Status of Ruffed Grouse in the Northeast Region of the US

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Available data indicate that ruffed grouse populations in the Northeast have declined significantly in recent decades. Although no region-wide, ruffed grouse-specific monitoring has been conducted, both the USGS Breeding Bird Survey (BBS) and the Audubon Christmas Bird Count (CBC) can be used as a reasonably robust index to grouse abundance in the region. We also compiled relevant data from state Breeding Bird Atlas projects, hunter mail surveys, and grouse hunter cooperator surveys to help further understand grouse populations in the region.

BBS data indicate negative annual trend estimates over the last 30 years in 10 of 11 Northeastern states (Fig. 1). New England states' (Maine, New Hampshire, Vermont, Rhode Island, Connecticut, and Massachusetts) population indices have declined an average of 3.9% annually, while indices in Mid-Atlantic states (New York, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, and Virginia) declined 3.4% annually (Fig. 2). CBC data suggest similar, if not steeper, declines for both New England and Mid-Atlantic states (Fig. 3). The index of abundance in both the BBS and CBC is about 40% higher in New England than in Mid-Atlantic states.

Breeding Bird Atlas (BBA) projects have been completed two times in five Northeastern states (Maryland, Massachusetts, New York, Pennsylvania, and West Virginia), allowing for direct comparisons in occupied range between the two time periods. All five states completed BBAs prior to 1989 and again 2005 or later. The number of survey blocks where grouse were detected declined an average of 25% between the two time periods, with the most severe declines in Pennsylvania (30%), Maryland (32%), and West Virginia (46%; Fig. 4).

State-specific hunter data provide further evidence that grouse numbers have declined. Three states (Pennsylvania, Virginia, and West Virginia) have collected grouse cooperator survey data annually since 1993. The number of grouse flushed per hour has declined by over 30% when data are pooled (Fig. 5).

Hunter mail surveys (also referred to as small game hunter surveys) have been conducted regularly in five Northeastern States (Maryland, New Jersey, New York, Pennsylvania, and Virginia) since 1993. Declines are evident in both the number of grouse harvested per day (Fig. 6) and the number of grouse harvested per hunter (Fig. 7).

Based on these data, it is apparent that grouse populations have decreased by at least 30%, and likely more, in the last three decades throughout the Northeast Region. It seems probable that grouse populations in the Northeast will continue to decline in future years unless causative factors are identified and addressed.

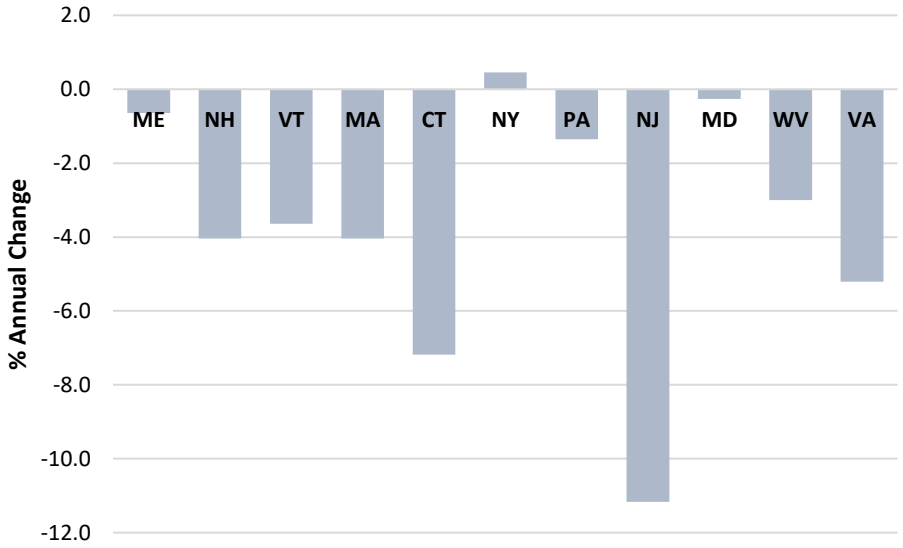

Figure 1. USGS Breeding Bird Survey annual trend estimates for ruffed grouse in Northeastern states (1983-2013).

