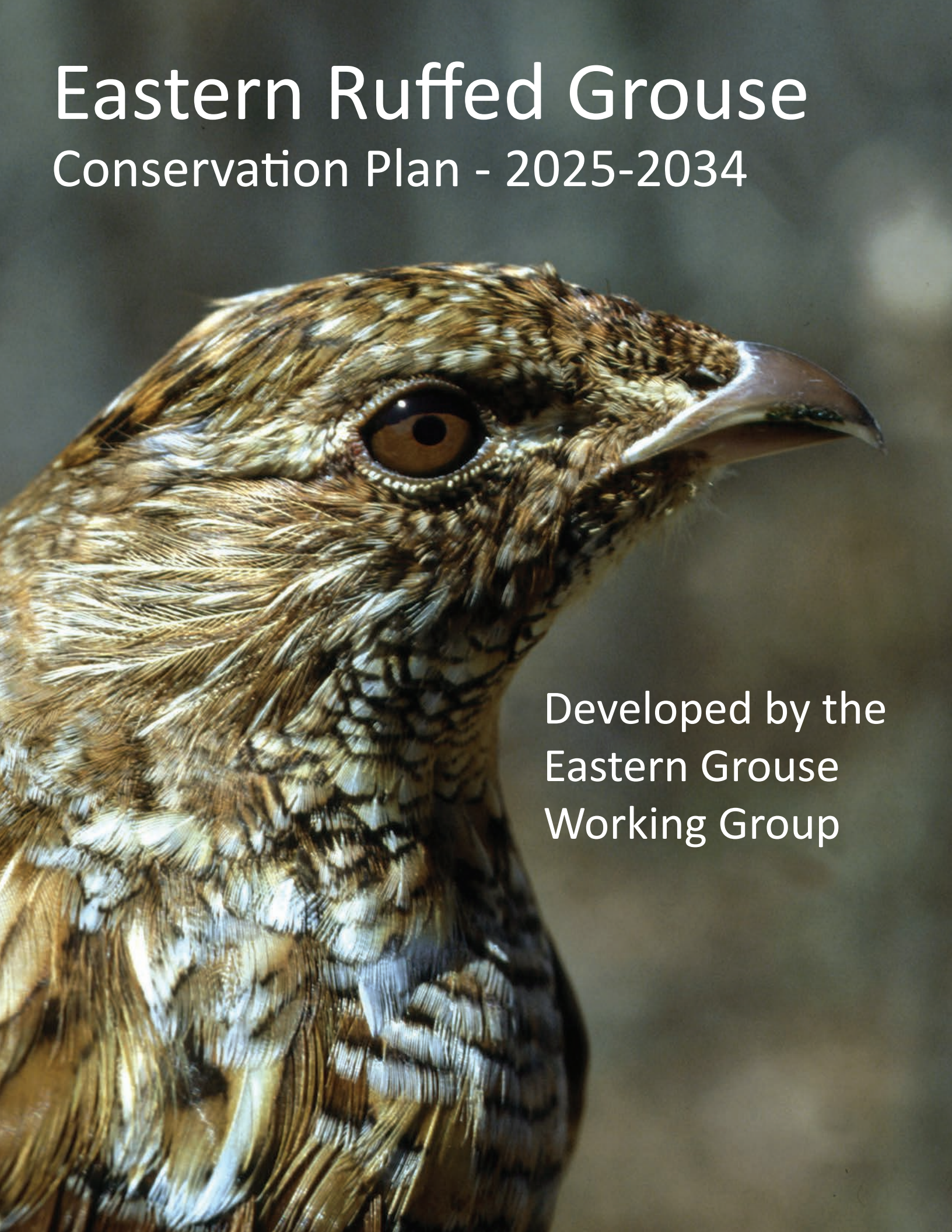
Eastern Ruffed Grouse

Conservation Plan - 2025-2034



Developed by the
Eastern Grouse
Working Group

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We would like to acknowledge the efforts of several former EGWG members—Karen Bordeau from the New Hampshire Fish and Game Department, Michael Schiavone from the New York State Department of Environmental Conservation, Michael Small from the South Carolina Department of Natural Resources, and Lisa Williams from the Pennsylvania Game Commission—as some of the words in the plan were borrowed from their participation during the January 2021 workshop and their subsequent writing of the Road to Recovery report. We thank the Northeast Association of Fish and Wildlife Agencies, the Ruffed Grouse Society and American Woodcock Society for funding the graphic design of this plan.

Joe Kosack/Pennsylvania Game Commission

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Ohio Division of Wildlife

Contents

Executive Summary

Ohio Division of Wildlife

Despite the development of a robust, range-wide conservation plan with habitat creation targets directly linked to population objectives, ruffed grouse *(Bonasa umbellus)* have continued to decline across much of their eastern range. In response, state wildlife agency biologists identified the need for a 'coordinated regional initiative' and 'associated strategic planning effort' to guide future efforts to conserve ruffed grouse populations within their eastern range.

To lay the groundwork for the development of this Eastern Ruffed Grouse Conservation Plan, a planning workshop was convened in January 2021 to characterize the suite of biological, social, political, governance, economic, and administrative conditions affecting ruffed grouse. From that effort, the Eastern Grouse Working Group (EGWG) identified Desired Future Conditions (DFCs), Current Conditions (CCs), gaps existing between desired and current conditions, barriers and opportunities that affect our ability to close those gaps, and Fundamental Objectives (FOs).

During a strategic plan development workshop in October 2023, EGWG members and key partners identified actions that would need to occur to achieve the FOs. These actions—synonymous with 'strategies' in other planning documents—are the core of this strategic plan. Implementation of this plan will be centered on accomplishing each of the identified actions. The results of a prioritization exercise completed by EGWG members and partners in January 2024 helped guide which actions take precedence (Table 1), and helped the group develop accomplishment timelines (Table 2) to ensure progress is made on all actions within the next 10 years. The highest priority actions were as follows:

- Evaluate the current distribution of quality grouse habitat using broadly applicable, standardized methods.
- Identify priority areas for grouse habitat management using a broad suite of biological and socio-economic factors, including available resources.
- Within grouse priority areas, develop and implement plans for creating and maintaining forest ecosystem diversity across space and time.
- Prioritize and commit adequate resources to conduct effective management of grouse and their habitats.
- Identify and address resource gaps and barriers that impede grouse habitat management.

Operational plans developed by EGWG members and partners will guide the work of three Regional Implementation Coordinators. These Coordinators will ensure progress is made on all actions within their respective region (i.e., northeast & Québec, southeast, Midwest & Ontario) by the end of 2034.

This plan is meant to serve as guidance for how to conserve ruffed grouse within the eastern region. It is not meant to be prescriptive and aims to be flexible enough to be incorporated into planning documents at various administrative levels across a diverse group of agencies and organizations. No single agency or partner has the resources to undertake this effort alone, but strategic collaboration within and among states, provinces, and organizations will yield highly effective partnerships and implementation efforts. Together we can further landscape-scale conservation of ruffed grouse.

Glossary of Terms

Jacob Dingel/Pennsylvania Game Commission

Eastern Grouse Working Group (EGWG) - a group of state and provincial wildlife agency biologists tasked with overseeing ruffed grouse monitoring and management within their respective state or province. The term "EGWG members" refers to these state and provincial biologists and managers.

EGWG Partner (hereafter "Partner") - an entity with an active role in the grouse management system. Partners are a form of stakeholder that plays a larger role in the grouse management system through resource contributions. Partner involvement is essential to ensure successful implementation of this Plan.

Eastern range of ruffed grouse - the portion of the ruffed grouse range in North America east of the Great Plains, whose southwestern limit reaches Missouri and northwestern limit falls within Minnesota and Ontario.

Management system - interacting biological, ecological, sociocultural, and institutional components of the social-ecological system in which wildlife management occurs.

Regional Implementation Coordinators (hereafter "Coordinators") **-** project managers, hired collaboratively and directed by EGWG members, who are responsible for overseeing implementation of the Eastern Ruffed Grouse Conservation Plan within their respective Association of Fish and Wildlife Agencies (AFWA) region (i.e., Northeast, Southeast, Midwest).

Stakeholder - an entity who is directly impacted by, or has the ability to influence, management of grouse and their habitats. Stakeholders may not realize or fully understand their role in the grouse management system.

Capacity (also known as "Conservation Capacity") **-** resources available to EGWG and Partners to further grouse conservation.

Resources - a stock or supply of materials, funding, personnel, time, expertise, land or land access, political connections, and other assets that can be drawn on by a person or organization to function effectively.

Young forest - (also known as "early successional forest") a mostly even-age forest stand that is generally 5 to 20 years old and that contains approximately 3,000 to 8,000 woody stems (i.e., sapling or seedling age trees or shrubs) per acre. Young or early successional forests lack a closed, mature-tree canopy and are created or maintained by recurring disturbance.

Forest ecosystem diversity - the variety of forest types, forest stand age classes, and their arrangement that support forest species conservation, forest health, and forest ecosystem resilience. Grouse and many young forest associates use forest stands of different age classes to complete their annual life cycle and require a balanced mosaic of age classes interspersed within a forested landscape.

Grouse habitat - refers to the diversity of forest cover types or conditions grouse occupy while completing their annual cycle. May include but is not limited to young/early successional forest, forest openings, forest edges, and structurally complex mature forest stands.

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Quality habitat - the resources and conditions are present in an area to permit occupancy, survival, and reproduction by ruffed grouse (adapted from Hall et al. 1997).

Habitat quantity/scale - amount of grouse habitat within a defined geography.

Priority area - a general term used to describe where strategic grouse habitat management projects are being planned and implemented. Similar terms may include but are not limited to focus area, focal landscape, priority landscape, and planning landscape. Specific examples include Dynamic Forest Restoration Blocks and priority areas identified by Grouse Priority Area Siting Tools (G-PAST).

Viable population - a wildlife population with the ability to persist and avoid extirpation or extinction.

Desired Future Condition (DFC) - desired biological, ecological, sociocultural, and institutional components of a management system (habitat, population, institutional, and human attitudinal and behavioral conditions). DFCs focus on desired outcomes, rather than specific actions, and could be compared to goal-level statements in a traditional strategic plan.

Current Condition (CC) - the current conditions that greatly influence achieving or maintaining the DFC.

Fundamental Objective (FO) - aspects of a management system that need to be addressed to arrive at the DFCs. Some might compare FOs to objective-level statements in a traditional strategic plan. Accomplishing FOs would have the collective effect of achieving the DFCs.

Actions - specific tasks that need to be completed to accomplish the FOs. Some actions contain sub-actions. Actions are similar to strategies in a traditional strategic plan.

Ohio Division of Wildlife

General Species Overview

The ruffed grouse is North America's most widely distributed upland game bird. Its range spans across Canada and down into the northern Pacific Coast, the Rocky Mountains, the Appalachian Mountains, and the Midwest regions of the United States.

In the northern portions of their range, ruffed grouse populations exhibit 10-year abundance cycles. In the Appalachian and lower Midwest regions, grouse exist at lower densities and do not exhibit detectable 10-year population cycles.

Ruffed grouse are a popular quarry for small game hunters across most of their range; however, significant grouse population declines in portions of the eastern range have led to fewer hunters pursuing the species and hunting season closures in some states.

Ruffed grouse are a young forest habitat specialist and occupy many different forest types. However, grouse prefer deciduous or mixed forest types and occur at the greatest densities within forests dominated by aspen and birch.

Historically, young forest habitats were sustained by fire, windthrow, and other natural disturbances. Today, many of these natural disturbances have been reduced or absent from the landscape. Thus, intentional, targeted forest management—including commercial timber harvests and non-commercial treatments–must be implemented to maintain forest ecosystem diversity that can support ruffed grouse populations.

For more detailed information on ruffed grouse ecology and habitat management, see Dessecker et al. 2006.

Jacob Dingel/Pennsylvania Game Commission

Population Status Overview

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Ruffed grouse populations in the east have declined in recent decades. In the northeast, mid-Atlantic, and southeast United States, ruffed grouse populations have declined by at least half during the last 30 years. Although once considered strong-holds for ruffed grouse, the eBird Status and Trends map indicates that populations may be declining in portions of the upper Midwest, Ontario, and Quebec (Figure 1) (Fink et al. 2023). Landscape-scale loss of young forests is the primary driver of these widespread declines. Shifts in climate and predator regimes, changing land use (i.e., development, invasive species), and mortality from West Nile virus (WNV) are additional contributing factors.

For a more detailed assessment of ruffed grouse populations in the eastern United States, see the report "Ruffed Grouse Population Declines in the Eastern United States" prepared by the Eastern Grouse Working Group (Appendix A).

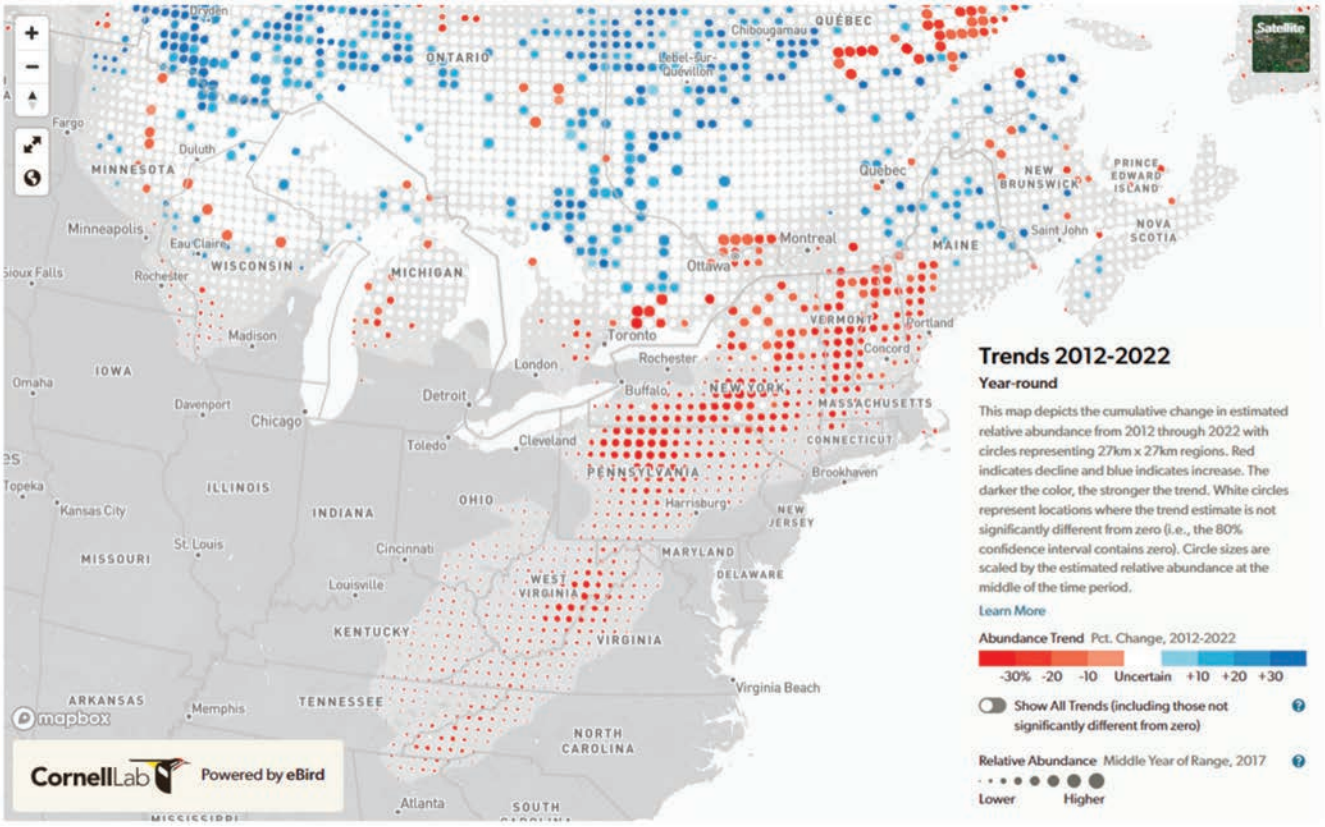

Figure 1. eBird Status and Trends map of ruffed grouse abundance trends (as percent change from 2012 to 2022) across the eastern portion of their range (Fink et al. 2023).

Why a Regional Approach to Ruffed Grouse Conservation?

Zak Danks/Kentucky Department of Fish and Wildlife Resources

While ruffed grouse are non-migratory, the viability of their populations is dependent upon the proper functioning of a complex social-ecological system operating at landscape-scale, irrespective of political boundaries. A single grouse moves only short distances in its lifetime, but sustainable eastern grouse populations require diverse age classes in well-managed forests throughout the Appalachians, Midwest, and beyond. Conservation success in any one state or province is insufficient for the long-term security of ruffed grouse across the eastern region.

When natural resource agencies, grouse managers, and partners work in concert toward shared goals, the likelihood of success increases dramatically. A regional approach allows for a thorough, consistent understanding of the problem and effective communication to the public and conservation community.

A regional approach also provides a structure for sharing research and expertise, standardizing monitoring and management techniques, and leveraging resources and economic opportunities.

This approach can produce landscape-scale strategic habitat management aligned with ecological rather than jurisdictional boundaries. The cooperation of multiple agencies and organizations can have a synergistic effect whereby positive outcomes from a well-coordinated regional effort are greater than the sum of its parts.

In the end, ruffed grouse conservation across the eastern half of their range depends upon large-scale habitat restoration. A coordinated effort within states and across the region will provide a greater return on investment, and greater benefit to forest ecosystems, than habitat management that is done opportunistically or without critical ecological, social, and economic considerations.

