state; however, this number was likely closer to 175 individuals (Bouta 1991). In 1999, the species was added to the NYS Endangered Species List. By 2006, only 14 of 32 sites occupied from 1976-1987 (Fritz 1977, Bouta 1991) and one new site were occupied (Ross and Johnson 2008) and there were probably less than 75 – 100 adult spruce grouse in the state (Ross and Johnson, unpublished data).

Population viability analysis (PVA) modeling (Ross 2018) indicates that lack of action will likely lead to the species' extirpation in New York, since forests in areas occupied by spruce grouse are aging to the point where they may no longer provide the necessary requirements for the species. The PVA indicated that the probability of extinction was 84.8% over 100 years and the average time to first extinction was 23.06 years (SE = 0.93 years) using Adirondack population data (A. Ross, unpublished data). However, absolute results of PVA, such as time to extinction, should be considered cautiously, as models are best used to test different management actions against one another and to highlight data deficiencies. Such a sensitivity analyses best allows us to learn where to direct conservation and data collection efforts. PVA Sensitivity Analyses results indicated that the population is sensitive to changes in mortality, forest carrying capacity, and reduction in genetic diversity, measures of which can be productively changed by improving habitat conditions and translocating spruce grouse into New York from areas in which spruce grouse are more genetically diverse (e.g., Canada and Maine).

The Wildlife Conservation Society conducted point counts for 12 boreal species at 80 sites in the Adirondack Park from 2007-2009 (Glennon 2010). Fewer than five detections were obtained for spruce grouse, which prevented occupancy modeling.

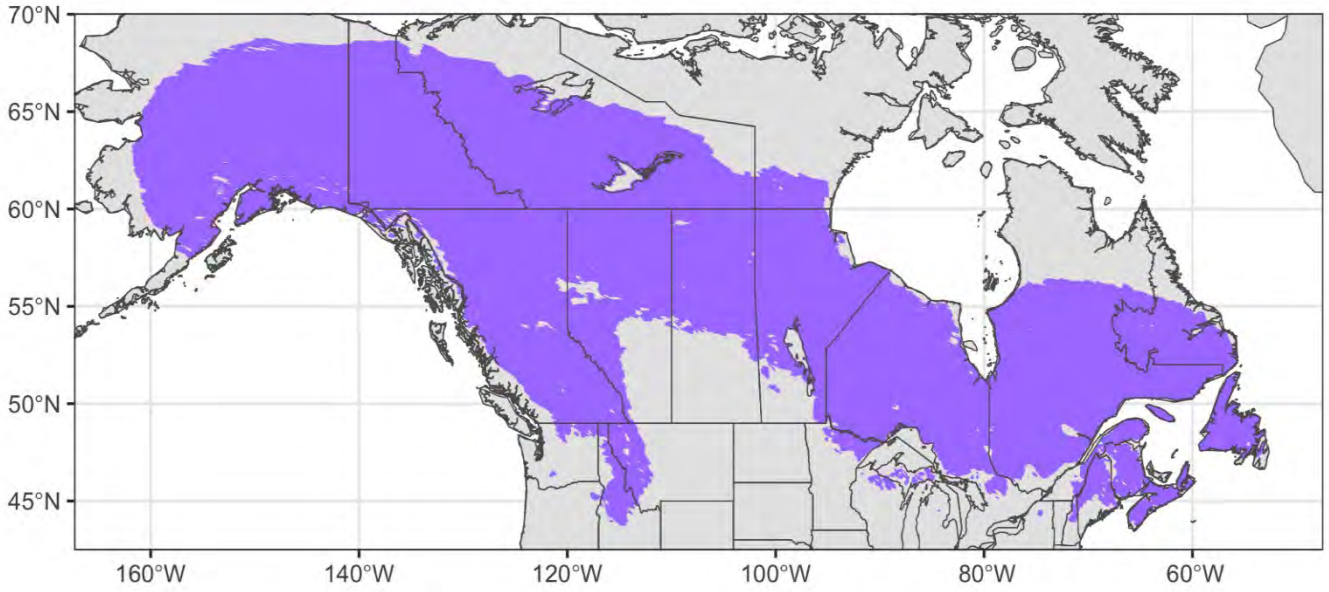

Figure 1. Year-round distribution of spruce grouse (*Canachites canadensis*) in North America (from eBird 2023).