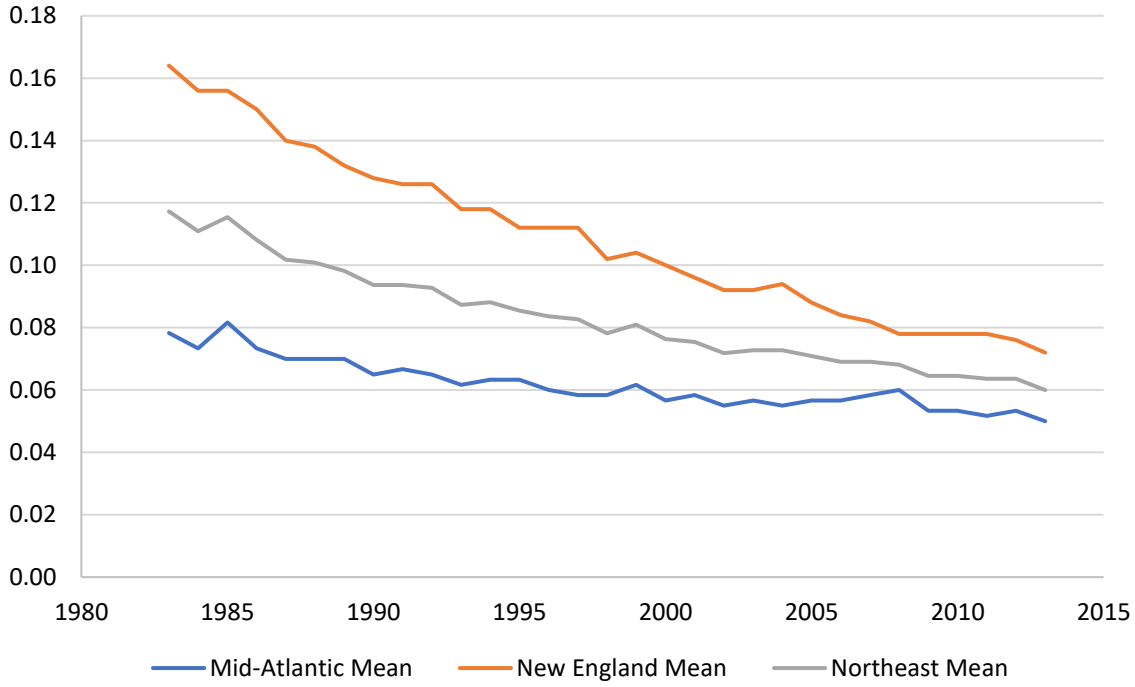

Figure 2. Mean USGS Breeding Bird Survey Indices for ruffed grouse in Northeastern states (1983-2013). "New England" includes Maine, New Hampshire, Vermont, Rhode Island, Connecticut, and Massachusetts. "Mid-Atlantic" includes New York, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, and Virginia.