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Jacob Dingel/Pennsylvania Game Commission

Strategic Plan Development Background

Eric Gracey

In 2006, the Association of Fish and Wildlife Agencies' Resident Game Bird Working Group endorsed the completion of a Ruffed Grouse Conservation Plan that established habitat management goals across the species' range with the aim of restoring ruffed grouse populations to 1980 levels (Dessecker et al. 2006). This plan did an excellent job of describing the species' biological needs and providing spatially explicit, jurisdiction-level objectives for habitat management. However, it's become apparent that the biological, social, political, and funding constraints identified in that plan (e.g., public perception of forest disturbance, availability of forest product markets, restrictive forest management policies, West Nile virus) have made achieving the population goal articulated in that plan impractical. A revised conservation strategy is needed that reflects current and future social-ecological conditions, constraints, and opportunities.

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In response to the lack of progress made toward the goal of the 2006 plan and the continuing rapid decline of ruffed grouse, grouse biologists from across a large portion of the range met in Front Royal, Virginia in 2016. The meeting's purpose was to discuss the Appalachian Cooperative Grouse Research Project (ACGRP) and other recent research findings, and to brainstorm critical needs to slow population declines. The meeting was organized by the Northeast Upland Game Bird Technical Committee (NEUGBTC). More than 40 grouse biologists from 22 state agencies, non-government organizations (NGOs), and universities attended.

The primary focus of the 2016 meeting was to better understand the current state of knowledge about ruffed grouse through research and management updates. A portion of the meeting was also dedicated to discussing management priorities that would further grouse restoration. High-priority actions included increasing appropriate habitat, developing a process to identify grouse focus areas, active engagement with young forest restoration partners, conducting extinction probability/minimum viable population analyses, developing standardized population monitoring protocols, assessing impacts of West Nile virus, and better understanding the impact of hunting on declining and isolated populations. Attendees ranked the top three priorities as (1) habitat creation/restoration; (2) a multi-state collaborative management initiative, and (3) better understanding West Nile virus impacts on grouse populations.

In 2020, state grouse biologists reconvened to discuss the continued population decline of grouse and progress on the priorities identified at the 2016 meeting. While progress had been made on priorities in some individual states, large-scale progress to address range wide grouse declines had not occurred.

Why hadn't state-level efforts generated large-scale improvements in grouse conservation? State and regional efforts with multiple high-priority objectives require significant resources and coordination, both of which have been lacking. Attendees recognized the need to organize a collaborative group of state and provincial wildlife agency biologists that would assess

The group's first priority was to conduct a region-wide population status assessment of ruffed grouse.

Joe Kosack/Pennsylvania Game Commission

the current conditions affecting ruffed grouse and begin to develop a strategic approach to mitigating those factors.

The resulting collaborative—the Eastern Grouse Working Group (EGWG)—formed in 2020 and was originally comprised of 18 states. The group's first priority was to conduct a region-wide population status assessment of ruffed grouse. Using several available datasets—the Christmas Bird Count, the Breeding Bird Survey, Breeding Bird Atlases, Grouse Hunter Cooperator Surveys, and the Partners in Flight Conservation Assessment—the group illustrated the extent and severity of grouse population declines across New England, the mid-Atlantic, and the southeast United States (Appendix A). During the process of completing this status assessment, three states from the Midwest became involved with the group. By the end of 2020, the population status assessment was complete and the EGWG had grown to 21 states.

The second priority of the EGWG was to develop a strategic plan to guide ruffed grouse conservation in the east. Before an effective strategic plan could be developed for the region, the EGWG needed to articulate a collective vision for regional grouse conservation. A planning workshop was convened in January 2021 to characterize the full management system affecting ruffed grouse across their eastern range.

In April 2021, the products of the workshop were synthesized into a report titled "Ruffed Grouse Management in the East: Envisioning the Road to Recovery" (hereafter, the 'Road to Recovery report') (Appendix B). The Road to Recovery report outlined broadly agreed upon Desired Future Conditions (DFCs) for the ruffed grouse management system, Current Conditions (CCs) affecting ruffed grouse and grouse management across the region, and the Fundamental Objectives (FOs) needed to bridge the gap between CCs and DFCs.

The DFCs and FOs identified in the Road to Recovery report were meant to serve as the foundation upon which a strategic plan could be built. DFCs focus on desired outcomes rather than specific actions and could be compared to goal-level statements in a traditional strategic plan. FOs are aspects of a management system that need to be addressed to arrive at the DFCs. Some might compare FOs to

objective-level statements. Accomplishing FOs would have the collective effect of achieving the DFC. The strategic planning process would be focused on outlining action statements seated within the FOs. These 'actions' are the specific tasks that need to be completed to accomplish the FOs. Action statements are akin to 'strategies' in other strategic planning documents.

In April 2022, the EGWG reviewed the components of the Road to Recovery report at a virtual meeting. Representatives from other upland gamebird collaboratives (i.e., the National Bobwhite Conservation Initiative, National Pheasant Plan) spoke about "lessons learned" while orchestrating the work of their respective collaboratives. A main takeaway from the meeting was the recognition that an eastern grouse conservation initiative would not be successful without intentional collaboration with partners beyond state wildlife agencies.

Subsequent virtual meetings of the EGWG during 2022 included representatives from the United States Forest Service and the Ruffed Grouse Society & American Woodcock Society. Progress toward a strategic plan was limited to drafting an outline, compiling supporting material (e.g., a summary of recent state-level grouse priority area siting tools), and planning for an in-person meeting. The EGWG felt an in-person meeting format was vital to accelerate progress on the strategic plan. Federal, state, NGO, and academic partners were invited, along with all members of the EGWG, to a strategic plan development workshop in Blue Mountain Lake, New York in October of 2023. The goal of this workshop was to brainstorm the action statements that, when articulated in a strategic plan and properly implemented, would achieve ruffed grouse recovery.

The Road to Recovery report outlined four DFCs that represent the interrelated conditions needed for large-scale grouse restoration to be successful: (1) sufficient habitat and forest ecosystem diversity; (2) viable ruffed grouse populations; (3) essential conservation capacity; and (4) effective communication and engagement. Twenty-eight FOs were identified within these four DFCs. Before embarking on the strategic planning process, where the FOs would serve as objective-level statements within the plan, these twenty-eight FOs needed to be refined into a more manageable list upon which to build out the actions of the plan.

A subcommittee within the EGWG, hereafter referred to as the "core team," met virtually over the course of a few weeks to refine the FOs prior to the strategic plan development workshop. The core team was able to synthesize the ideas within the 28 FOs from the Road to Recovery report into 10 FOs that would guide the action statement brainstorm discussions.

Twenty-two EGWG members, state agency land managers, federal agency biologists, and NGO staff were able to attend the October 2023 workshop. During the first afternoon of the workshop, attendees were presented with the new list of FOs and had an opportunity to provide input. The next two days of the workshop were spent articulating the specific tasks that would need to be accomplished to achieve the FOs, and therefore, the DFCs. The result of the workshop was an incredible list of action items, hereafter referred to as the "action brainstorm," that would need to be refined into well-defined actions to be included in the strategic plan.

The core team met weekly after the workshop to refine the "action brainstorm." The core team took care to ensure all the group's ideas were represented within the refined actions while attempting to minimize redundancy and organize the actions logically within each FO and DFC. In early January, the core team shared the refined list of 22 actions, 10 FOs, and 4 DFCs with the workshop participants. Workshop participants provided

Twenty-two EGWG members, state agency land managers, federal agency biologists, and NGO staff were able to attend the October 2023 workshop.

input, especially on whether they felt the groups' ideas were adequately summarized by the refined actions. Several workshop participants provided detailed feedback that greatly improved the October workshop's final product.

Not all EGWG members and partners were able to attend the workshop in October; therefore, the core team hosted a webinar in late January 2024 to present the draft actions, FOs, and DFCs to the entire collaborative—which had grown to 26 member states and provinces. After the webinar, all EGWG members and partners were given an opportunity to provide formal input. Feedback from EGWG members and partners resulted in the final list of 21 actions, 10 FOs, and 4 DFCs presented herein.

Additionally, to guide plan implementation, webinar participants were encouraged to complete a survey to rank the actions from highest to lowest priority. The survey also asked participants to determine whether each action was accomplishable in the short-term (0-5 years) or long-term (6-10+ years) as well as whether the action only needed to be completed once (i.e., discrete) or whether the action should occur iteratively (i.e., continuous). The results of this survey improved the organization of the strategic plan and will be used to guide implementation of the plan and to assess the success of implementation efforts.

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From Visioning to Strategic Plan

The Eastern Grouse Working Group has been working toward developing a functional regional initiative for large-scale ruffed grouse conservation rather than a list of short-term and localized research and management projects. That is the purpose of this plan—to articulate actions that can address the large-scale systemic issues that were identified in the 2006 and 2016 grouse management products.

A regional initiative to enhance and maintain viable ruffed grouse populations needs a strategic plan to guide it. This plan presents a broad view of problems and opportunities and identifies areas where collaboration within and across states for sharing expertise and other resources is likely to yield the greatest benefits for all those participating. The diversity of CCs across states and provinces with respect to ruffed grouse management requires that this strategic plan provides guidance, not prescription. This plan will foster interactions and synergies among partners, thereby magnifying the impact of investments of resources made at the state and provincial level. However, success will require sustained engagement and commitment by state and provincial wildlife agencies, partners, and stakeholders.

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Desired Future Conditions, Fundamental Objectives, and Actions

Linda Ordiway

DFC 1 - Sufficient Habitat & Forest Ecosystem Diversity

Ruffed grouse are specialists of young forest patches within extensively forested landscapes. Consequently, biologists and land managers have long considered young forest habitat availability as fundamental for ruffed grouse management. The 2006 plan identified state-specific young forest acreage targets needed to restore grouse to 1980 population levels. Unfortunately, in most eastern states, the pace and scale of active forest management on public and private land have proven insufficient to achieve those targets by the 2006 plan's intended 2025 end point.

This plan recasts these specific targets into broadly defined actions meant to be achievable within local geographies (i.e., state, priority area) based on the current conditions. The Road to Recovery report emphasized the importance of being strategic, collaborative, and communicative to optimize the scale and configuration of habitat. In this plan, we have refined those ideas into actions which represent our need to understand current habitat conditions and what is needed to positively impact ruffed grouse populations across the eastern region.

Some portions of the eastern range, especially the southern Appalachians, have seen grouse densities decline to the point where it could take significant time for grouse to respond to habitat management. Therefore, we do not want to limit the evaluation of habitat management efforts to grouse population response alone. Evaluations should also consider the vegetative response (i.e., stem density, coarse woody debris) and the population response of other young forest dependent wildlife.

FO 1.1 - Create quality grouse habitat across the eastern region.

1. Evaluate the current distribution of quality grouse habitat using broadly applicable, standardized methods.

2. Identify priority areas for grouse habitat management using a broad suite of biological and socio-economic factors, including available resources.

3. Within grouse priority areas, develop and implement plans for creating and maintaining forest ecosystem diversity across space and time.

4. Evaluate success of habitat management efforts in terms of 1) habitat quality and quantity and 2) grouse population response.

FO 1.2 - Understand the scale and configuration of grouse habitat needed to improve grouse populations.

5. Conduct research to better understand the relationship between scale and configuration of habitat and potential grouse population response and viability.

Pennsylvania Game Commission

DFC 2 - Viable Populations

Maintaining viable populations of ruffed grouse remains the core intent of this strategic plan. We acknowledge that population status of ruffed grouse varies greatly across the eastern region. As such, it would be impractical to recommend overly prescriptive population goals to meet the needs of every state or province. The actions within this DFC allow for the development of population goals that are obtainable within localized geographies. These goals may be specific numeric population goals, or they may be broad concepts such as maintaining population viability to avoid extirpation, stabilizing or increasing abundance, or maintaining a harvestable surplus.

Similarly, wildlife management agencies are often challenged with competing stakeholder demands and expectations that may confound public policy and management decisions. This DFC is designed to accommodate for those realities and not force entities into management decisions that do not fit their current conditions. The actions within this DFC are designed to be completed simultaneously with actions within other DFCs; completion of actions within this DFC should not preclude progress on actions within other DFCs. We can conduct research to better inform management of grouse and their habitats while simultaneously working to create habitat using the best available knowledge all while increasing public understanding of the benefits of forest ecosystem diversity.

While this DFC provides a framework for research needs as we currently understand the most pressing issues facing grouse populations in the eastern region, it should not prevent the adoption of new priorities or needs as our collective understanding develops.

FO 2.1 - Manage grouse populations consistent with stakeholder values and habitat potential.

6. Set obtainable grouse population goals based on available and potential habitat and stakeholder values and expectations.

FO 2.2 - Manage hunting opportunity in a manner that is compatible with grouse populations and stakeholder values.

7. Evaluate the effects of harvest and hunting-related impacts on grouse populations and adjust hunting regulations based on research outcomes.

FO 2.3 - Use accurate, precise, and comparable data to monitor grouse populations across jurisdictional boundaries to inform management.

8. Use standardized protocols to allow for cross-jurisdictional monitoring of grouse populations, factors affecting grouse populations, and hunter participation.

9. Create a centralized repository of monitoring data that is updated annually and accessible by partners.

FO 2.4 - Understand factors that affect the viability of grouse populations.

10. Identify and conduct research on factors that may affect grouse populations.

a. Assess the relative effects of various factors (i.e., weather, disease, harvest mortality) on grouse population dynamics (e.g., occupancy probability, density, colonization/extinction rates).

b. Evaluate grouse response (i.e., habitat use or selection) to specific habitat management treatments (e.g., prescribed fire, coarse woody debris retention, invasive vegetation removal).

c. Evaluate West Nile virus (WNV) landscape epidemiology and effects of WNV on grouse populations.

d. Conduct research to better understand how projected climate changes may affect grouse populations, including climate-induced range shifts, and how to mitigate negative effects of climate changes on grouse populations.

e. Assess grouse population genetic diversity and connectivity.

DFC 3 - Essential Conservation Capacity

Attaining the DFCs outlined in this plan will require increased coordination, collaboration, and resource allocation by EGWG members, partners, and stakeholders. Additionally, conditions within the grouse management system will need to

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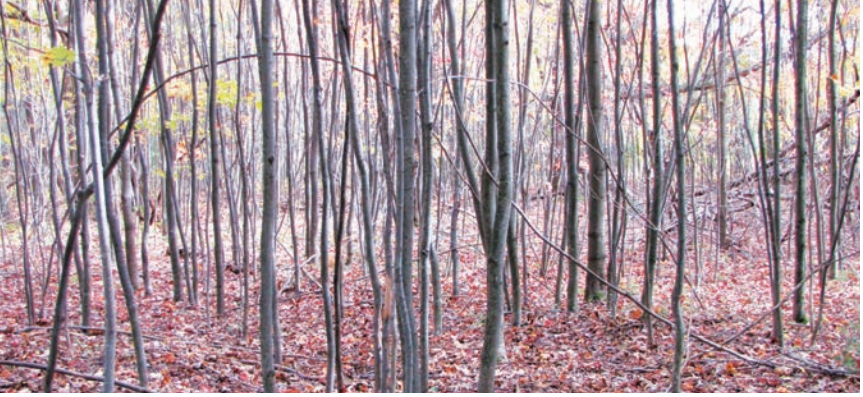
Jacob Dingel/Pennsylvania Game Commission



Anthony Ross/Pennsylvania Game Commission

permit and promote successful management of grouse and their habitats. The concept of "promoting conditions" below refers not only to the prioritization of management of grouse and their habitats when it comes to allocating resources (i.e., increased capacity), but also that we cannot successfully promote forest ecosystem diversity if the management actions needed to achieve this outcome are operationally prohibited or discouraged from occurring.

FO 3.1 - Promote conditions that ensure successful grouse population and habitat management can occur.

11. Prioritize and commit adequate resources to conduct effective management of grouse and their habitats.

a. State wildlife agencies maintain a biologist position with a portion of their time dedicated to grouse management.

b. Hire Regional Implementation Coordinators to lead regional grouse initiatives including the implementation of this strategic plan.

c. Include grouse as a species of importance in agency planning documents (e.g., State Wildlife Action Plan, Federal Aid Narratives).

d. Advocate for the prioritization of grouse habitat management in agency planning documents (e.g., State Forest Action Plans, USFS Land Management Plans).

12. Identify and address resource gaps and barriers that impede grouse habitat management.

a. Conduct a comprehensive review of available funding sources and technical assistance programs that can be leveraged for grouse habitat management and share information with partners and stakeholders, including private landowners.

b. Connect NGO partners with state, federal, and private land managers to augment staff capacity and funding needs.

c. Identify and alleviate political, regulatory, societal, or operational barriers where feasible.

d. Identify technical resource gaps for habitat management (e.g., GIS, LiDAR).

e. Identify and leverage existing interdisciplinary programs or conservation initiatives where intentional collaboration can help achieve mutual goals (e.g., forest health, prescribed fire, carbon storage, non-game species habitat).

f. Collaborate with forest industry professionals to support the forest products industry as a mechanism for efficient, broad-scale, sustainable habitat management.

i. Identify forest product market and/or workforce capacity conditions that limit ability or willingness to harvest timber.

ii. Identify incentives or other mechanisms to help overcome market and industry limitations.

iii. Support commercial and non-commercial workforce development, including building partnerships with experienced, reliable private contractors.

FO 3.2 - Maximize agency and partner coordination and collaboration.

13. Identify management plans, at various administrative levels, that can be leveraged to support eastern ruffed grouse conservation and ensure those management plans enable management of grouse and their habitats.

14. Improve intra- and inter-agency and organization collaboration to increase support for young forest and grouse habitat management.

a. Identify and leverage existing interdisciplinary programs, and create additional opportunities, to increase collaboration between grouse biologists and habitat managers.

b. Draw on expertise from social science and communications or marketing staff to accomplish actions within the "Effective Communication and Engagement" DFC.

15. Garner continued, long-term support for EGWG and its efforts.

a. Advocate for a dedicated EGWG representative from each state and provincial wildlife agency within the eastern range of ruffed grouse.

b. Ensure EGWG representation at annual Northeast Wildlife Administrator Association, Southeast Wildlife Resources Committee, and Midwest Association of Fish & Wildlife Agencies Directors' meetings.

c. Develop by-laws and guiding documentation outlining membership, roles, and responsibilities within EGWG.

d. Conduct collaborative meetings between EGWG and other working groups to discuss and pursue common interests.