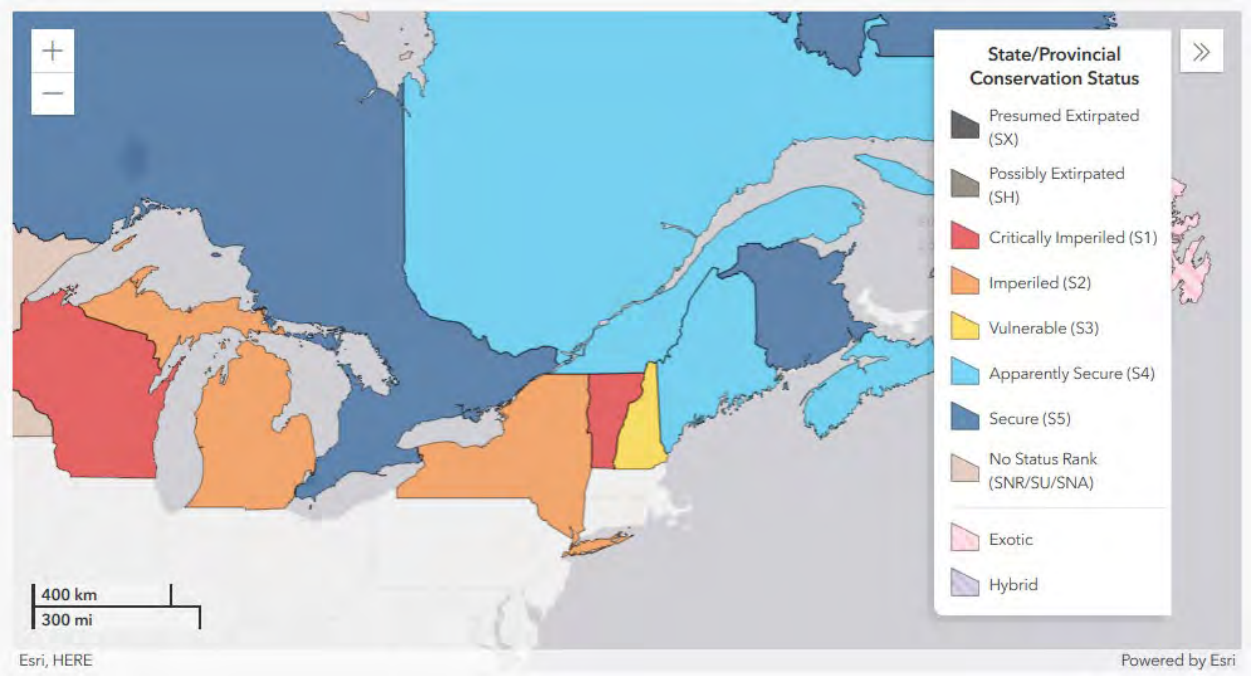

Figure 2. Conservation status of spruce grouse in North America (NatureServe 2023).