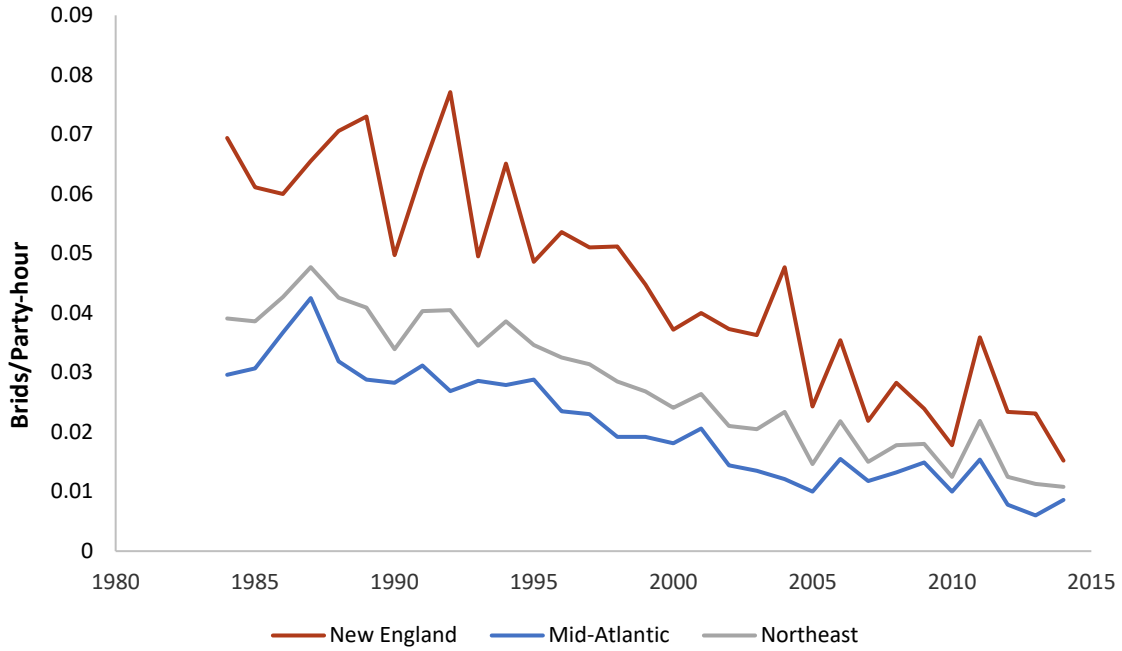

Figure 3. Christmas Bird Count Index for ruffed grouse in Northeastern states (1984-2014). "New England" includes Maine, New Hampshire, Vermont, Rhode Island, Connecticut, and Massachusetts. "Mid-Atlantic" includes New York, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, and Virginia.

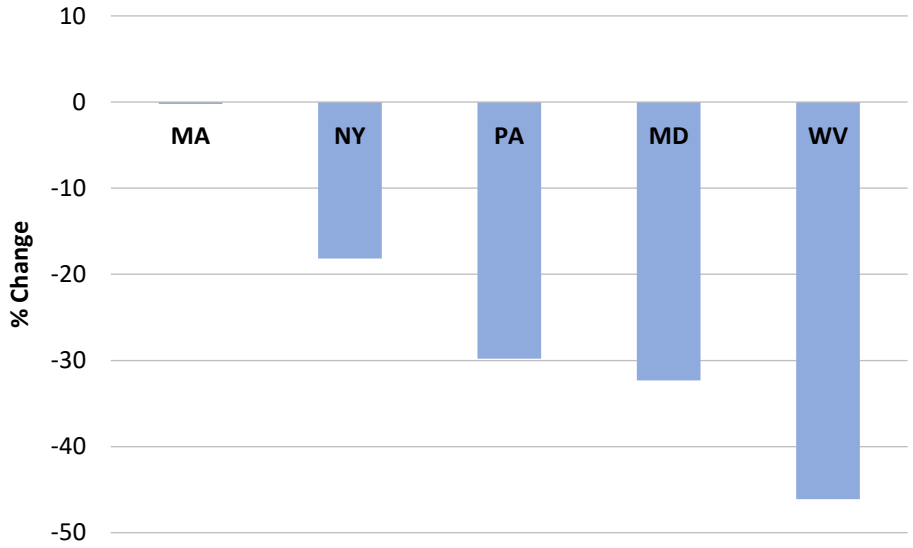

Figure 4. Change in the number of Breeding Bird Atlas blocks with grouse detected between the 1st survey period and 2nd survey periods. Atlas projects conducted in Massachusetts (1974-79 and 2007-11), New York (1980-85 and 2000-05), Pennsylvania (1983-89 and 2004-09), Maryland (1983-87 and 2002-06), and West Virginia (1984-89 and 2009-14).