DFC 4 - Effective Communication and Engagement

Like capacity, communication and engagement will be essential to achieving actions for ruffed grouse populations and habitat. Continued engagement with traditionally supportive stakeholders in addition to effective communication with those ambivalent, or even adverse, to active forest management will be necessary to ensure successful implementation of this plan. Not only must we justify the creation and continual maintenance of ephemeral, disturbance-dependent habitat that is often underappreciated by the public, we must do so for a game species whose populations are apparently secure in some portions of its range, and in an era of increasing acknowledgment of the need for forest management practices that align with climate change mitigation objectives. The actions within this DFC highlight the importance of understanding public attitudes and values, and employing effective messaging to foster knowledgeable and engaged stakeholders.

FO 4.1 - Understand the best way to communicate with the full suite of stakeholders about management of grouse and their habitats.

16. Identify stakeholders and their values and attitudes toward grouse and forest management.

17. Determine the most effective messaging for each stakeholder group.

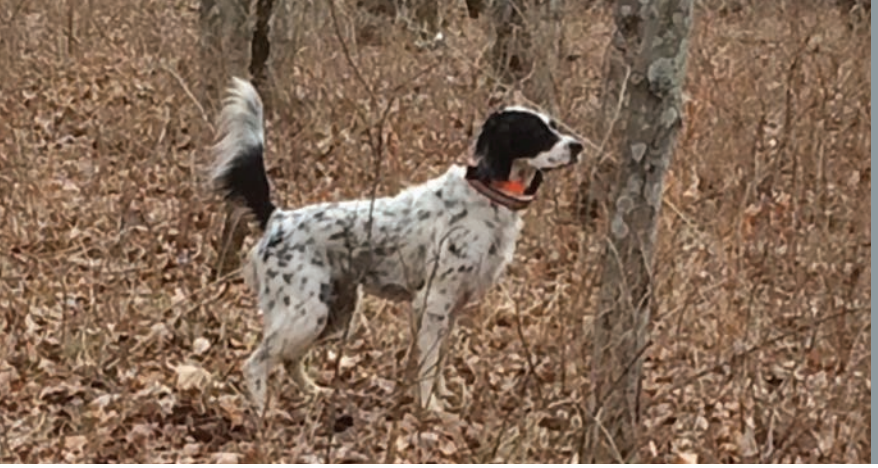
FO 4.2 - Maximize social and political support for management of grouse and their habitats.

18. Develop an eastern grouse conservation strategic communication plan that identifies collaborators and partners, develops targeted messages, evaluates the effectiveness of messaging efforts, and outlines how messaging information is shared across partners and stakeholders.

19. Train natural resource managers to become more effective communicators, to a variety of stakeholders, regarding grouse population and grouse habitat management issues.

20. Incorporate stakeholder values, attitudes, and preferences in grouse management decision-making processes.

21. Conduct organized advocacy efforts, including communication responses, around issues affecting management of grouse and their habitats.



Eric Gracey

Implementation

Successful implementation of this strategic plan requires a more dedicated effort than can be made by any one biologist, or even a group of biologists, charged with championing the plan. During the development of this plan, it became apparent that implementation would be most effectively accomplished by Regional Implementation Coordinators. These Coordinators would serve as project managers—hired collaboratively and directed by EGWG members—that would bear responsibility for overseeing implementation of this plan within their respective region (i.e., northeast & Québec, southeast, Midwest & Ontario).

During the strategic planning process, a survey was conducted to gather input from EGWG members and partners regarding the relative priority of each action (Table 1). Additionally, survey participants assigned a reasonable accomplishment timeline to each action and determined whether the action was discrete or continuous (i.e., iterative). The result is a matrix where actions are organized into four categories: short-term discrete, short-term continuous, long-term discrete, and long-term continuous (Table 2). The short-term discrete actions may be the easiest to implement while progress on long-term continuous actions may take significant time and effort. Additionally, continuous actions may not ever be completely resolved, but single iterations of these actions can be completed given enough resources.

Regular meetings between EGWG members and partners should occur to develop work plans for each Coordinator that outline clear expectations, timelines, and deliverables. Coordinators should provide regular accomplishment reports to EGWG members and partners. Clear communication between EGWG members and partners and the Coordinators will be required to ensure the Coordinators are able to successfully implement this plan within their region.

This plan is designed to serve as a 10-year strategic plan (2025-2034); however, given the long-term and continuous nature of some actions, it is unlikely that all 21 actions will be complete at the end of the 10-year period. At the end of the 10-year period, EGWG members and partners should conduct a review of the progress made on all actions within the plan. All actions should be complete or have had significant progress made toward their completion by the end of this period.

Issues affecting ruffed grouse populations and their habitats are ever evolving. The information in this plan is not meant to be exhaustive or all-encompassing. We attempted to build flexibility into this plan to allow for implementation of actions to change given emerging, unforeseen issues. The emergence of a novel issue affecting ruffed grouse management may warrant a premature (i.e., prior to 10-year) evaluation or update of this plan.

Tracy Graziano/Pennsylvania Game Commission

Table 1: Action Rankings

Actions are ranked by composite score. Survey participants were asked to assign an "importance" score to each action where a value of 10 indicated highest importance and a value of 1 indicated lowest importance.

Action	Score
3.1.11 - Prioritize and commit adequate resources to conduct effective management of grouse and their habitats.	**171**
1.1.3 - Within grouse priority areas, develop and implement plans for creating and maintaining forest ecosystem diversity across space and time.	**158**
1.1.2 - Identify priority areas for grouse habitat management using a broad suite of biological and socio-economic factors, including available resources.	**157**
1.1.1 - Evaluate the current distribution of quality grouse habitat using broadly applicable, standardized methods.	**147**
3.1.12 - Identify and address resource gaps and barriers that impede grouse habitat management.	**140**
1.1.4 - Evaluate success of habitat management efforts in terms of 1) habitat quality and quantity and 2) grouse population response.	**140**
2.3.8 - Use standardized protocols to allow for cross-jurisdictional monitoring of grouse populations, including factors affecting grouse populations, and hunter participation.	**136**
2.4.10 - Identify and conduct research on factors that may affect grouse populations.	**130**
1.2.5 - Conduct research to better understand the relationship between scale and configuration of habitat and potential grouse population response and viability.	**124**
3.2.15 - Garner continued, long-term support for EGWG and its efforts.	**123**
2.2.7 - Evaluate the effects of harvest and hunting-related impacts on grouse populations. Adjust grouse hunting regulations based on research outcomes.	**121**
2.1.6 - Set obtainable grouse population goals based on available and potential habitat and stakeholder values and expectations.	**116**
3.2.14 - Improve intra- and inter-agency and organization collaboration to increase support for young forest and grouse habitat management.	**116**
4.2.18 - Develop an eastern grouse conservation strategic communication plan that identifies collaborators and partners, develops targeted messages, evaluates the effectiveness of messaging efforts, and outlines how messaging information is shared across partners and stakeholders.	**111**
3.2.13 - Identify management plans, at various administrative levels, that can be leveraged to support eastern ruffed grouse conservation and ensure those management plans enable management of grouse and their habitats.	**108**
4.2.20 - Incorporate stakeholder values, attitudes, and preferences in grouse management decision-making processes.	**107**
4.2.21 - Conduct organized advocacy efforts, including communication responses, around issues affecting management of grouse and their habitats.	**106**
4.1.16 - Identify stakeholders and their values and attitudes toward grouse and forest management.	**105**
4.1.17 - Determine the most effective messaging for each stakeholder group.	**99**
2.3.9 - Create a centralized repository of monitoring data that is updated annually and accessible by partners.	**93**
4.2.19 - Train natural resource managers to become more effective communicators, to a variety of stakeholders, regarding grouse population and grouse habitat management issues.	**92**

Table 2: Action Accomplishment Matrix

Actions are organized by whether they can be accomplished in the short-term (0-5 years) or will require a long-term (6-10+ years) timeline to complete. Additionally, actions are organized by whether they are discrete, meaning they only need to be accomplished once, or continuous, meaning the task is ongoing but single iterations of the task can be completed in either the short- or long-term.

	Short-Term	Long-Term
Discrete	1.1.1 - Evaluate the current distribution of quality grouse habitat using broadly applicable, standardized methods. 1.1.2 - Identify priority areas for grouse habitat management using a broad suite of biological and socio-economic factors, including available resources. 2.1.6 - Set obtainable grouse population goals based on available and potential habitat and stakeholder values and expectations. 3.2.13 - Identify management plans, at various administrative levels, that can be leveraged to support eastern ruffed grouse conservation and ensure those management plans enable management of grouse and their habitats. 4.1.16 - Identify stakeholders and their values and attitudes toward grouse and forest management. 4.1.17 - Determine the most effective messaging for each stakeholder group. 4.2.18 - Develop an eastern grouse conservation strategic communication plan that identifies collaborators and partners, develops targeted messages, evaluates the effectiveness of messaging efforts, and outlines how messaging information is shared across partners and stakeholders.	1.2.5 - Conduct research to better understand the relationship between scale and configuration of habitat and potential grouse population response and viability. 2.2.7 - Evaluate the effects of harvest and hunting-related impacts on grouse populations and adjust hunting regulations based on research outcomes.
Continuous	1.1.3 - Within grouse priority areas, develop and implement plans for creating and maintaining forest ecosystem diversity across space and time. 2.3.8 - Use standardized protocols to allow for cross-jurisdictional monitoring of grouse populations, including factors affecting grouse populations, and hunter participation. 2.3.9 - Create a centralized repository of monitoring data that is updated annually and accessible by partners. 3.1.11 - Prioritize and commit adequate resources to conduct effective management of grouse and their habitats. 3.1.12 - Identify and address resource gaps and barriers that impede grouse habitat management. 3.2.14 - Improve intra- and inter-agency and organization collaboration to increase support for young forest and grouse habitat management. 4.2.20 - Incorporate stakeholder values, attitudes, and preferences in grouse management decision-making processes.	1.1.4 - Evaluate success of habitat management efforts in terms of 1) habitat quality and quantity and 2) grouse population response. 2.4.10 - Identify and conduct research on factors that may affect grouse populations. 3.2.15 - Garner continued, long-term support for EGWG and its efforts. 4.2.19 - Train natural resource managers to become more effective communicators, to a variety of stakeholders, regarding grouse population and grouse habitat management issues. 4.2.21 - Conduct organized advocacy efforts, including communication responses, around issues affecting management of grouse and their habitats.

Jacob Dingel/Pennsylvania Game Commission

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Appendix A - 2020 EGWG Report: Ruffed Grouse Population Declines in the Eastern United States

Ruffed Grouse Population Declines in the Eastern United States

Prepared by the Eastern Grouse Working Group - December 2020

Executive Summary

Ruffed grouse populations have declined by at least 50% throughout the Eastern U.S. over the last 30 years. Landscape-scale loss of young forests (stands <20 years of age) is the primary driver of decline. Shifts in climate, predator regimes, changing land use, and mortality from West Nile virus (WNV) are also contributing factors. Ruffed grouse abundance indices have declined by an average of 84% in the Mid-Atlantic region, 69% in the New England, and 71% in the Southeast since 1989 (CBC data).

The most recent Partners in Flight Conservation Assessment identifies Bird Conservation Region (BCR) 28, the Appalachian Mountain stronghold for ruffed grouse south of New England, as having a threat level score of 4, indicating that "Severe deterioration in the future suitability of . . . conditions is expected to significantly affect a majority of the population."1 New England populations (BCR 14) were identified as being of "Regional Concern" and "Regional Importance" in need of "Management Attention", and BCRs 22, 24, 29, 30 as currently "Peripheral" or near peripheral, with grouse populations in the foothills east of the Appalachian Mountains (BCR 29) "Nearing Extirpation." Moderate to severe threats and moderate to significant population declines were identified in all Eastern and Lower Midwestern BCRs containing ruffed grouse.

In Eastern states where two Breeding Bird Atlases have been completed, the number of atlas blocks with grouse detections declined an average of 25% between the two time periods, with the most severe declines in Pennsylvania (30%), Maryland (32%), and West Virginia (46%). Hunter flush rates have also declined by an average of 4.6% per year in the Mid-Atlantic region and 8.5% per year in the Southeast. Because hunters tend to focus effort in the highest quality habitat (i.e., known to hold grouse), declines observed in hunter flush rates are likely conservative, reflecting minimum rates of decline.

Loss of young forests impact not only grouse but also forest health, forest resilience, and the entire suite of Species of Greatest Conservation Need that rely upon young forests. Declining grouse populations are an urgent indicator of the plight of other species which use young forests during critical life stages, including many we class as 'mature forest' species.

Urgent action is needed at the landscape scale, above and beyond localized habitat improvement efforts, to halt the decline in ruffed grouse and other young forest species. To fulfill our public trust responsibilities, natural resource agencies must re-double their efforts in habitat restoration, partner collaborations, and landowner outreach to stop range contractions and slow population declines. To do otherwise compromises our collective mission of ensuring sustainable populations of ruffed grouse and other young forest species for present and future generations.

Population Status Assessment

Ruffed grouse are a cryptic and difficult to survey species, so it is a challenge to assess the magnitude of declines with high precision. No region-wide, ruffed grouse-specific monitoring has been conducted in the East. For this population analysis, the Eastern Grouse Working Group compiled relevant data from the Christmas Bird Count (CBC), the USGS Breeding Bird Survey (BBS), state Breeding Bird Atlas projects (BBA), and grouse hunter-cooperator surveys to better understand grouse population status in the East.

Christmas Bird Count. The Audubon Christmas Bird Count (CBC) provides a robust harvest-independent index of trends in grouse abundance in the region. CBC data clearly demonstrate precipitous grouse population declines in all regions of the Eastern grouse range (Figs. 1-3). State-level data is more variable, but population declines are evident (Figs. 4-6). In the last 20 years, grouse abundance indices have declined by an average of 84% in the Mid-Atlantic region, 69% in the New England region, and 71% in the Southeast region. Abundance remains significantly higher in New England than the Mid-Atlantic and Southeast regions, which may be masking the severity of regionwide population declines.

Ruffed grouse declines across the Eastern US are exacerbated by habitat fragmentation, ongoing deleterious impacts to population dynamics that occur with small and isolated habitats, and low population densities. As a result, Mid-Atlantic states have experienced rapid population decreases and the number of grouse detected in the Southeast region is exceptionally low.

Comparing CBC data with Hunter-Cooperator data further indicates that CBC can serve as a valid harvest-independent metric of population change. In the five Eastern states with reasonably robust sample sizes for both CBC and hunter cooperator surveys (NC, NY, OH, PA, VA), the mean annual CBC grouse index is highly correlated with the mean annual flush rate ($r^2 = 0.90$, $P<0.001$), lending strong credence to the suggestion that grouse declines can be tracked by CBC data when grouse-specific surveys are not available and CBC routes occur within a state's grouse range.

Breeding Bird Survey. The USGS Breeding Bird Survey methodology is not conducive to detecting changes in ruffed grouse abundance, particularly in areas with low grouse densities. BBS Trend estimates have poor reliability measures in most states due to low sample sizes. Nonetheless, available BBS data do indicate negative annual trend estimates since 1985 in 10 of 12 Eastern states with data available (Fig. 7).

Breeding Bird Atlas. Breeding Bird Atlas projects have been completed twice in five Eastern states (Maryland, Massachusetts, New York, Pennsylvania, and West Virginia), allowing for direct comparisons of presence between the two time periods. All five states completed BBAs prior to 1989 and again in 2005 or later. Coincidentally, these time periods represent pre- and post- snapshots of the arrival and spread of WNV in the Eastern U.S, which began in 1999. The number of survey blocks with grouse detections 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. 8).

Grouse Hunter-Cooperator Surveys. Hunter data provide further evidence that grouse numbers have declined. Nine states in the East have used a grouse cooperator survey as an index of populations annually for at least 10 years since 1995 (Figs. 9 and 10). All states except West Virginia (with a very low number of cooperators) have recorded a substantially declining trend in number of grouse flushed per hour (Fig. 11). Flush rates have declined by an average of 4.6% per year in the Mid-Atlantic region and 8.5% per year in the Southeast. Because hunters are likely to focus efforts in the most productive habitats with the highest densities of grouse, these data, again, are likely conservative, reflecting minimum rates of decline.

Partners in Flight Conservation Assessment. The most recent Partners in Flight (PIF) Conservation Assessment identifies BCR 28, the Appalachian Mountain stronghold for ruffed grouse south of New England, as having a Threat Level score of 4, indicating that "Severe deterioration in the future suitability of . . . conditions is expected to significantly affect a majority of the population"[1] (Fig. 12). Grouse populations in the foothills east of the Appalachian Mountains (BCR 29) were identified as "Nearing Extirpation". In New England (BCR 14) grouse were identified as a species of "Regional Importance" of "Regional Concern" and needing "Management Attention." The PIF Assessment identifies BCRs 22, 24, 29, 30 as currently "Peripheral" or near peripheral, with reviewers expressing concern over "some", "a handful", "maybe hanging on", and "steep decline" in BCR 22; "still being detected/not yet extirpated" in BCR 24, and "becoming rare/hard to find" in BCR 29. Regional threats are identified as "decline in young oak systems", "uncertain markets/potential decline in oak harvests", and "loss of habitat." Eastern ruffed grouse, in a majority of the BCRs where they occur, are expected to face Moderate to Severe threat levels in future (Fig. 12).