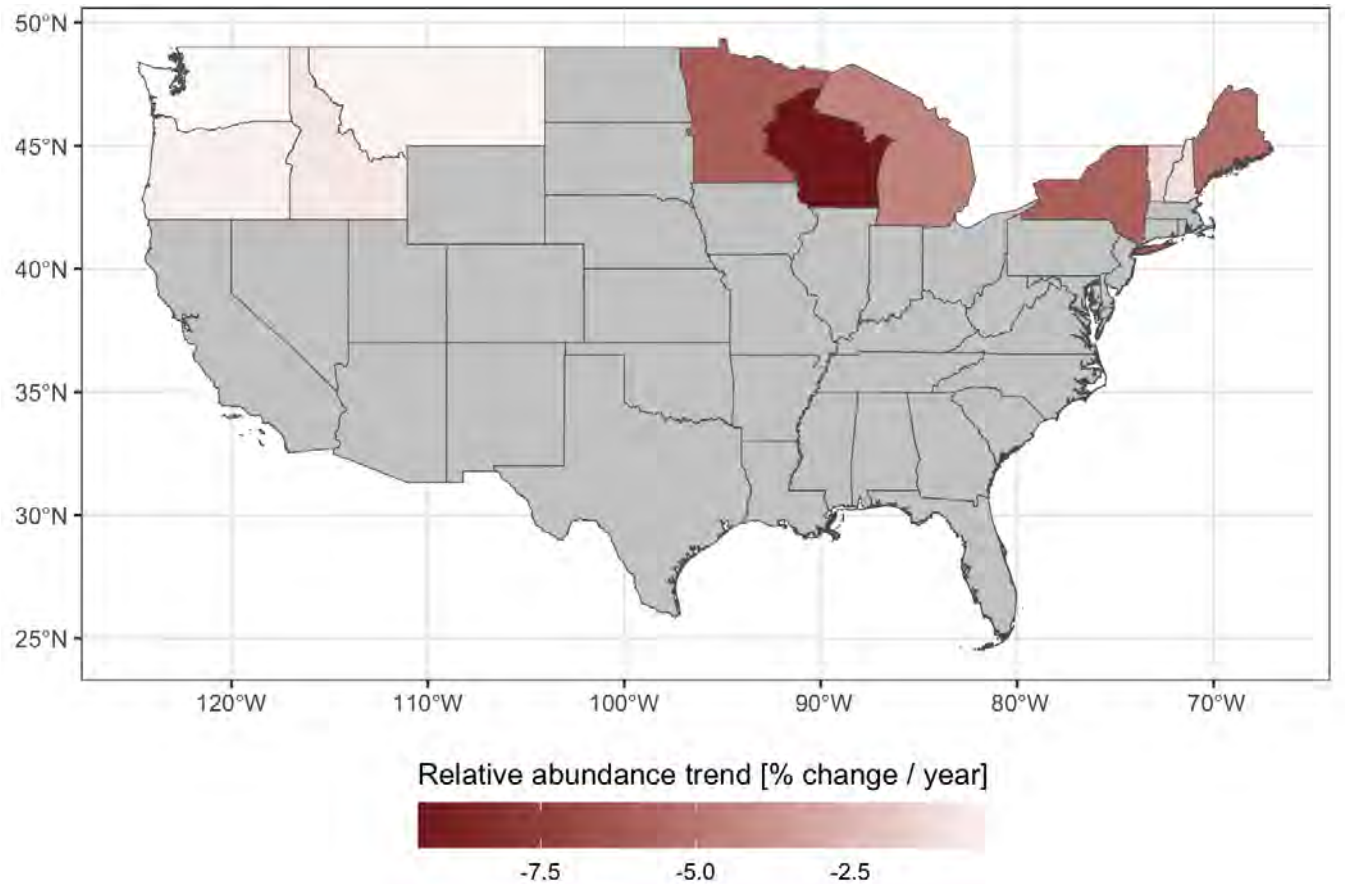

Figure 3. Breeding trends of spruce grouse (*Canachites canadensis*) in the USA from 2012-2022 (from eBird 2023).