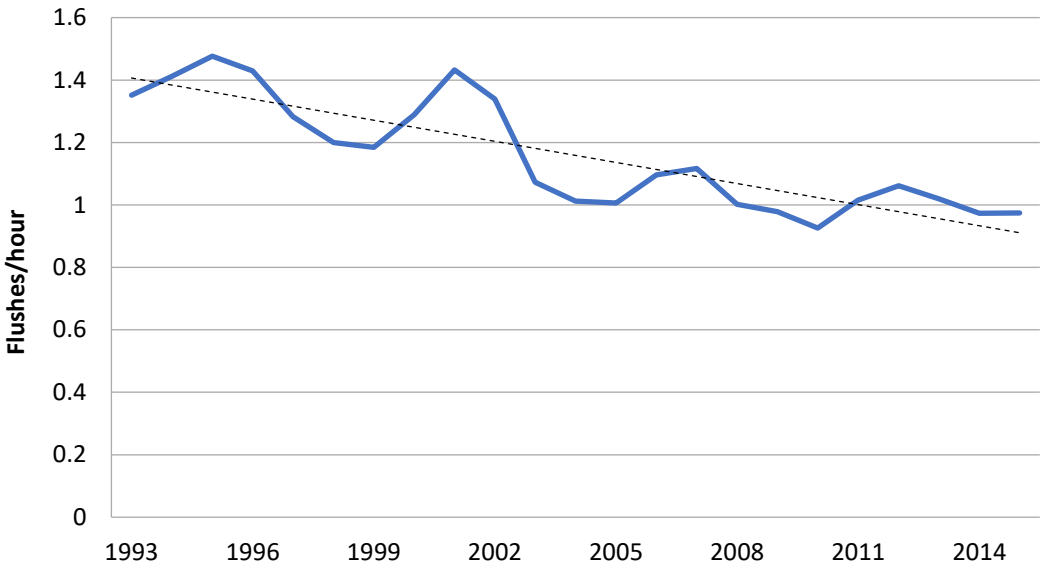

Figure 5. Mean number of ruffed grouse flushed per hour reported on hunter cooperator surveys in 3 Northeastern states (Pennsylvania, Virginia, and West Virginia, 1993-2015).

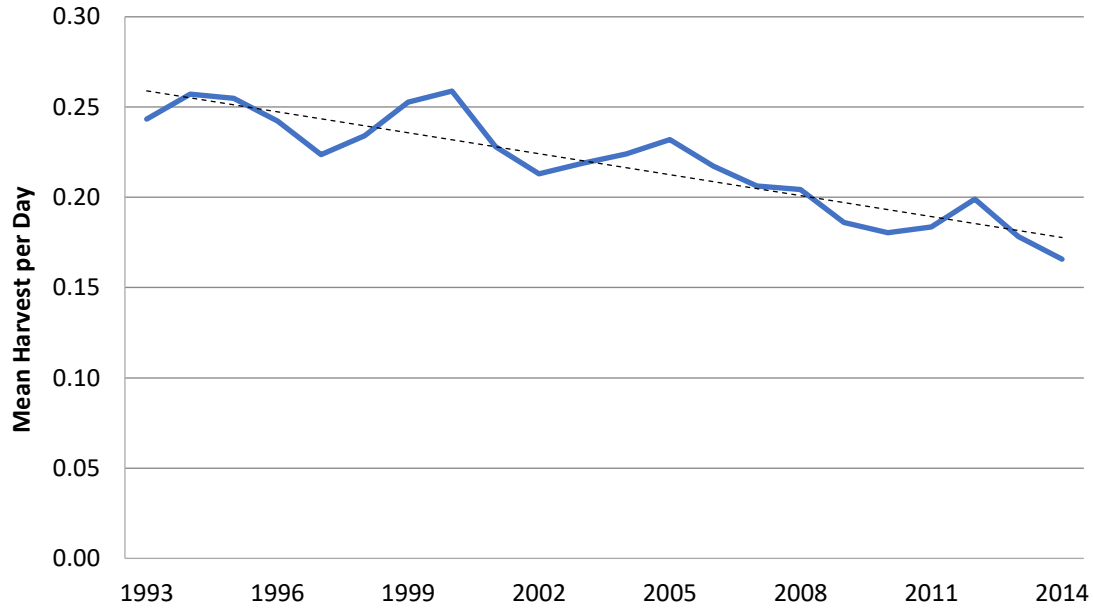

Figure 6. Mean ruffed grouse harvest per day in 5 Northeastern states (Maryland, New Jersey, New York, Pennsylvania, and Virginia), 1993-2015. Three-year state running averages were used due to missing data in some states/years. Data from New York, 1993-2003, not available.