Drivers of Decline

Early successional forests have been declining in North America for decades because of changing land use, changes in forest management practices, lack of natural disturbance, and widespread forest maturation, resulting in reduced habitat quantity and quality for ruffed grouse.[2,3,4,5] High-quality grouse habitat in lower New England, the Mid-Atlantic, the southern Appalachians, and the Lower Midwest has become increasingly fragmented and isolated. In some areas, suitable habitat remains unoccupied because it is too isolated to be re-colonized. In many areas that continue to hold grouse, population persistence is severely compromised because reproduction and immigration do not outpace mortality. In areas of high-quality habitat, grouse may still occur at high densities, and habitat remains the key to population recovery. Monitoring in Pennsylvania suggests that populations in regions of high-quality habitat experience WNV-related declines but recover more quickly than those in regions of marginal and fragmented habitat.[6]

Urgent Action is Needed

Ruffed grouse populations have declined more than 50% throughout the East over the past three decades. Local extinctions and range contraction may be hastened by the double threats of young forest habitat loss and West Nile virus mortality. Increased predation pressure and changing weather conditions that reduce brood survival may also contribute to declines. Loss of high-quality habitat at landscape scale renders grouse less capable of coping with all stressors.

Ruffed grouse seem destined for extirpation in several areas unless immediate habitat restoration is initiated. Efforts to restore habitats should be focused near areas where grouse already occur due to their limited dispersal distance. Research is needed to determine if high elevation sites buffer grouse from WNV impacts. Population restoration efforts must be planned at the scale and intensity necessary to create well-

connected patches of high-quality young forest comprising 10-15% of restoration landscapes.[4] Young forests at this scale will benefit not only young forest species but also many others that are considered 'mature forest' obligates.[7]

Site-specific habitat management efforts are the simplest to plan and implement, but the scope and scale of declines call for a different approach. Large-scale strategic planning and carefully prioritized implementation is needed to accomplish the goal of sustaining ruffed grouse and other species associated with young forest habitats.

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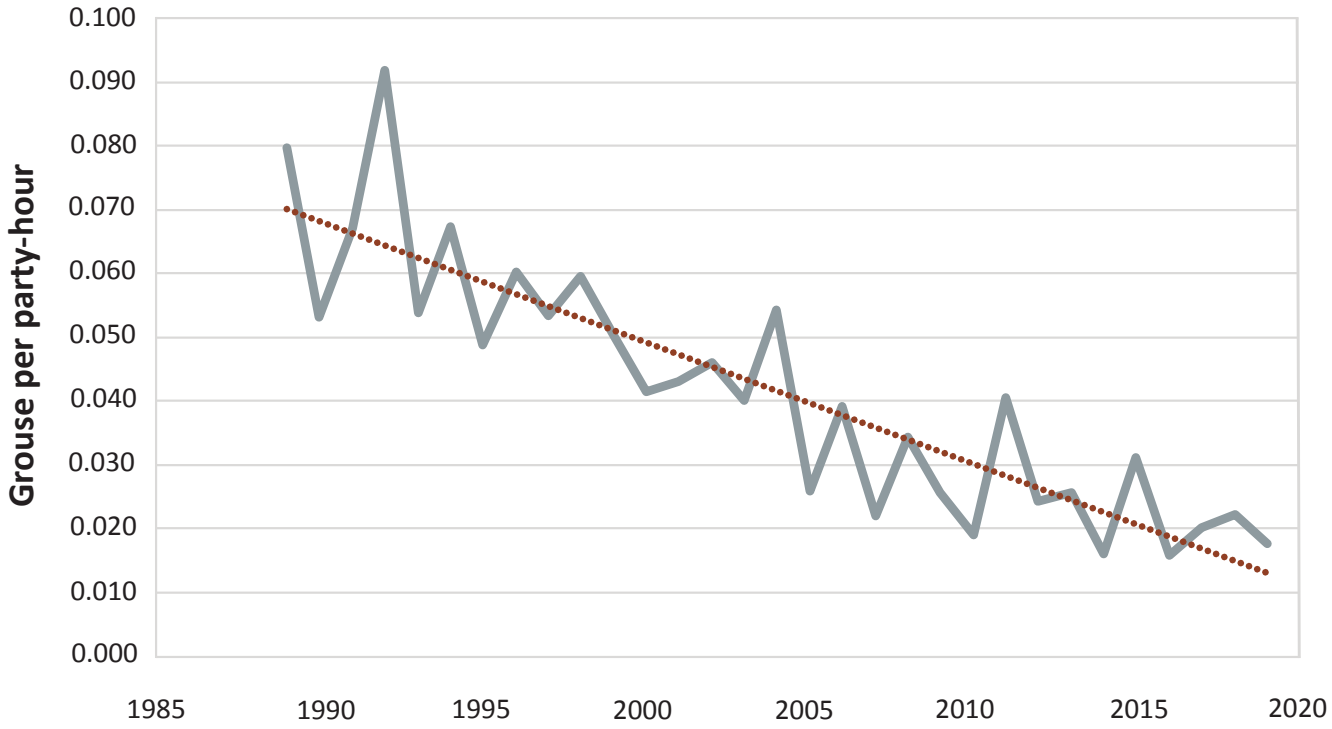


Figure 1. Mean Christmas Bird Count Index for ruffed grouse in New England states (1989-2019). "New England" includes Maine, New Hampshire, Vermont, Rhode Island, Connecticut, and Massachusetts.

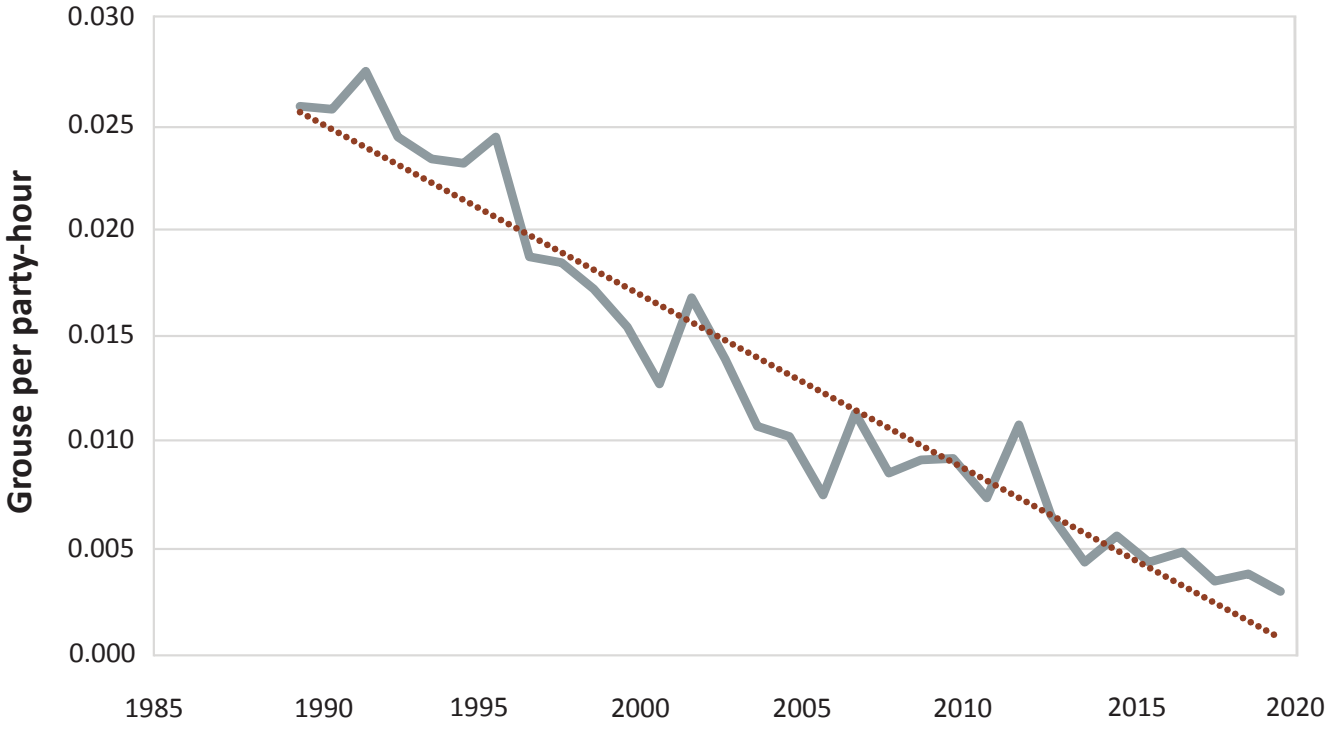


Figure 2. Mean Christmas Bird Count Index for ruffed grouse in Mid-Atlantic states (1989-2019). "Mid-Atlantic" includes New York, New Jersey, Pennsylvania, Maryland, Ohio, West Virginia, and Virginia.

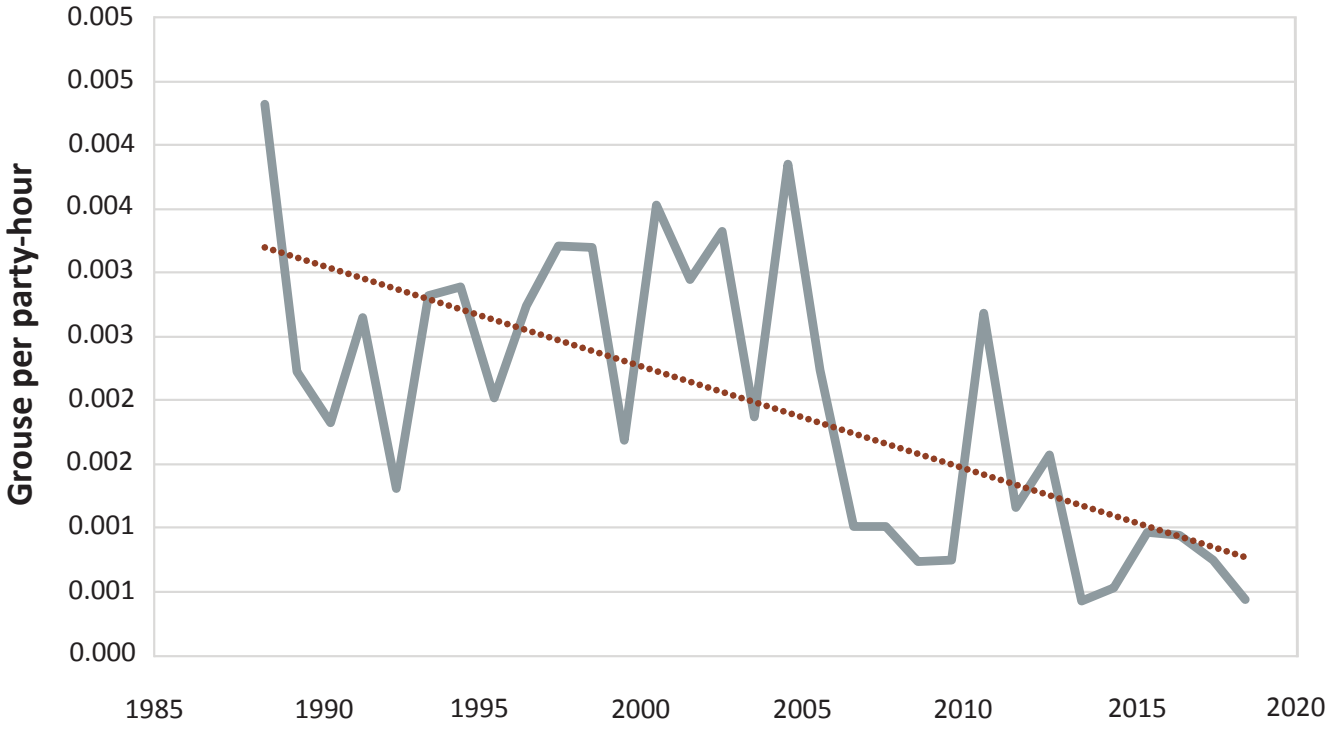


Figure 3. Mean Christmas Bird Count Index for ruffed grouse in Southeast states (1989-2019). "Southeast" includes Kentucky, Georgia, North Carolina, and Tennessee. Data not available for South Carolina.

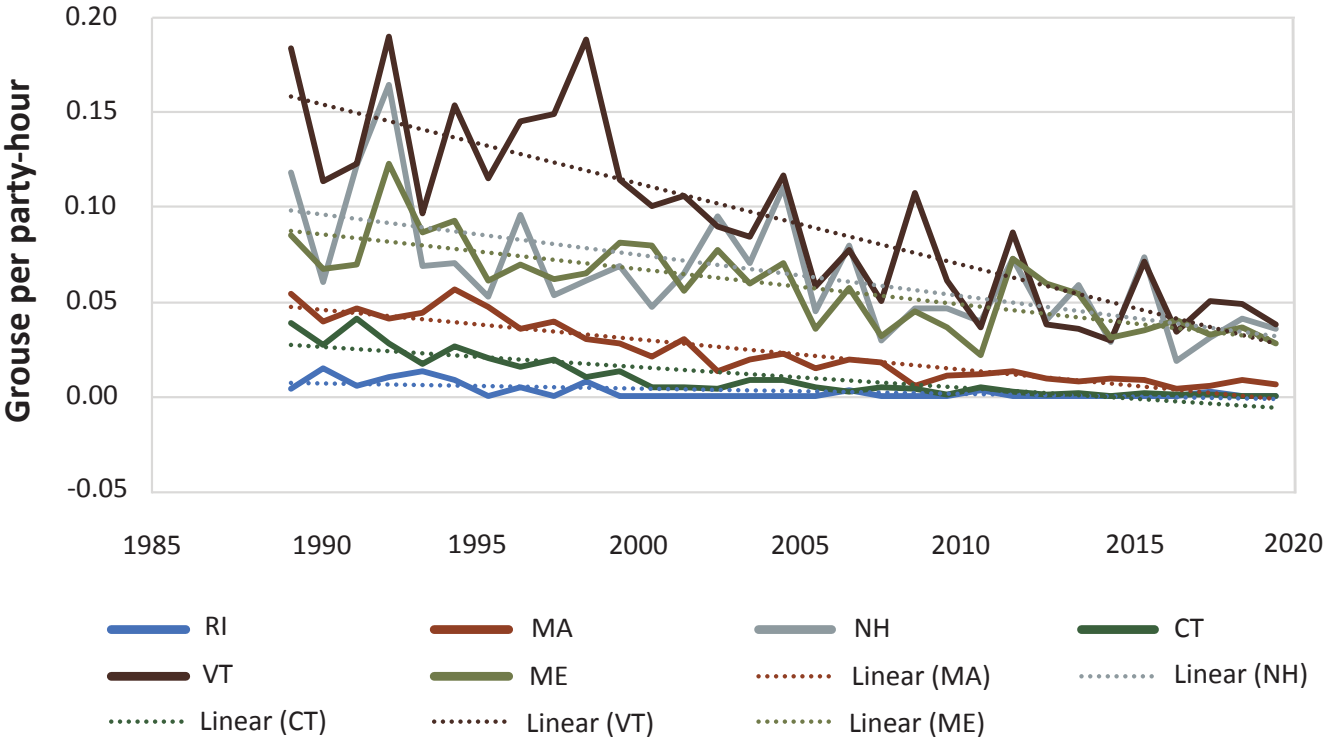


Figure 4. Christmas Bird Count Index for ruffed grouse in New England States (1989-2019).

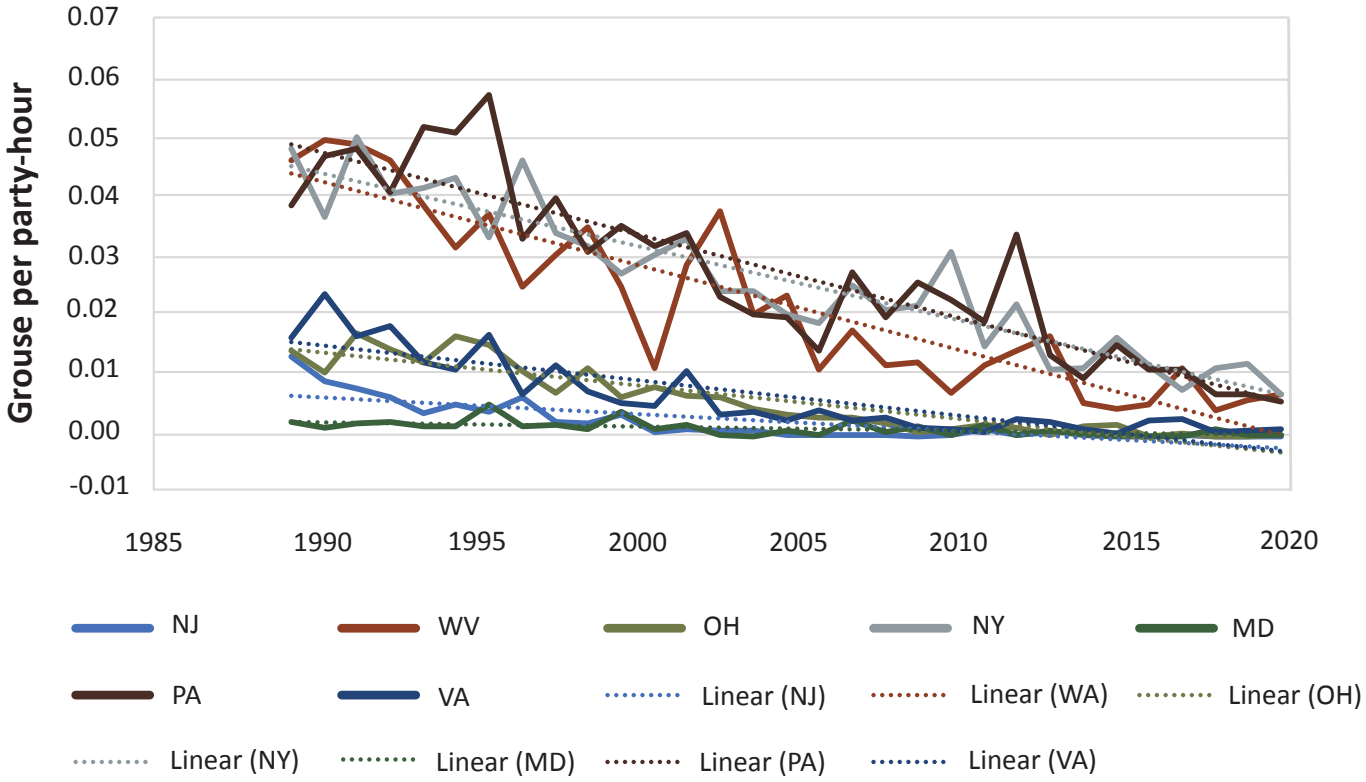


Figure 5. Christmas Bird Count Index for ruffed grouse in Mid-Atlantic States (1989-2019).