III. New York Rarity *(provide map, numbers, and percent of state occupied)*

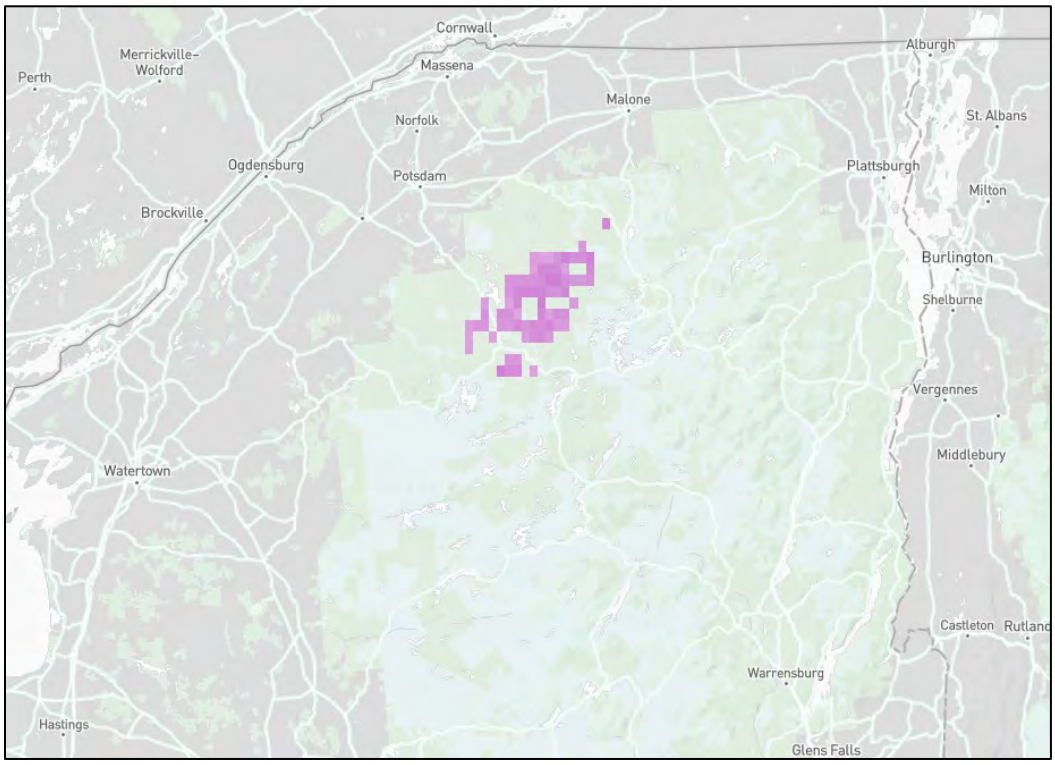

Figure 4. Spruce grouse distribution in New York (eBird 2023).

Details of historic and current occurrence:

By 2024, 20 of the 32 historically occupied sites from 1976-1987 (Fritz 1977, Bouta 1991) had extant subpopulations, with one additional site occupied that was not historically occupied. In 1987, there were 175-315 individuals thought to be present in the Adirondack Park; however, by 2010, there were probably fewer than 100 adult spruce grouse in the state (Ross and Johnson, unpublished data [2012]). Translocations that had begun in 2013 have likely moved these numbers upwards, although it is difficult to develop an estimate without intensive surveys and marking of individuals. In more recent surveys taking place from 2020-2024, there were 21 distinct locations with evidence of spruce grouse presence; however, these locations were not from confirmed breeding individuals, but instead from movements of translocated individuals.

New York's Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Disjunct	280 km

Column options
Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item
Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

In New York, the spruce grouse is restricted to 21 small, isolated subpopulations located exclusively within the northwestern and northcentral section of the Adirondack Park in St. Lawrence and Franklin counties. Of these 21, 14 subpopulations are located on private lands and 7 are located on state-owned lands that are part of the Adirondack Forest Preserve in the Raquette Boreal, Saranac Lakes, and Debar Mountain state land management units. The species is declining in the northeastern USA. The populations in Quebec and Ontario are each about 280 km away.

IV. Primary Habitat or Community Type *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

The spruce grouse occurs in the Northern Appalachian – Boreal forest ecoregion. The species is an indicator of lowland boreal forests in New York, Vermont, and Maine, but occurs in both high and low elevations in New Hampshire. Presence of spruce grouse is also an indicator for the American three-toed woodpecker, black-backed woodpecker, Cape May warbler, bay-breasted warbler, Lincoln's sparrow, Canada Jay, boreal chickadee, palm warbler, and a host of other boreal obligates.

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	Declining	

Column options
Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

In New York the species is restricted to isolated sub-populations within lowland coniferous forests. These isolated populations occur at fringes of bogs and water courses and tend to be associated with peatlands. Throughout their range, the spruce grouse is associated with a short-needled conifer overstory having dense live foliage of low-hanging branches and is dominated by an ericaceous understory (Soule 1992). There is evidence that spruce grouse show some changes in habitat use seasonally (Keppie 1977, Allan 1985), in which denser conifer stands are used more often in winter. These shifts may result from dietary shifts and seasonal changes in canopy cover after tamarack needles are shed. In New York, the spruce grouse inhabits coniferous forests

dominated by black spruce and tamarack with lesser components of balsam fir and white pine, although historically the species also inhabited areas dominated by red spruce in upland forests.