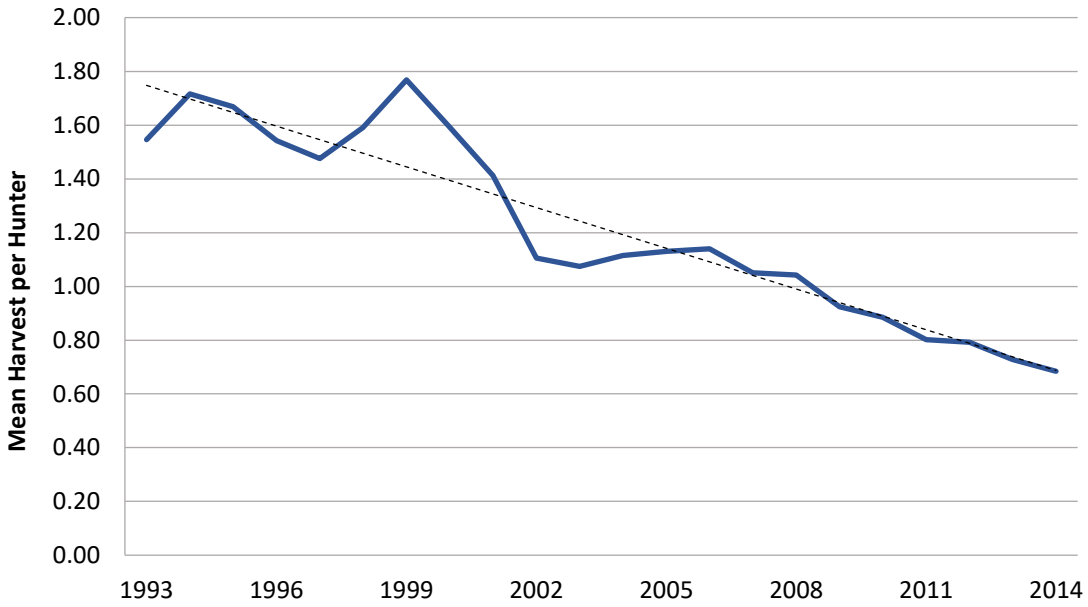

Figure 7. Mean ruffed grouse harvest per hunter in 5 Northeastern states (Maryland, New Jersey, New York, Pennsylvania, and Virginia), 1993-2015. Three-year state running averages were used due to missing data in some states/years.

Factors Driving Ruffed Grouse Population Abundance and/or Declines in the Northeast Region

The lack of young forests is commonly cited as a major reason for range wide decline in ruffed grouse populations (Dessecker and McAuley 2001; Dessecker et al. 2006; Deveers et al. 2007). Young forest habitat has been declining in eastern North America for decades because of changing land use, changes in forest management practices and widespread forest maturation. This has reduced habitat quantity and quality for ruffed grouse. High-quality grouse habitat in lower New England, the Mid-Atlantic and the southern Appalachians has become increasingly fragmented and isolated. A New York study showed that persistence of grouse may depend on the combination of young forest age and landscape configuration which provide source populations adjacent to newly developed habitats (Porter and Jarzyna 2012).