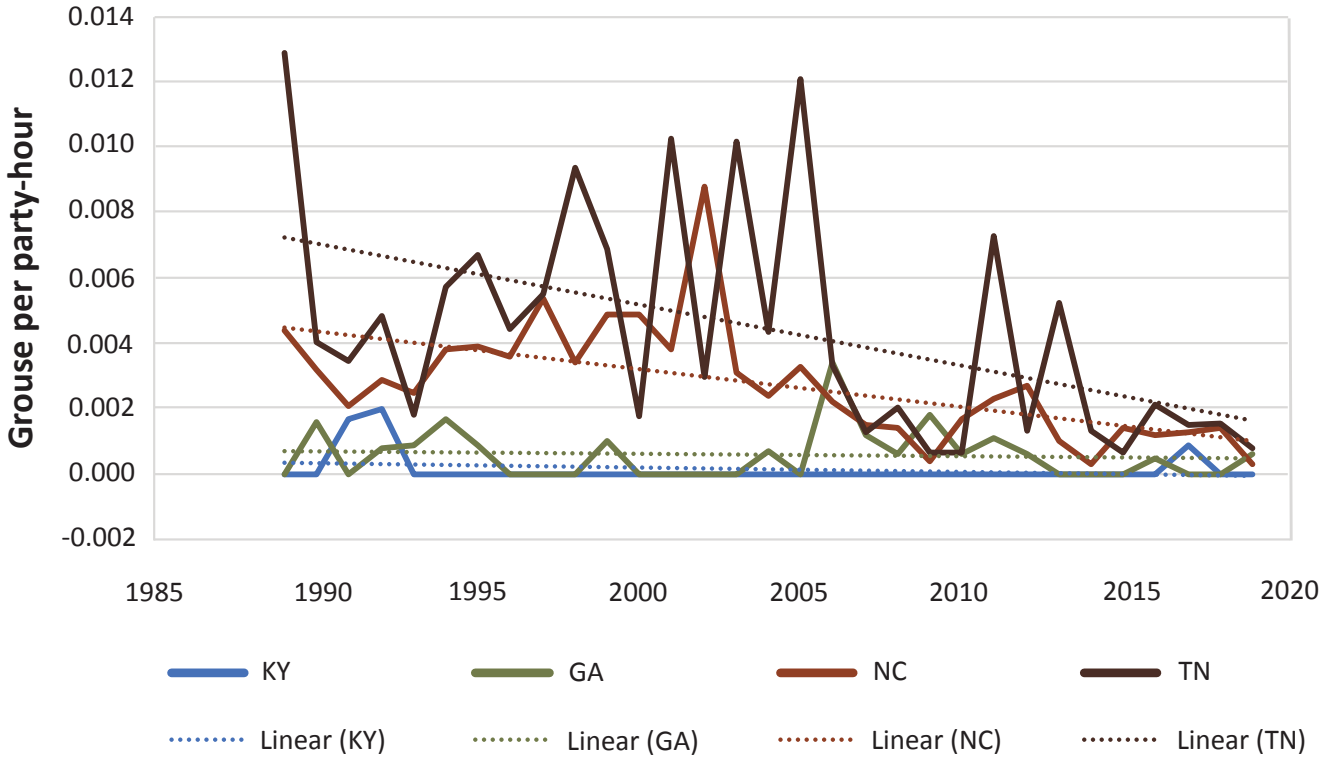


Figure 6. Christmas Bird Count Index for ruffed grouse in Southeast States (1989-2019).

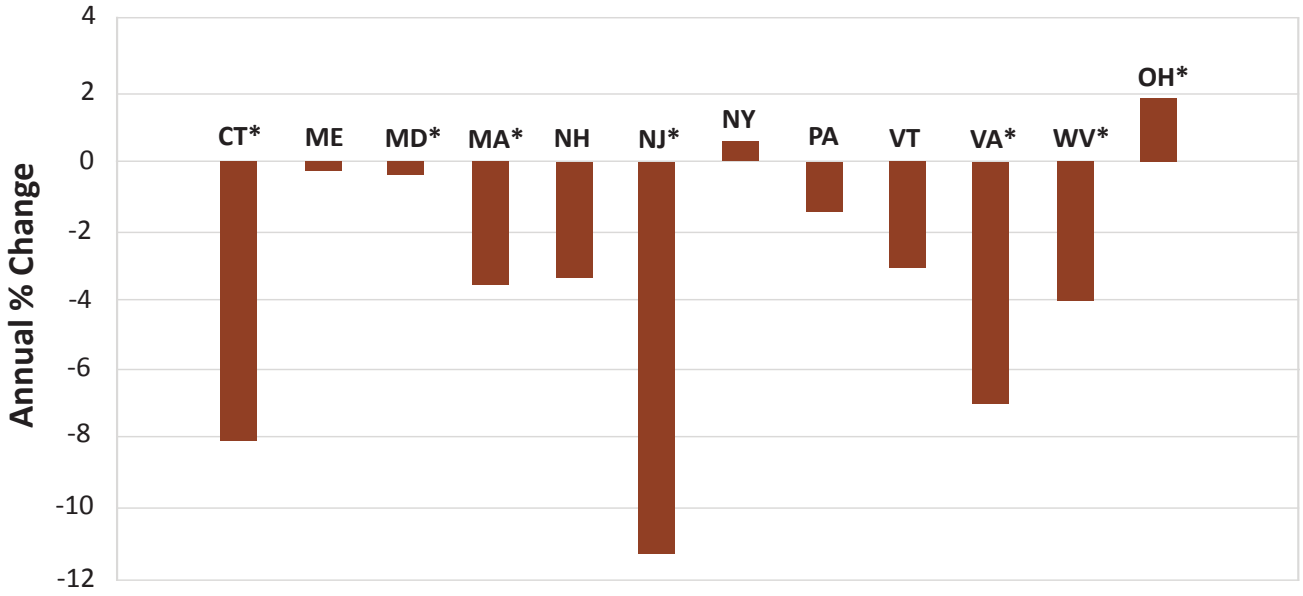


Figure 7. USGS Breeding Bird Survey annual trend estimates for ruffed grouse in Eastern states (1985-2015). Asterisk (*) indicates poor data credibility per USGS. Trend data not available in all states due to low sample sizes.

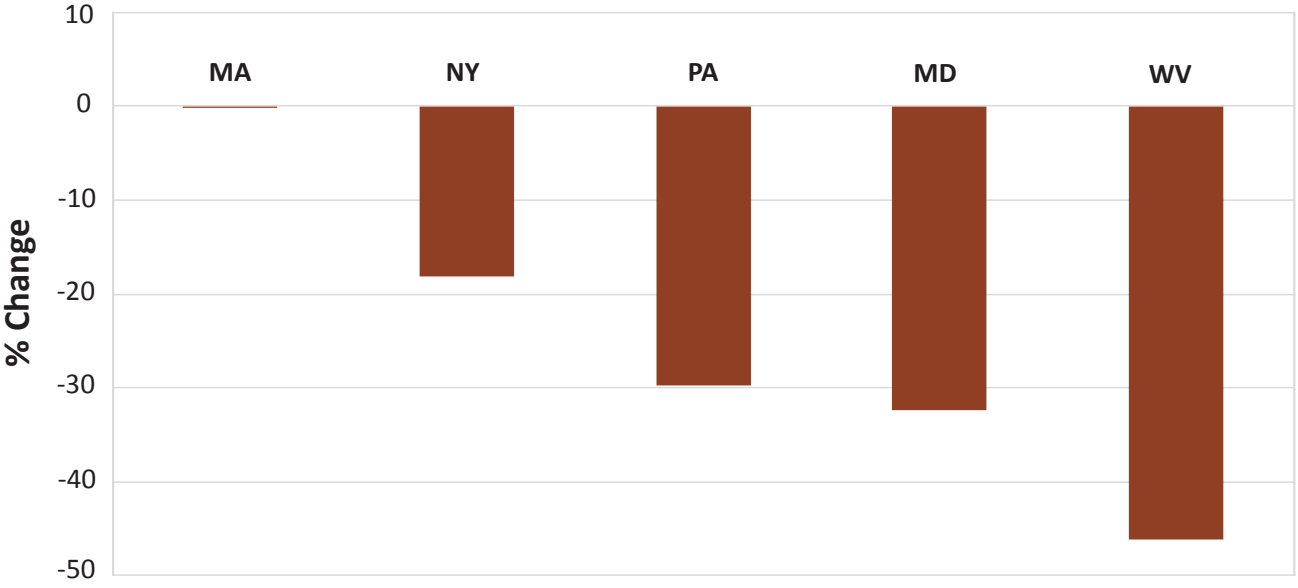


Figure 8. Change in the number of Breeding Bird Atlas blocks with grouse detected between the 1st survey period and 2nd survey periods. Atlas projects conducted in Massachusetts (1974-79 and 2007-11), New York (1980-85 and 2000-05), Pennsylvania (1983-89 and 2004-09), Maryland (1983-87 and 2002-06), and West Virginia (1984-89 and 2009-14).

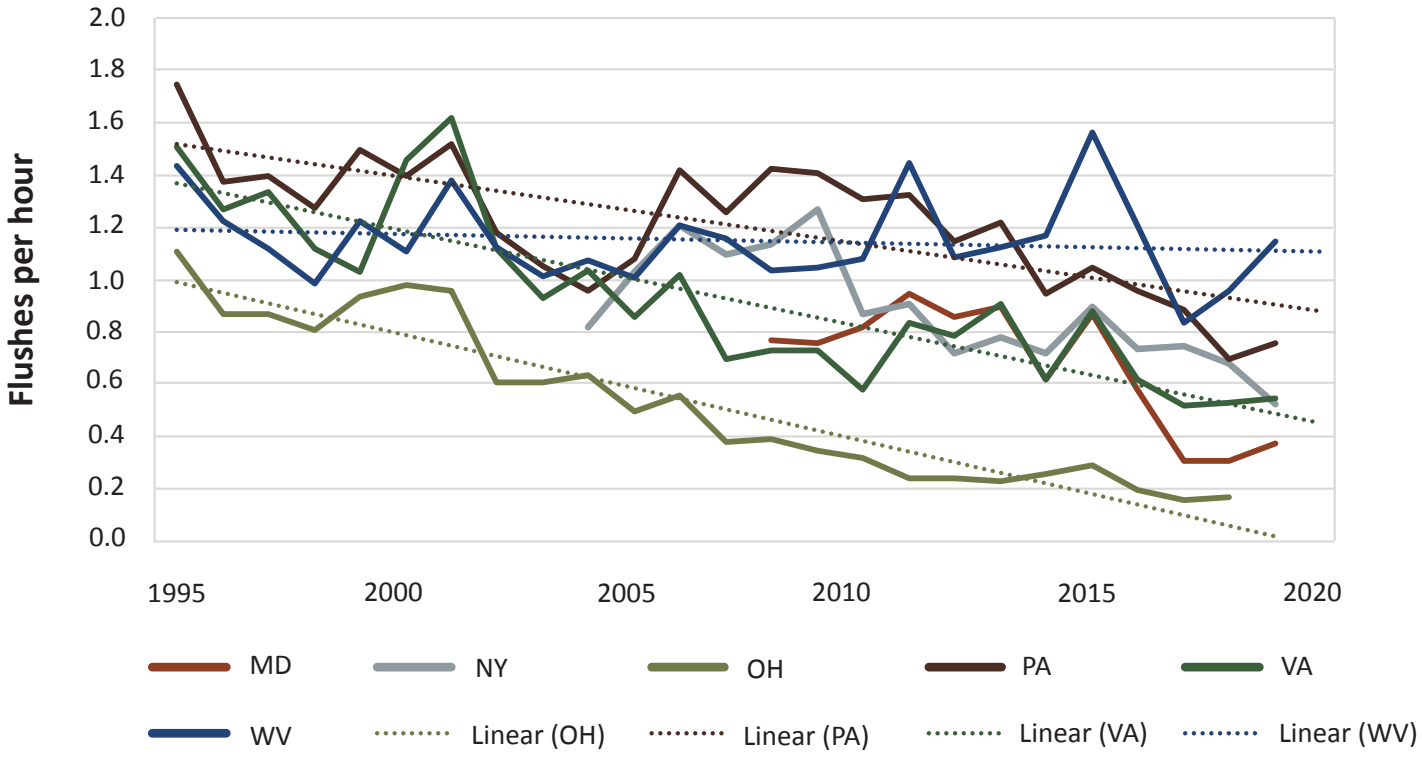


Figure 9. Number of ruffed grouse flushed per hour reported on hunter cooperator surveys, Mid-Atlantic states.

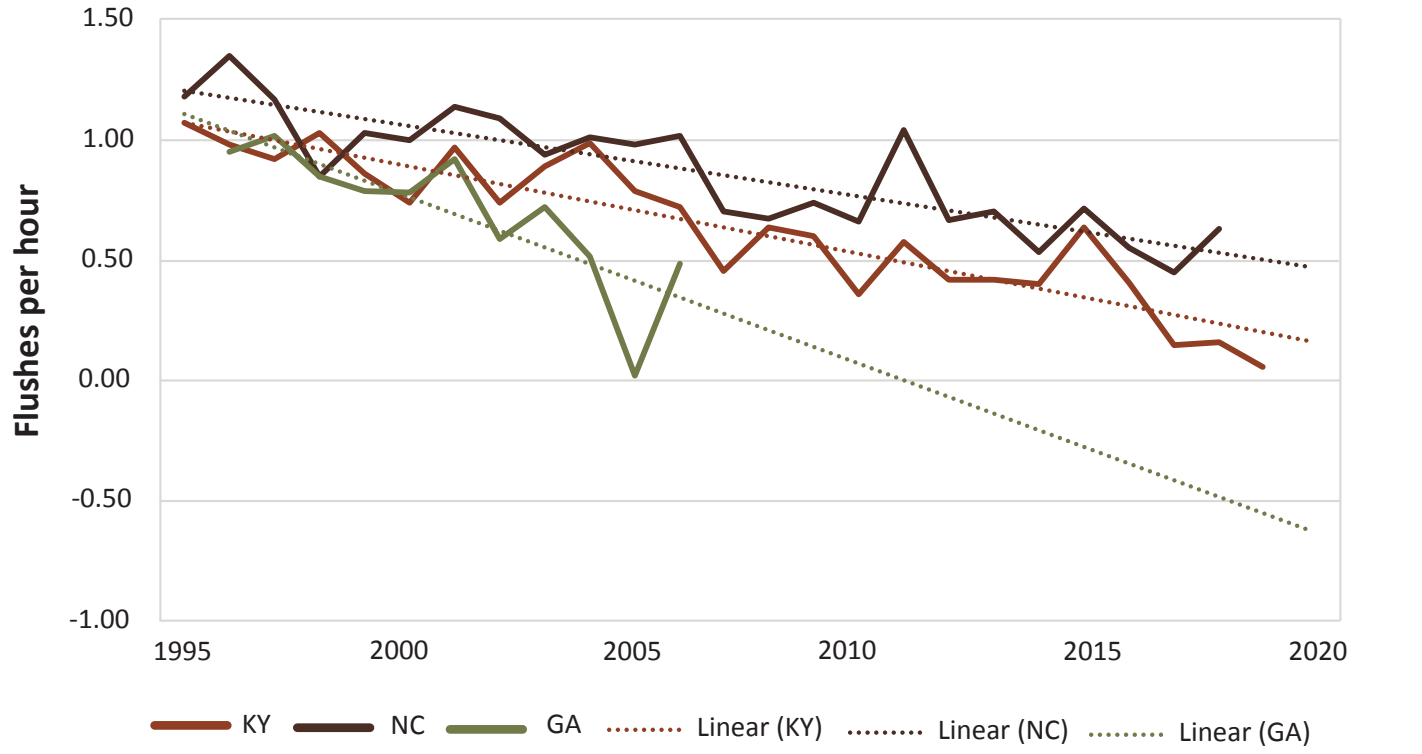


Figure 10. Number of ruffed grouse flushed per hour reported on hunter cooperator surveys, Southeastern states.