Throughout the rest of the species' range, the spruce grouse occurs in boreal forest and wet spruce forests in the far north to jack pine-spruce, jack pine (*Pinus banksiana*), or spruce-fir forests in the southeastern portions of the range (from Minnesota east), and in southwestern Canada, lodgepole pine (*Pinus contorta*), usually with small inclusions of clumped spruce (Redmond et al. 1982, Boag et al. 1979, Pietz and Tester 1982, Boag and Schroeder 1992). In Alaska, spruce grouse occur in white spruce (*Picea glauca*) and birch (*Betula* spp.), or black spruce (Ellison 1973), especially the dense spruce forests along rivers (Bent 1932). Robinson (1980) concluded that in the northeast, spruce grouse prefer wet lowland forests, but also use adjacent uplands occasionally. However, farther west, the species becomes less dependent on swamps and increasingly prefers uplands. Although forest species composition varies across the spruce grouse's range, the vegetation structure has common features. One regular component of the species' forest structure is inclusion of areas with an understory of low berries, especially *Vaccinium* spp., which make up an important component of its diet. A key feature is a forest structure that provides good cover and food for these ground-nesting birds. This means either live branches from 0-4 meters above ground level, or sufficient tree density to create suitable escape cover (Bouta 1991, Ross et al. 2016).

In the western USA and Canada, lodgepole and jack pine forests tend to be young enough that trees have not begun to self-prune. Generally, they must be less than about 12 m in height. Thus in areas where grouse occupy jack pine and lodgepole pine forests, they are essentially a successional species. Populations may be highest in earlier stages of post-fire succession (Boag and Schroeder 1987). Older pine forests are used only when subdominant spruce are also present. Mature fir stands will also self-prune and become unsuitable. Mature spruce stands are more suitable (Robinson 1980; Keppie, pers. comm.). Redmond et al. (1982) compared habitat in New Brunswick and southwestern Alberta. The lodgepole pine forests in the latter had sparse shrub cover, whereas the former's jack pine-spruce forest habitat had much greater (about 10x) shrub cover. In northern Washington state, were found to preferentially occupy mixed lodgepole pine/Engelmann spruce stands (Ratti et al. 1984). In Maine, preferred lowland conifer habitat (Hedberg 1980). Largely arboreal in winter, less so in summer. Roost and feed in trees in winter, but nest and feed on the ground as well as feed in trees in the spring and summer. In Minnesota, Pietz and Tester (1982) found that grouse preferred jack pine upland in winter, and moved into black spruce bogs for nesting and summer range. When jack pine stands were occasionally used for nesting, the ground cover and tree density was similar to that of the black spruce nesting areas. In this study spruce grouse and sympatric ruffed grouse (BONASA UMBELLUS) overlapped in winter range, but not in summer habitat choices. Keppie (pers. comm.) however, commented that Ruffed Grouse are often seen in Spruce Grouse range in summer elsewhere. In other studies where jack pine uplands were not available, spruce grouse remained in black spruce lowlands year round (Pietz and Tester 1982). A study in Maine showed that the grouse used more open forest areas in summer than winter, probably because of greater availability of summer foods in more open areas (Hedberg 1980, Allan 1985). Similar patterns were found in New York (Chambers, pers. comm.). During the summer molting period, males in the Maine study area used areas where the forest canopy was more closed compared to the areas used by females (Hedberg 1980). Nests are on the ground in a slight depression scraped out, with minimal lining of twigs, grasses, and/or leaves. They are located in a variety of locations, but most often under low branches of young conifers, brush, or other vegetation or against the trunk of trees. Nests are usually well-concealed by surrounding vegetation and the cryptic coloration of the female (Robinson 1980, Redmond et al. 1982).

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

Column options
First 5 fields: Yes; No; Unknown; (blank) or Choose an item
Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

The spruce grouse has a polygynous reproductive system and mating begins in early to mid-April and continues through the end of May. Spruce grouse breed during their first year of life with varying success. Chick growth has been shown to be negatively affected by the spruce budworm pesticide *Bacillus thuringiensis kurstaki*, primarily due to loss of caterpillar larvae in their diets (Norton et al. 2001).