Local extinctions appear to be occurring frequently due to habitat loss or other factors such as disease, changes in predator abundance and diversity, and weather. Additionally, hunter surveys suggest that grouse numbers have declined in occupied or seemingly good habitat where hunters most likely target their efforts. While high quality habitats may help buffer against the negative effects of disease, predation, and weather, it is possible that the quantity of high quality habitat on the landscape has declined below some threshold to the point where the ability of grouse populations to recover has been suppressed**.**

Although habitat is a key component that is driving grouse populations, emerging disease is currently being identified as a deleterious factor. In 2015-16, Pennsylvania Game Commission research identified West Nile Virus (WNV) as a grouse mortality factor with population level impacts. In response, population analyses were done to assess the relative strengths of forest

age, land use and WNV as factors driving grouse population declines (G. Stauffer et al., J. Wildlife Management - in development). The results suggest a synergistic effect occurring between young forest habitat availability and West Nile virus occurrence. Study results support that loss of young forest habitat is an important driver of declines, and that exposure to WNV may explain decreases in occupancy probability as well as decreased abundance. Grouse were more likely to *persist* or *colonize* areas where early successional habitat availability was increasing and WNV prevalence was low. Results suggest that young forest habitat and WNV might be equally important for population *persistence* while WNV might be more important than young forest habitat for grouse *colonization* (i.e. geographic expansion). These findings are supported by field-derived data showing strong correlations between WNV prevalence and declining hunter flush rates and declining brood observations in Pennsylvania.

As is so often the case in single species management, there are usually multiple issues that are driving a population. Ruffed grouse are no exception to this rule. Loss of young forest habitat has long been determined as a major factor in the decline of this species; however, new research is showing that there are other factors that may play significant roles in the range wide grouse population dynamics. Over the next year the Committee will identify and research other factors (e.g. predation) that may play a role in declining grouse populations. In addition, the Committee will incorporate the 5 high-priority management responses to the regional grouse decline, into our grouse discussions, which were identified during the 2016 Multi-State Grouse Management Meeting:

RUFFED GROUSE MANAGEMENT PRIORITIES

1. **Aggressive and Targeted Habitat Creation / Restoration** – Identify Grouse Focal Areas, areas where: 1) source populations still exist; 2) habitat can be restored at large scale to allow for dispersal from source populations, and; 3) WNV prevalence is relatively low. Preliminary data in PA suggest that grouse in areas of high-quality large-scale habitat (in northern hardwoods forest type) are better able to recover from periods of high WNV prevalence. Habitat management must become more targeted and proactive.

2. **Multi-State Initiative** – Managing grouse populations at a regional / multi-state level is likely to be more efficient and successful. Though grouse are resident game birds, factors driving population declines are occurring at large geographic scales.

3. **Improve Understanding of WNV Impacts** – State wildlife agencies need a better understanding of the WNV dynamic in their states. State health departments generally handle surveillance, so wildlife agencies may not have a detailed understanding of WNV prevalence or of the temporal and spatial occurrence in their state. Understanding the cyclic, episodic nature of WNV and how prevalence changes across the geography of a state can make habitat management efforts more effective and could be used to inform harvest management.

4. **Extinction/Persistence Probability Modeling** – An effort to assess the probability of grouse colonization, persistence, extinction in light of young forest habitat availability and WNV can help states identify where habitat restoration efforts should be sited. The end result of this effort would be state, regional and local maps that direct habitat partners to areas where habitat management would be most effective. Proceeding in this manner would help states determine where to direct resources, improve cost-effectiveness of habitat investments, and provide consistency, transparency and scientific rigor to habitat siting decisions.

5. **Increased Integration and Collaboration with Regional Habitat Initiatives –** Partnerships and Farm Bill Programs aimed at Cerulean Warbler / Golden-winged Warbler / New England Cottontail projects can be enhanced to provide grouse benefits. Overlapping focal areas should be high-priority targets for habitat management. Engage the Young Forest Initiative and Northeast Habitat Technical Committee to see how messaging could be used on a local/regional level to incorporate a grouse conservation message.

To fulfill our public trust responsibilities, State wildlife agencies responsible for managing ruffed grouse must re-double our efforts to stop the range contraction and slow population declines of ruffed grouse. To do otherwise compromises our collective mission of ensuring sustainable populations and providing hunting opportunities.

Charge 16 References

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