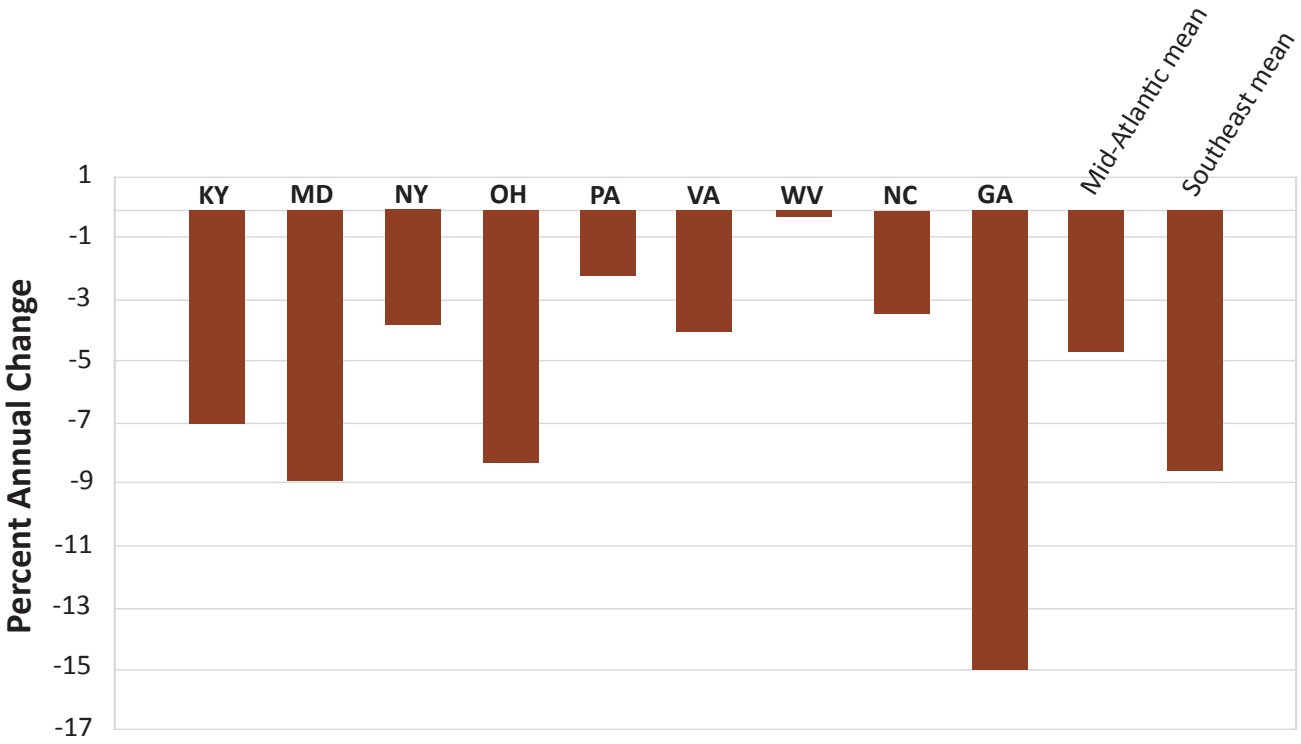
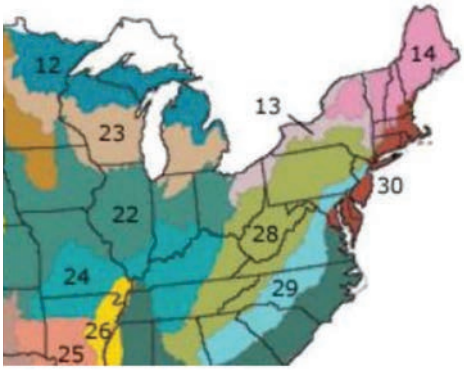


Figure 11. Percent annual change in flushes per hour reported on hunter cooperator surveys in the Eastern Region, 1995-2019 (if available). "Mid-Atlantic" includes Maryland, New York, Ohio, Pennsylvania, Virginia, and West Virginia. "Southeast" includes Kentucky, North Carolina, and Georgia. No data were available for New England.



BCR	Relative Density	Regional Threats	Population Trend
12	5 high	2 low	2 stable
13	2 low	3 moderate	2 stable
14	4 moderately high	3 moderate	4 moderate/large decrease
22	1 very low	4 high	5 significant decrease
23	2 low	4 high	4 moderate/large decrease
24	peripheral	2 low	3 uncertain; possible decrease
28	2 low	4 high	4 moderate/large decrease
29	nearing extirpation	2 low	3 uncertain; possible decrease
30	1 very low	3 moderate	5 significant decrease

Figure 12. a) Bird Conservation Regions (BCRs) in the eastern U.S; b) Partners in Flight Species Conservation Assessment of relative density, regional threat, and population trend for ruffed grouse in the Eastern U.S.

Appendix B - 2021 EGWG Report: Ruffed Grouse Management in the East: Envisioning the Road to Recovery

Ruffed Grouse Management in the East: Envisioning the Road to Recovery

"Where are we, where do we want to go, and what components of the social-ecological system need to be in place to get there?"

Developed by the Eastern Grouse Working Group

4/1/2021

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Executive Summary

In response to the continuing rapid decline of ruffed grouse *(Bonasa umbellus)* in the eastern U.S., state agency biologists from across the region met in 2016 and again in 2020 to discuss how to slow or halt the current population trajectory. Among the suite of potential actions identified by the group, a 'coordinated regional initiative' and associated 'strategic planning effort' were deemed high priority needs. To that end, the 21-state Eastern Grouse Working Group (EGWG) was formed and has met monthly since August 2020.

The top priority of the EGWG was to complete a region-wide population status assessment of eastern ruffed grouse, completed January 2020 (Appendix C). Ruffed grouse population indices have declined by an average of 84% in the Mid-Atlantic region, 69% in New England, and 71% in the Southeast over the past 30 years. These population trends show no sign of recovering without intervention. Following an assessment of relevant population indices, the status document concluded:

"Loss of young forests impact not only grouse but also forest health, forest resilience, and the entire suite of Species of Greatest Conservation Need that rely upon young forests. Declining grouse populations are an urgent indicator of the plight of other species which use young forests during critical life stages, including many considered 'mature forest' species.

Urgent action is needed at the landscape scale, above and beyond localized habitat improvement efforts, to halt the decline in ruffed grouse and other young forest species. To fulfill our public trust responsibilities, natural resource agencies must re-double their efforts in habitat restoration, partner collaborations, and landowner outreach to stop range contractions and slow population declines. To do otherwise compromises our collective mission of ensuring sustainable populations of ruffed grouse and other young forest species for present and future generations."

Before the second priority (an effective strategic plan) could be developed for the region, the EGWG needed to articulate a collective vision for regional grouse conservation. A planning workshop was convened in January 2021 to characterize the full management system affecting ruffed grouse in the eastern U.S. The suite of biological, social, political, governance, economic, and administrative conditions affecting grouse management were reviewed in detail. From that effort, Desired Future Conditions, Current Conditions, gaps existing between desired and current conditions, barriers and opportunities that affect our ability to close those gaps, and Fundamental Objectives were identified and are presented herein.

The four Desired Future Conditions (DFCs) for ruffed grouse conservation and management in the eastern U.S. represent the interrelated conditions needed for large-scale grouse restoration to be successful: (1) Sufficient habitat and forest ecosystem diversity; (2) Viable ruffed grouse populations; (3) Essential conservation capacity; and (4) Effective communication and engagement. The Fundamental Objectives associated with DFCs represent what needs to be in place for grouse management programs to progress from their current condition to an effective large-scale restoration effort.

This report presents guiding principles shared by state agency grouse managers in the eastern U.S. The DFCs and Fundamental Objectives are relevant whether working at the scale of the eastern grouse range, a state, or a local management area. This report, and the Regional approach it represents, is designed to be compatible, complementary, and supportive of state-level management actions regardless of the status of grouse in that state (e.g., abundant, rare, listed).

The regional initiative to restore and maintain viable ruffed grouse populations needs a strategic plan to guide it. Moving forward, the development of a regional strategic plan will involve input and collaboration with many partners beyond state wildlife agencies. This document is not a Regional Strategic Plan, but it is the foundation for one. Federal, State, NGO partners, and stakeholders can use the information contained as they develop a common vision and implementation roadmap to conserve eastern ruffed grouse.

We anticipate that the emphasis of a Regional Strategic Plan will be on guidance, not prescription. That planning effort will identify obstacles, opportunities, and areas where collaboration within and across states to share expertise and other resources will yield the greatest benefits for all partners. A regional approach will foster interactions and produce synergies that magnify the impact of partner and state investments of money, human capital, and political capital.

No single state agency or partner has the resources to undertake this effort alone, but with strategic collaboration within and among states, yielding highly effective partnerships and implementation efforts, together we can further the landscape-scale conservation of ruffed grouse populations.

Glossary of Terms Used in this Report

Young Forest: young forests, or early successional habitats, are generally defined as forest stands less than 20 years of age, with "a well-developed ground cover of shrub and young tree component. They lack a closed, mature tree canopy, and are created or maintained by intense or recurring disturbances." (Greenberg et al. 2011). To maintain this habitat, managers must plan for a moving mosaic of tree harvests, stand disturbance, and other habitat improvements across time and space.

Forest Ecosystem Diversity: the landscape mosaic of forest age classes that supports forest species conservation, forest health, and ecosystem resilience. "Most ecologists and environmentalists agree that disturbances and early successional habitats are important to maintain the diverse flora and fauna native to deciduous eastern forests. Indeed, many species, including several listed as endangered, threatened, sensitive or of management concern require the openness and thick cover that early successional habitats provide" (Greenberg et al. 2011). Grouse and many young forest associates use forest stands of different age classes in different seasons and require a balanced mosaic of age classes within a forested landscape.

Conservation Capacity: resources (expertise, staffing, funding) available to partners to further grouse conservation

Management System: interacting biological, ecological, sociocultural and institutional components of the social-ecological system in which wildlife management occurs.

Desired Future Conditions (DFCs): desired biological, ecological, sociocultural and institutional components of a management system (habitat, population, institutional, and human attitudinal and behavioral conditions). DFCs focus on desired outcomes, rather than specific actions.

Current Conditions: the current conditions that greatly influence achieving or maintaining the DFC. Important positive and negative Effects these conditions have on DFCs are identified.

Fundamental Objectives (FOs): aspects of a management system that need to be addressed to arrive at the DFC. FOs point to conditions that require management attention but are not specific objectives. Some might compare these to Goal-level statements in a traditional strategic plan. Accomplishing FOs would have the collective effect of achieving the DFC.

Stakeholders: Persons who can significantly affect or who are significantly affected by grouse or their management. Partners: have special status because of their focus on grouse (e.g., mission is related to grouse). Partners may share goals for grouse management and can bring resources (human capital, expertise, money, land, or landowner access, etc.) to the effort. Public: by virtue of grouse being public trust resources, all people have a right to be informed about grouse and grouse management and a responsibility to be informed about grouse management and conservation needs if they choose to have input into management decision making.

Background to the 2021 Eastern Grouse Working Group Planning Workshop

In 2006, the Association of Fish and Wildlife Agencies' Resident Game Bird Working Group completed a Ruffed Grouse Conservation Plan that established habitat management goals across the species' range with the aim of restoring ruffed grouse populations to 1980 levels (Dessecker et al. 2006). This plan did an excellent job of describing the species' biological needs and providing spatially-explicit goals for habitat restoration. Over the last 15 years, however, it's become apparent that biological, social, political, and funding constraints have made achieving the population goal articulated in that plan impractical. An revised conservation strategy is needed that reflects current and future social-ecological conditions, constraints, and opportunities.

In response to the lack of progress made to accomplish the goals of the 2006 plan and the continuing rapid decline of ruffed grouse, a meeting of grouse biologists from across a large portion of the range occurred in 2016. The purpose was to discuss the Appalachian Cooperative Grouse Research Project (ACGRP), more recent research findings, and to brainstorm critical needs to slow population declines. The meeting was organized by the ACGRP and Northeast Upland Game Bird Technical Committee. More than 40 grouse biologists from 22 state agencies, NGOs, and universities attended.

The primary focus of the 2016 meeting was to better understand the current state of knowledge about ruffed grouse through research updates. A portion of the meeting was also dedicated to discussing management priorities that would further grouse restoration. High-priority actions included increasing appropriate habitat, a process to identify grouse focus areas, active engagement with young forest restoration partners, extinction probability/minimum viable population analyses, standardized population monitoring protocols, assessing impacts of West Nile virus, and better understanding the impact of hunting on declining and isolated populations. Attendees ranked the top three priorities as: (1) habitat creation/restoration; (2) a multi-state collaborative management initiative, and (3) better understanding West Nile virus impacts on grouse populations.

In 2020, state grouse biologists re-convened to discuss the continued population decline of grouse (see Appendix C) and progress on the priorities identified in 2016. While progress had been made on priorities in some individual states, large-scale progress to address range wide grouse declines had not occurred.

Why hadn't state-level efforts generated large-scale improvements in grouse conservation? State and Regional efforts with multiple high-priority objectives require significant resources and coordination, both of which have been lacking. Attendees recognized the need to develop an Eastern Grouse Working Group that would assess the current conditions affecting ruffed grouse and begin to develop a strategic approach to mitigating those factors.

Why a Regional Approach to Ruffed Grouse Conservation?

While ruffed grouse are non-migratory, the viability of their populations is dependent upon the proper functioning of a complex social-ecological system operating at a landscape-scale, irrespective of political boundaries. A single grouse moves only short distances in its lifetime, but sustainable eastern grouse populations require diverse age classes in well-managed forests throughout the Appalachians and beyond. Conservation success in any one state is insufficient for the long-term security of ruffed grouse across the region.

When natural resource agencies, grouse managers, and partners work in concert toward shared goals, the likelihood of success increases dramatically. A regional approach allows for a thorough, consistent understanding of the problem, the sharing of information among partners, and consistent and effective communication about the urgency of the problem to the public and conservation community.

A regional approach provides a structure for sharing research and expertise, standardizing monitoring and management techniques, leveraging resources and economic opportunities (e.g., staff, funding, forest industry partnerships). This approach can produce landscape-scale strategic habitat management aligned with ecological rather than jurisdictional boundaries. The cooperation of multiple agencies and organizations can have a synergistic effect whereby positive outcomes from a well-coordinated regional effort are greater than the sum of its parts.

In the end, ruffed grouse conservation in the eastern U.S. depends upon large-scale habitat restoration. Ultimately, a coordinated effort within states and across the region will provide a greater return on investment, and greater benefit to forest ecosystems, than habitat management that is done opportunistically or without critical ecological, social, and economic considerations.

From Visioning to Strategic Plan

In summary, the Eastern Grouse Working Group is working to develop a functional regional initiative for large-scale grouse conservation rather than a list of short-term and localized research and management projects. That is the challenge addressed in this document – to incorporate the large-scale systemic issues that were missed in the 2006 and 2016 grouse management products.

A regional initiative to enhance and maintain viable ruffed grouse populations needs a strategic plan to guide it. Such a plan presents a broad view of problems and opportunities and identifies areas where collaboration within and across states for sharing expertise and other resources is likely to yield the greatest benefits for all those participating. Other initiatives, like the National Bobwhite Conservation Initiative, have successfully garnered support for declining populations and habitats across a large scale. The diversity of current conditions across states with respect to ruffed grouse management requires that a regional strategic plan for ruffed grouse provides guidance, not prescription. Such a plan will foster interactions and synergies among partners, thereby magnifying the impact of investments of money, human capital, and political capital made at a state level.

Output measures of specific projects done at small scale are relatively easy to list and measure. They are the bread and butter of our agency annual reports. Outcome measures for multi-state efforts will be harder to articulate, implement, and measure – yet they may be the most successful for grouse conservation. Success will require sustained engagement and commitment by state wildlife agencies, partners, and key stakeholders (Fig. 1).

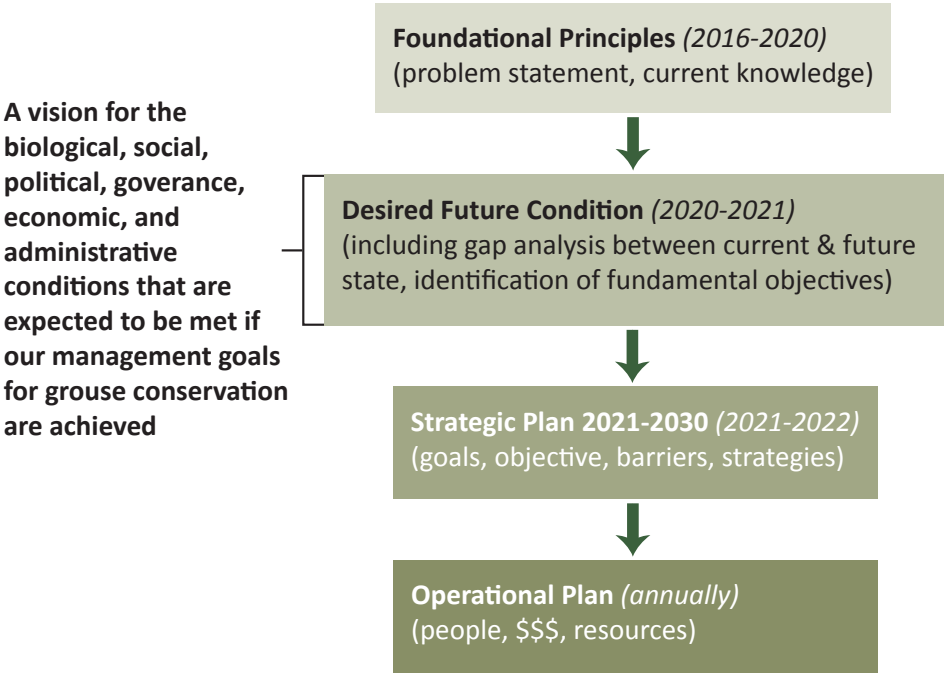

Figure 1. Process for developing a Strategic Plan for Ruffed Grouse Conservation in the Eastern U.S. starts with articulation of Desired Future Conditions (DFCs). The focus of the January 2021 workshop was drafting DFCs and Fundamental Objectives (FOs). The next step, post-workshop, will be to use the DFCs and FOs as the foundation for development of a strategic plan.

Where We Need to Go: Desired Future Conditions

The core planning team of the Eastern Grouse Working Group (EGWG) worked through a facilitated process to develop a "Managers' Model" for ruffed grouse in the eastern U.S. (Appendix A). The team identified high-level elements in the grouse management system: 1) Desired Future Conditions (DFCs); 2) Current Conditions (CCs) (i.e. constraints, limitations, opportunities, stakeholders), and 3) Gap Analysis. From this effort, Fundamental Objectives (FOs) were identified for each Desired Future Condition.

Taken together, these elements articulate the Eastern Grouse Working Group's understanding of the social-ecological system affecting ruffed grouse management. This report presents the Working Group's perspective about what's possible to achieve in eastern ruffed grouse management and what conditions must be in place for success.

Four themes tie together the Desired Future Conditions for ruffed grouse conservation and management in the East: (1) Sufficient Habitat & Forest Ecosystem Diversity; (2) Viable Populations; (3) Essential Conservation Capacity; and (4) Effective Communication and Engagement.

Some DFCs are prerequisites for others; they are essential to enabling another DFC to occur. For example, habitat is essential for viable grouse populations, and public understanding and support of habitat management practices is essential for this management to occur on a landscape scale. These and other relationships (tiered and parallel) are recognized by the EGWG.

Desired Future Condition: Sufficient Habitat and Forest Ecosystem Diversity

1. A mosaic of forest age classes is created and maintained at optimal scale and configuration to enhance and maintain populations of ruffed grouse and other young forest-dependent wildlife.