Sex ratios have generally been reported (5 studies) as 1:1 (summarized in Boag and Schroeder 1992). In New York, 82% of females attempted to nest with 75% success (Ross et al. 2022). Mean annual adult survival in the Adirondacks was observed to be 71% over the period 2002 - 2019 (Ross et al. 2022). Researchers observed one male spruce grouse alive, 11 years after he was banded as a juvenile (Ross, unpublished data). Robinson (1980) reported the oldest male at 13 years and the oldest female at 5.5 years among 315 banded birds in Michigan. The spruce grouse has a diversity of predators that, in sum, may have significant impacts on both productivity and mortality.

VI. Threats *(from NY 2015 SWAP or newly described):*

In New York, the loss and fragmentation of habitat by selective logging of softwoods in the late 1800s and early 1900s has been noted as a major factor in the species' historical decline, as these practices usually led to an increase in the more prolific hardwood species (Bouta and Chambers 1990, Jenkins 2004). Spruce budworm outbreaks have led to the further loss of conifer forest (Fox 1895, Fox 1902). Erecting dams to facilitate floating softwoods downstream to be milled exacerbated the problem by flooding large tracts of lowland coniferous forests (e.g., Lows Lake and Stillwater Reservoir), thus increasing fragmentation and the loss of habitat. Changes in species composition and structure of these even-aged coniferous stands due to natural succession resulting from previous logging activity may be an important factor in the declines (Bouta 1991; Ross and Johnson, unpublished data). Small (e.g., 1-ha) areas of clear intensive forest thinning with leave strips has resulted in increased spruce grouse use at larger scales (Potvin (on the order of The even-aged structure of spruce forests that have reestablished may be approaching a successional stage that is too old and homogenous in character to be persistently occupied by spruce grouse.

Since 2012, several radio-collared spruce grouse have died of West Nile Virus (A. Ross, unpublished data). It is unknown whether spruce grouse are carriers of the virus or are susceptible to high levels of mortality from the disease. Elevated ruffed grouse mortality has been suggested as a contributor to West Nile Virus infection in Appalachia (Stauffer et al. 2018).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
5. Biological Resource Use	5.3 Logging & Wood Harvesting	5.3.2 Partial removal of the forest cover	Small	Slight	Immediate	Stable and ongoing	High
7. Natural System Modifications	7.3 Other Ecosystem Modifications	7.3.2 Vegetation succession	Large	Slight	Long-term	Stable and ongoing	Choose an item.
5. Biological Resource Use	5.1 Hunting & Collecting Terrestrial Animals	5.1.4 Poaching/persecution of terrestrial animals	Restricted	Moderate	Immediate	Choose an item.	Choose an item.

Table 1. Threats to the spruce grouse.

The spruce grouse was classified as “highly vulnerable” to predicted climate change in an assessment of vulnerability conducted by the New York Natural Heritage Program (Schlesinger et al. 2011). Osborne et al. (2011) showed that the effects of mercury can be exacerbated in boreal obligate species, especially in those that occur in high-acid communities such as peatlands (e.g., spruce grouse and boreal obligate songbirds).

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: ✓ **No:** **Unknown:**

If yes, describe mechanism and whether adequate to protect species/habitat:

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.1.1.0 Mechanical management - plants	Implement forestry practices that enhance mixed age classes in spruce-fir. Promote black spruce regeneration.
A.2 Direct Species Management	A.2.2.2.0 Augment existing population	Enhance genetic diversity and increase numbers of individuals. Translocate individuals from outside NY.
B.3 Outreach	B.3.1.2.2 Educational Events	Targeting public on spruce grouse ID and conservation.
B.3 Outreach	B.3.1.4.2 Education Display	Kiosks and information on spruce grouse ID in public hunting areas to reduce accidental harvest.
B.3 Outreach	B.3.1.4.0 Electronic newsletters/marketing	Social media posts and direct mailing of information on spruce grouse conservation and species ID.
B.5 Economic and Other Incentives	B.5.4.0 Economic incentives and disincentives (provide incentives to private landowners)	Conservation payments (where habitat management would otherwise not take place)

Action Category	Action	Description
C.7 Legislative and Regulatory Framework or Tools	C.7.1.3 Create, amend, or influence regulation (season closure)	Consider regulation change to temporarily close ruffed grouse hunting season in areas where spruce grouse are accidentally harvested.

Table 2. Recommended conservation actions for spruce grouse

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