Desired Future Condition: Viable Populations

2. Ruffed grouse populations are maintained or growing in abundance and distribution where feasible.

3. Agencies and partners have accurate, standardized, and widely used metrics of management success.

4. The public has opportunity to use and enjoy the ruffed grouse resource while having realistic expectations of use and a willingness to limit recreational pursuits, if necessary, to protect the grouse population in an area.

Desired Future Conditions: Essential Conservation Capacity

5. Natural resource agencies understand that ruffed grouse are a representative species of a larger suite of species of conservation concern, are committed to remedying the problem, recognize that young forest management is compatible with many other agency priorities, and commit resources needed to incorporate young forest management into activities of the agency wherever and whenever possible.

6. Natural resource managers whose work affects ruffed grouse coordinate their activities in a regional, multi-state manner to efficiently and effectively maintain viable grouse populations by having: (1) sufficient funding; (2) other essential institutional support; (3) engaged partners; and (4) knowledgeable, supportive stakeholders.

Desired Future Conditions: Effective Communication and Engagement

7. Natural resource managers recognize the importance of and seek to understand public attitudes about habitat management for young forest wildlife and transparently address stakeholder concerns in management planning and implementation.

8. Natural resource agencies work collaboratively with partners to understand public attitudes regarding grouse and grouse conservation and use this information to effectively communicate the importance of young forest habitats in sustainably managed forest ecosystems.

9. Informative communication about grouse and grouse conservation is tailored to specific audiences in ways that maximize its effectiveness for raising people's appreciation of grouse and understanding of grouse management.

10. The full suite of stakeholders in ruffed grouse conservation are knowledgeable and have the opportunity and means to become engaged in some aspect of grouse management. Stakeholders understand: (1) the factors that influence grouse populations, (2) their role in the grouse management system, and (3) how they can contribute to grouse conservation while achieving other goals such as sustainable forest management, forest health and resiliency, biodiversity preservation, and diverse recreational uses.

11. The public is satisfied with agency and partner efforts to maintain viable grouse populations and with their opportunity to enjoy this resource.

Where We Are: Current Conditions and Effects on the Desired Future Conditions

Several social-ecological conditions exist in the ruffed grouse management system that contribute to the *current status* of grouse and impede conservation and management efforts. A smaller number of current conditions offer opportunities for effectuating the DFCs. The EGWG acknowledges the variability in current conditions (both positive and negative) that occur across the region. Conditions and their Effects may not apply to every jurisdiction and are meant as general statements about the current status of grouse and grouse management.

DFC: Sufficient Habitat and Forest Ecosystem Diversity	
Current Conditions	**Effects on DFCs**
State agencies are doing habitat work opportunistically instead of strategically	Managers may think they are doing well, but this can result in a lot of time and effort while not maximizing returns in grouse population response
Economic forces, especially lack of necessary timber markets, generally disincentivizes forest management that produces the quality and quantity of grouse habitat needed to meet conservation goals	The East currently lacks strong, diversified timber markets that would support extensive forest management. This often results in a lack of forest management or poor forest management that yields negligible benefits to grouse
Quantity and quality of active forest management on public land is not sufficient for long-term grouse habitat *(public land means federal lands, wildlife management areas, state parks, anything not private)*	Ongoing lack of active forest management impacts the amount of habitat (structural diversity) and cumulatively increases the work and resources required to reverse the decline of grouse across the region.
	In some jurisdictions, most potential ruffed grouse habitat is on public land. If management for grouse doesn't occur here, the Habitat DFC can't be achieved. Lack of mgt on private lands is making this a more significant issue.
	Short-term implications: public land managers are underutilized, and they and enthusiastic traditional grouse stakeholders can become frustrated. Long-term implications: we lose functional grouse populations on public lands.
	Need to be cognizant that both no management and counter-productive management for grouse occurs on public lands
	If not doing work on public lands, we don't have demonstration areas for public and private forest landowners

Quantity and quality of active forest management on private land is not sufficient for long-term grouse habitat	In many jurisdictions, most potential ruffed grouse habitat is on private land. If effective management doesn't occur, the Habitat DFC can't be achieved. Demographic and land ownership trends are making this a more significant issue.
	At local scales, market forces, pest/disease outbreaks, and severe storm events create or maintain habitat on private lands, but without strategic placement. At broad spatial scales, we continue to lose habitat to forest succession, parcelization, and shifting attitude of family forest owners.
	Current lack of forest management for grouse on private lands impedes awareness, understanding, and support by private landowners (i.e., lack of positive "role models" for private forest owners).
	Need to be cognizant that both no management and counter-productive management for grouse occurs on private lands

DFC: Viable Populations	
Current Conditions	**Effects on DFCs**
Reduced population size and range contraction may be producing an unsustainable eastern population	We can neither ensure viable, stable populations nor increase distribution and abundance under the current level of effort
	Accurate ruffed grouse status (numbers, distribution, population trajectory) is unknown in most states
Hunters may not have the opportunity to enjoy the ruffed grouse resource that they expect	Hunter expectations often do not match current grouse population conditions; hunters may become unwilling, unable, or unmotivated to advocate or help with ruffed grouse management as grouse #s decline. This is concerning because there already is limited demand for agency action in some jurisdictions so with a declining public constituency, grouse may not receive needed management attention to address declines.
	Declining grouse populations may further hasten declines in hunter numbers. Hunters are strong advocates for grouse restoration so declining participation and continuing loss of this advocacy or mis-directed advocacy is a concern.
Uncertainty exists about the impact of hunting and other regulatory actions on the East's declining, isolated, and fragmented populations.	State agencies may respond to declines in multiple ways because the impacts of changes to hunting regulations and other regulatory changes is unclear. Hunters and others may lose trust in agency decision-making due to uncertainty around the impact of regulatory decisions.
	States may place lower priority on grouse if and when they're listed as a species of conservation concern or the hunting season is closed.
Grouse management tends to occur opportunistically rather than strategically	Grouse cannot be efficiently and economically restored at landscape scale unless all partners are strategic about planning and implementation
	Impact of effort to sustain grouse can be maximized if we strategically plan efforts on the landscape

Consistent population monitoring (protocols and metrics) is not being implemented region wide.	The magnitude of changes in grouse populations across the range is uncertain, as is the extent of the decline.
	Cannot accurately compare population trajectories and associated conditions between states or evaluate the impact of management interventions.
DFC: Essential Conservation Capacity	
Current Conditions	**Effects on DFCs**
Lack of multi-state coordination to increase capacity and stakeholder perception of consistency (i.e. credibility of management programs)	Inefficiencies of use with agency resources
	Inability to operate on a landscape scale
	Potential for stakeholder confusion
	Decreases effectiveness and political capital
	Difficulty in information sharing
Insufficient funding to meet DFC	Can't get work done at a scale sufficient to make a landscape-level difference; low quality timber markets needed
Insufficient staff (human resources—number and expertise of staff working on grouse management) to meet public trust obligations	Not enough staff assigned to ruffed grouse management to effectively address the decline in grouse numbers and distribution
	Individual states may lack necessary expertise
Engaged partners exist in (some) individual states	Helps natural resource managers have capacity for some activities
	Creating active, effective partnerships may be hard to achieve for states where they don't currently exist. States with successful partnerships can serve as models as collaboration spreads through the region.
	Partners may not engage because consistent messaging to promote the shared benefits of sustainable forests (e.g., multiple age classes) may be lacking.
	Positive and negative effects—sometimes partners are a great asset and sometimes they are a hindrance because agendas are conflicting. Effective partners would have mutually agreeable goals and commit to mutually acceptable actions.
Insufficient political and material support (funding, training, equipment, etc.) in agencies for ruffed grouse management	Lack information for planning and implementation
	Less than full commitment to grouse management activities has poor results
Many/most stakeholders in some states do not understand the management system (unaware of biological, ecological, social, political, and fiscal processes and constraints), leading to unrealistic expectations of what an agency can do and what grouse population and distribution is possible under various conditions	Stakeholders don't know what agency limitations are or how they can contribute to help agency or other conservation efforts
	Stakeholder-perceived "success" in ruffed grouse management is unachievable if stakeholder expectations are unrealistic
	Perceived lack of responsiveness by ruffed grouse managers leads to lack of trust

Ruffed grouse are not a priority in some agencies; in some agencies ruffed grouse are a priority, but resource commitments have been inadequate to have significant population effects	Agencies not sufficiently committed to remedying the grouse population problem
	This affects allocation of resources for ruffed grouse management
	Lack of resources (staff numbers, expertise and funding) for ruffed grouse management
No single state has the resources or ability to restore ruffed grouse at the scale needed to secure the eastern population	Even where ruffed grouse are a priority and resources are committed, many local restoration efforts will be unsuccessful due to grouse population dynamics.
	Lack of success may lead to stakeholder frustration, diminished stakeholder support or demand for grouse management, resulting in waning agency commitments to grouse management
	Realization of individual agency limitations should strengthen support for regional coordination
Ruffed grouse restoration is an urgent need because populations are declining rapidly	Ruffed grouse are taken more seriously in some states now as the bird has become a species of conservation concern in some jurisdictions
	Further delay in curbing the grouse decline exacerbates problems, increases challenges to conservation, and renders young forest management efforts less effective

DFC: Effective Communication and Engagement	
Current Conditions	**Effects on DFCs**
Natural resource managers don't understand or are unaware of the importance of ruffed grouse to many stakeholders	Untapped resources (and the things they can bring to the table) are not put to good use if stakeholders don't know they are stakeholders
	Agency actions aren't aligned with stakeholders' goals
Stakeholders lack understanding of the ruffed grouse management system (unaware of landscape ecology, bird biology, socio-cultural, economic and political factors), leading to unrealistic expectations regarding what their state wildlife agency can do, and what population levels and distribution can be	Agencies may misdirect efforts in attempts to be responsive to unrealistic stakeholder requests
	Hard to be successful if desires are unrealistic
	Curtails people's understanding of how they can contribute to ruffed grouse conservation (e.g., improving habitat)
	Perceived lack of responsiveness by ruffed grouse managers because of infeasibility of meeting stakeholder expectations leads to lack of trust
Perception of condition of ruffed grouse populations and understanding the needs and requirements of ruffed grouse is variable across the region	Negative public perception diminishes support for ruffed grouse
	Positive public perception yields public support for ruffed grouse
Agencies don't fully understand stakeholders' values, beliefs, attitudes and preferences regarding ruffed grouse and ruffed grouse management	Can't target informative communication (messaging) with stakeholders to best effect (i.e. messages might not even reach stakeholders)
	Can't make informed decisions with respect to providing benefits to stakeholders or meeting their felt needs

Dissatisfaction of current efforts felt by agency staff, stakeholders generally, and hunters specifically leads to mistrust (in some states, variable across the region)	Stakeholders do not believe outreach/messaging or progress reporting
	Stakeholders might work against the agency
	Variability of state-level support of stakeholder groups affects ability to implement actions

Charting the Course: Fundamental Objectives Necessary for Achieving Desired Future Conditions

To overcome limitations of the current conditions and make the most of the opportunities they offer, Fundamental Objectives were identified. Each Fundamental Objective is associated with one or more Desired Future Conditions. These Fundamental Objectives represent ruffed grouse managers' collective thinking about what needs to be in place if regional ruffed grouse management is going to progress and advance from the current conditions limiting grouse populations. These are intended to serve as foundational thinking needed to initiate the more publicly- transparent and partner-inclusive strategic planning effort that will follow.

Desired Future Condition: Sufficient Habitat and Forest Ecosystem Diversity

Fundamental Objectives

Strategic Habitat Management

1. Natural resource managers work strategically with public and private partners to create and maintain young forest habitat at the optimal scale and configuration to enhance and maintain populations of ruffed grouse and other young forest-dependent wildlife species.

2. Natural resource agencies manage habitat in a collaborative and strategic manner, with flexibility for state-specific needs.

3. Ruffed grouse managers (e.g., EGWG) communicate with each other across state lines to determine criteria and discuss considerations necessary to identify ruffed grouse priority areas and actions.

4. Ruffed grouse managers and partners work in a coordinated effort to maintain connectivity of high-quality habitat at meaningful scales and supports genetic diversity of grouse sub-species, populations, and sub-populations.

Leveraging Internal and External Partnerships

5. Ruffed grouse managers communicate with multiple partners to develop strategies for management of ruffed grouse habitat at optimal scale and configuration.

6. Ruffed grouse managers identify management practices for young-forest species that also benefit ruffed grouse and communicate these practices to internal and external partners.

7. Ruffed grouse managers actively engage the forest industry on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and practices in the forest industry, etc. to create extensive high-quality habitat).

8. Ruffed grouse managers actively engage private landowners on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and forest management practices, etc. to create extensive high-quality habitat).

9. Ruffed grouse managers will actively engage public landowners on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and forest management practices, etc. to create extensive high-quality habitat).

Desired Future Condition: Viable Populations

Fundamental Objectives
Population Management and Monitoring

1. Ruffed populations are stabilized, and populations have increased where feasible.

2. Standard methods are used region-wide for monitoring ruffed grouse populations.

Sustainable Use

3. Stakeholders have opportunity to use the ruffed grouse resource within the constraints of resource sustainability.

4. Stakeholders are better informed about the issue of ruffed grouse as a declining species and the factors contributing to decline.

5. The impact of hunting is assessed on a regular basis through multi-state collaborative research and is used to inform state-level hunting regulations and harvest management.

Desired Future Condition: Essential Conservation Capacity

Fundamental Objectives
Agency Political and Material Support (intrastate)

1. Agencies recognize ruffed grouse are a representative species within a larger suite of species of conservation concern and that ruffed grouse management is an urgent priority that is consistent with other programs focused on species of conservation concern.

2. Agencies commit adequate resources at multiple organizational levels to support population

3. Stabilization and recovery of ruffed grouse and young forest obligates at landscape scale.

Leveraging Regional Resources (interstate)

4. A coordinated regional ruffed grouse conservation effort is established with resources, capacity, and opportunities for restoring ruffed grouse and young forest habitats.
5. Coordinated multi-state agency relationships are in place to: (1) leverage funding; (2) share knowledge and expertise among agency staff; and coordinate research, monitoring, communication/messaging and management.

6. Regional coordinated efforts are in place that engage key partners and generate high interest among them for ruffed grouse management (magnifying the efficiency/effectiveness and multi-partner expertise on both sides).

7. Regional coordinated efforts are in place that engage key stakeholders and generate high interest among them for ruffed grouse management to provide political and material support.

8. Ruffed grouse managers coordinate work to develop goals that support individual state ruffed grouse management planning and implementation to maintain viable ruffed grouse populations.

Desired Future Condition: Effective Communication and Engagement

Fundamental Objectives
Understanding Public Attitudes and Values

1. Natural resource managers and their partners understand public attitudes towards ruffed grouse and young forest management across the region and use this insight to inform planning and communication about forest ecosystem diversity.

Effective Communication and Messaging

2. Natural resource managers efficiently identify audiences and tailor messages based on a solid understanding of the audiences (needs, interest, concerns, communication channel preferences, etc.).

3. Natural resource managers and partners work collaboratively to effectively communicate the impacts of declining forest ecosystem diversity on multiple species and to improve public acceptance of sustainable forest management.

4. Ruffed grouse managers routinely evaluate the public's satisfaction and concerns with grouse management.

Fostering Knowledgeable and Engaged Stakeholders

5. The full suite of stakeholders for sustainable forest management are identified and ways they can contribute are understood.

6. Ruffed grouse managers and their partners effectively communicate to stakeholders what roles they play (including understanding of realistic constraints) in ruffed grouse management (i.e., stakeholders know they are stakeholders, how they can contribute to grouse conservation, and why their contributions are important).

7. Ruffed grouse managers and their partners help stakeholders engage in forest ecosystem conservation (they know how to be active in forest management, how to provide input into decision making, how to provide financial or political support).

Next Steps - Developing a Strategic Plan for Regional Grouse Conservation

Although this document is not a Regional Strategic Plan for restoring ruffed grouse, it is the foundation on which such a plan can be built. By identifying broadly agreed upon Desired Future Conditions for ruffed grouse, carefully analyzing important Current Conditions affecting ruffed grouse and grouse management across the region, and describing Fundamental Objectives for effort needed to bridge the gap between current and future conditions, the EGWG has created a robust base for a Strategic Plan that can provide guidance that serves all partners and all states across multiple levels of implementation.

The Eastern Grouse Working Group intends to build upon our effort to date by initiating a regional strategic planning process in 2021. Participation by government and non-government partners involved in the ruffed grouse management system will be requested. The working group will solicit partner input on DFCs and FOs, then all partners will work together to identify prioritized strategies and actions. A diversity of partners will be encouraged to participate, so a variety of approaches in implementation plans and prioritization can be considered when developing the region-level plan.

The management of ruffed grouse and the restoration of forest ecosystem diversity throughout the eastern U.S. is tremendously challenging. But for the first time, these states are speaking with one voice about what is needed to support ruffed grouse, to safeguard other young forest species, and to create a healthy, resilient forest across this complex social-ecological system.

References

Dessecker, D.R., G.W. Norman, and S.J. Williamson. 2006. Ruffed Grouse conservation plan. Association of Fish and Wildlife Agencies. Resident Game Bird Working Group.

Greenberg, C.H., B.S. Collins, and F.R. Thompson III, editors. 2011. Sustaining Young Forest Communities: Ecology and Management of Early Successional Habitats in the Central Hardwood Region, USA. Managing Forest Ecosystems. Volume 21. Springer, 310 pp.

Appendix B1. Using the Managers' Model to Assess the Future for Ruffed Grouse Conservation in Eastern U.S.

What is a Managers' Model?

A Manager's Model (MM) is a structured situational-analysis tool for describing a management system (e.g., bear management, public lands management). Creating a MM contributes to participating wildlife professionals' development of a common understanding of the elements and drivers of a management system. Once created, a MM is an aid in systematically explaining the management system managers are working in and provides a vehicle for eliciting additional input that can further improve understanding the potential management opportunities and challenges within the system. This knowledge, in turn, can be used to develop objectives and associated actions designed to achieve fundamental objectives leading to desired future conditions. The process also explicitly identifies stakeholders, situations in which stakeholder concerns can affect the issue, and gaps in biological, ecological and social science information.

The primary objective of a MM is to improve understanding and communication among members of a management team. Important secondary objectives are to facilitate communication about the management system internally within an agency and, later, external communication with partners and stakeholders. Ultimately, a MM can inform management decisions (Fig. A-1).

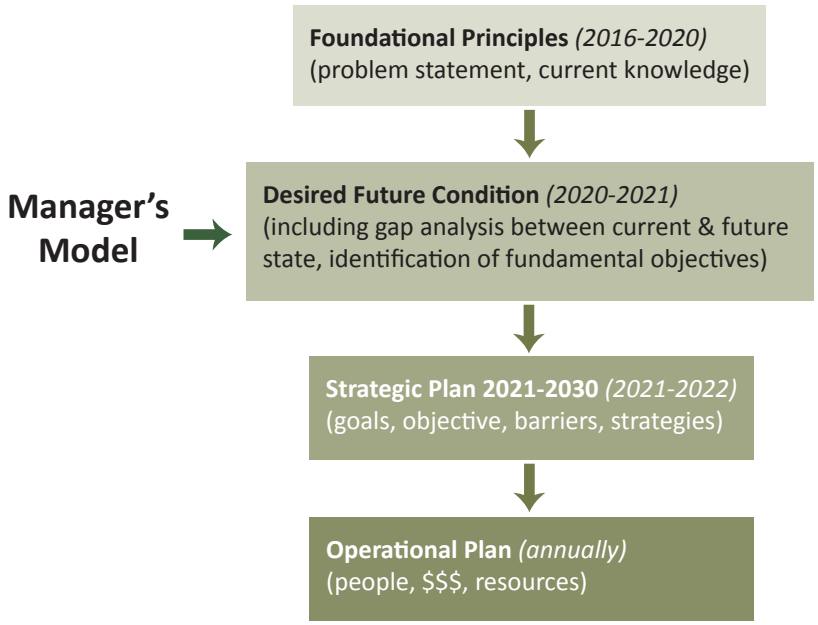

Figure A-1. The Managers' Model used to develop Desired Future Conditions (DFCs), explore Current Conditions and their effects on the DFCs, and to develop Fundamental Objectives.

A MM focuses on managers pulling together their own collective thinking before broadening the envelope of review and input. Stakeholders should play a vital role in later stages of MM review and refinement, likely in a subsequent formal planning process. Formal partners (e.g., state and federal agencies or NGOs) may be invited to participate in developing a MM, depending on the situation. It may suffice to have them involved only in the public planning effort.

The primary value of the MM comes from the group discussion, where learning and building a common understanding of an issue or management system occurs. This then supports consistent, effective communication at several levels. In fact, a product of a MM called a concept/relational map can be used as a communication aid to help describe a management system to others.

The Managers' Model process includes a management team's effort to:

- describe management purpose, premise, and context;
- articulate Desired Future Conditions, current conditions, factors influencing these conditions, and interests and concerns to be addressed via fundamental and enabling objectives (Fig. A-2);
- characterize stakeholders and the impacts of management they experience or seek;
- describe key assumptions, current knowledge/understanding and knowledge gaps; and
- identify a potential suite of management objectives (means objectives), actions and their intended and unintended consequences (collateral and subsequent impacts) (Fig. A-2).

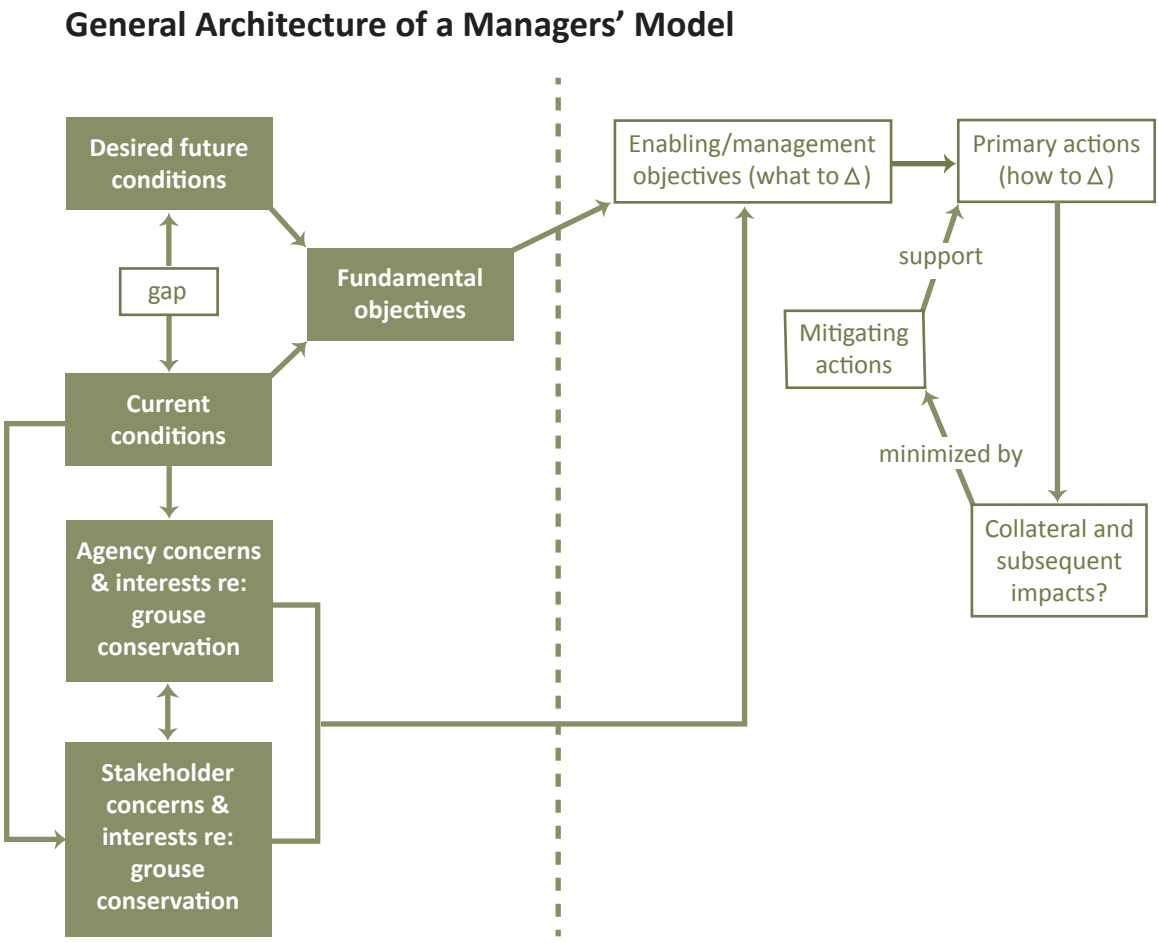

Figure A-2. Key components of a Managers' Model. During the January 2021 workshop, the Core Planning Team went through the steps to the left of the dashed line.

The MM approach was developed by Dr. Daniel Decker and his colleagues at Cornell University for the Florida Fish and Wildlife Conservation Commission (FWC). This tool has been applied to an array of issues including: black bear management, freshwater turtle management, non-regulated marine species, FWC's wildlife management area system, nongame management system, coyote management, FWC facilities management, NYSDEC Bureau of Wildlife pre-strategic planning, Tennessee Wildlife Resources Agency deer management and many other topics and issues.

The EGWG recently engaged in development of a Managers' Model for ruffed grouse in the eastern U.S. This work was done as a prequel to strategic planning that the EGWG anticipates doing in 2021 (Fig. A-1). The EGWG focused on the higher level elements of the Managers' Model: Desired Future Conditions (DFCs), Current Conditions (CCs) (including identification of barriers, constraints, limitations, opportunities and stakeholders), gap analysis, and articulation of Fundamental Objectives (FOs) associated with various Desired Future Conditions (basically those components of the Managers' Model to the left of the vertical dashed line in Fig. A-2). These are the elements reported in the body of the report. Taken together, the effort of EGWG is in essence professional work aimed at explicitly articulating the team's collective understanding of the social-ecological system in which ruffed grouse management occurs (Fig. A-3). It is the team's perspective about what is possible to achieve in grouse management regionally and what major conditions need to be in place to do so. The managers' model produced is not a strategic plan per se, but pre-work that can inform development of such a plan.

Process to Develop Desire Future Conditions and Fundamental Objectives for Ruffed Grouse Conservation in the eastern U.S.

A subset of the EGWG (referred to as the Core Planning Team) convened for a virtual workshop over several days in late January 2021 to engage in an analytical process with the aim of developing draft desired future conditions and fundamental objectives for ruffed grouse in the eastern U.S. About midway through the 6-day workshop, the preliminary work of the Core Planning Team on DFCs and current conditions was shared with the entire EGWG. Feedback from the EGWG was solicited via a Qualtrics input form. The feedback received from 13 state representatives was used by the Core Planning Team to refine their work and inform their subsequent task of describing draft Fundamental Objectives.

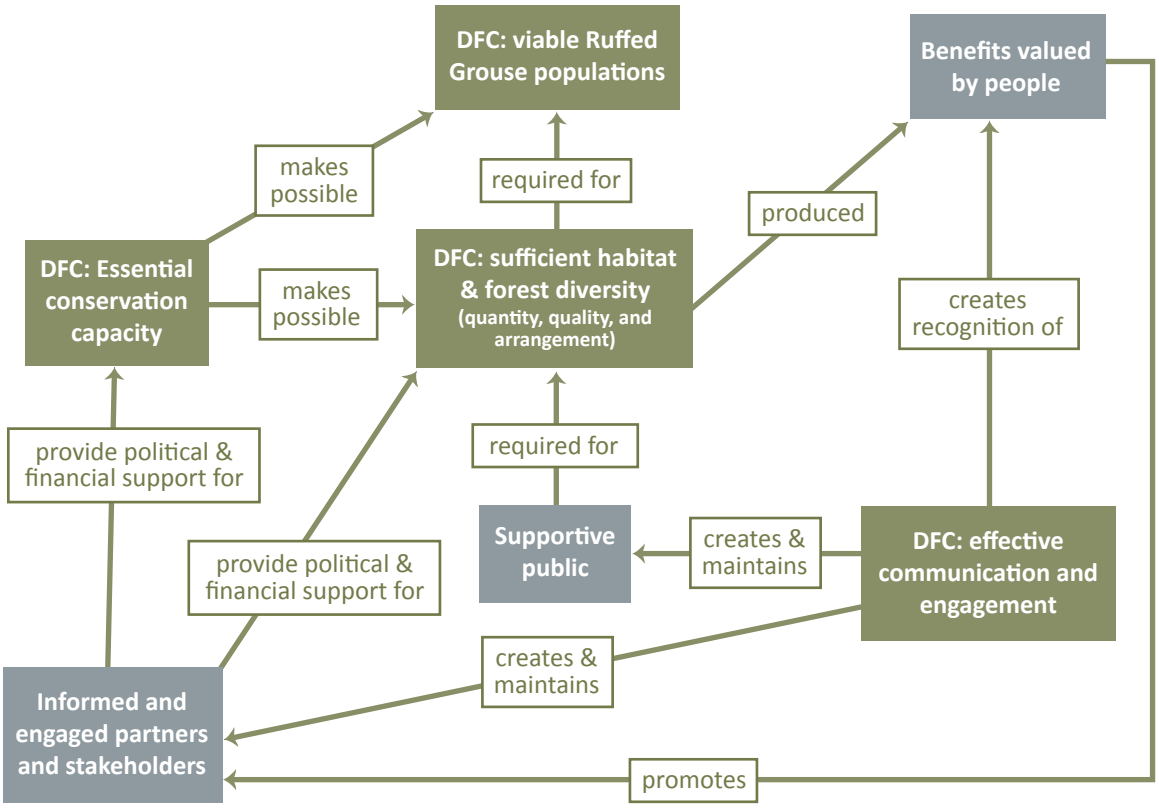

Figure A-3. Management system for ruffed grouse in the eastern U.S. The four major "themes" of the Desired Future Conditions are displayed in brown.

Appendix B2. Desired Future Conditions and Fundamental Objectives

	Desired Future Conditions	Fundamental Objectives
Sufficient Habitat & Forest Ecosystem Diversity	A mosaic of forest age classes is created and maintained at optimal scale and configuration to enhance and maintain populations of ruffed grouse and other young forest-dependent wildlife.	Habitat is created strategically at the quality and quantity necessary for sustainable ruffed grouse populations.
		State agencies respond to habitat implementation in a collaborative and strategic manner, with flexibility for state-specific needs.
		Ruffed grouse managers (e.g., EGWG) communicate with each other across state lines to determine criteria and discuss considerations necessary to identify ruffed grouse priority areas and actions.
		Ruffed grouse managers and partners work in a coordinated, multi-state effort that facilitates maintaining connectivity of similar habitat types and genetic diversity of ruffed grouse.
		Ruffed grouse managers communicate with multiple partners to develop strategies for management of ruffed grouse habitat at optimal scale and configuration.
		Ruffed grouse managers identify management practices for young-forest species that also benefit ruffed grouse and communicate these practices to internal and external partners.
		Ruffed grouse managers actively engage the forest industry on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and practices in the forest industry, etc. to create extensive high-quality habitat).
		Ruffed grouse managers actively engage private landowners on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and forest management practices, etc. to create extensive high-quality habitat).
		Ruffed grouse managers will actively engage public landowners on matters of science and planning regarding young forest management (advocating young forest management, bridging gaps between science and forest management practices, etc. to create extensive high-quality habitat).

Viable Populations	Ruffed grouse populations are maintained or growing in abundance and distribution where feasible. Agencies and partners have accurate, standardized, and widely used metrics of management success. The public has the opportunity to use and enjoy the ruffed grouse resource while having realistic expectations of use and willingness to limit recreational pursuits, if necessary, to protect the grouse population in an area.	Ruffed populations are stabilized, and populations have increased where feasible.
		Standard methods are used region-wide for monitoring ruffed grouse populations.
		Stakeholders have opportunity to use the ruffed grouse resource within the constraints of resource sustainability.
		Stakeholders are better informed about the issue of ruffed grouse as a declining species and the factors contributing to decline.
		The impact of hunting is assessed on a regular basis through multi-state collaborative research and is used to inform state-level hunting regulations and harvest management.
Essential Conservation Capacity	Natural resource agencies understand that ruffed grouse are a species of conservation concern, are committed to remedying that problem, recognize that young forest management is compatible with other agency priorities, and commit resources needed to incorporate ruffed grouse management into management activities of the agency wherever and whenever possible. Natural resource managers whose work affects ruffed grouse coordinate their activities in a regional, multi-state manner to efficiently and effectively maintain viable grouse populations by having: (1) sufficient funding; (2) other essential institutional support; (3) engaged partners; and (4) knowledgeable, supportive stakeholders.	Agencies recognize ruffed grouse as a species of conservation concern and ruffed grouse management as an urgent priority that is consistent with other programs focused on species of conservation concern.
		Agencies commit adequate resources at multiple organizational levels to support population recovery of ruffed grouse and young forest species at landscape scale.
		A coordinated regional ruffed grouse conservation effort is established with resources, capacity, and opportunities for restoring ruffed grouse and young forest habitats.
		Coordinated multi-state agency relationships are in place to: (1) leverage funding; (2) share knowledge and expertise among agency staff; and coordinate research, monitoring, communication/messaging and management.
		Regional coordinated efforts are in place that engage key partners and generate high interest among them for ruffed grouse management (magnifying the efficiency/effectiveness and multi-partner expertise on both sides).
		Regional coordinated efforts are in place that engage key stakeholders and generate high interest among them for ruffed grouse management to provide political and material support.
		Ruffed grouse managers coordinate work to develop goals that support individual state ruffed grouse management planning and implementation to maintain viable ruffed grouse populations.

Effective Communication and Engagement	Natural resource managers recognize the importance of and seek to understand public attitudes about habitat management for grouse and transparently address stakeholder concerns in management planning and implementation. Natural resource agencies work collaboratively with partners to understand public attitudes regarding grouse and grouse conservation and use this information to effectively communicate the importance of ruffed grouse and young forest habitats in sustainably managed forest ecosystems. Informative communication about grouse and grouse conservation is tailored to specific audiences in ways that maximize its effectiveness for raising people's appreciation of grouse and understanding of grouse management. The full suite of stakeholders in ruffed grouse conservation are knowledgeable and have the opportunity and means to become engaged in some aspect of grouse management. Stakeholders understand: (1) the factors that influence grouse populations, (2) their role in the grouse management system, and (3) how they can contribute to grouse conservation while achieving other goals they may have (e.g., sustainable forest management, biodiversity preservation, diverse recreational uses of public and private lands). The public is satisfied with agency and partner efforts to maintain viable grouse populations and with their opportunity to enjoy this resource.	Ruffed grouse managers and their partners understand public attitudes towards ruffed grouse and ruffed grouse management across the region and use this insight to inform planning and communication. Ruffed grouse managers efficiently identify audiences and tailor messages based on a solid understanding of the audiences (needs, interest, concerns, communication channel preferences, etc.). Ruffed grouse managers and their partners work collaboratively to effectively communicate grouse conservation and improve public acceptance of management. Ruffed grouse managers routinely evaluate the public's satisfaction and concerns with ruffed grouse management. The full suite of stakeholders for ruffed grouse management are identified and ways they can contribute are understood. Ruffed grouse managers and their partners effectively communicate to stakeholders what roles they play (including understanding of realistic constraints) in ruffed grouse management (i.e., stakeholders know they are stakeholders, how they can contribute to grouse conservation, and why their contributions are important). Ruffed grouse managers and their partners help stakeholders engage in ruffed grouse conservation while meeting their management goals (they know how to be active in grouse management, how to provide input into decision making, how to provide financial or political support).