MANAGEMENT PLAN
FOR
RUFFED GROUSE
IN PENNSYLVANIA
2011-2020

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Prepared by

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June 3, 2011

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EXECUTIVE SUMMARY

The ruffed grouse (*Bonasa umbellus*) is North America's most widely distributed resident game bird. It is the most popular small game bird in Pennsylvania (PA), as well as our official state bird. Each year, slightly more than 100,000 hunters harvest anywhere from 75,000-100,000 ruffed grouse, and grouse hunting results in the direct spending of approximately $79 million. Grouse are of significant social and economic value as a game bird in PA.

Ruffed grouse populations have declined since 1980. Numbers of hunters and their harvests also have fallen. Although grouse can be present in most forested areas, they are abundant only where young forest habitats (5-15 years old) are common. In PA, seedling/sapling stage forest cover, hereafter referred to as "young forests" (stands up to 20 years old) or "early-successional habitat", has gone from approximately 19.6% of total forest acres in 1980 to around 11.6% today.

The 2008 Ruffed Grouse Conservation Plan, a North American plan developed by the Association of Fish and Wildlife Agencies' Resident Game Bird Working Group, provides a comparison of ruffed grouse habitat conditions and populations between 1980 and 2005, across the continent's grouse range. This PA plan supports the North American plan, using the processes in that plan adapted for PA.

Forest inventory data were used to ascertain ruffed grouse population deficits between 1980 and 2007. Pennsylvania has lost over 29,000 breeding male grouse in that time. Because grouse population densities are strongly dependent on the proportion of young forests on the landscape, this plan documents the overall annual acreage treatments required to restore grouse populations to near 1980 levels by 2025 – the objective of the national Ruffed Grouse Conservation Plan. Within the time horizon of the PA plan, the population objective is to increase grouse numbers to 215,000 males by 2020. A more rigorous evaluation of state-level harvest management is also recommended.

To support the desired population increase, the PA plan includes a habitat objective of having approximately 2,750,000 acres (1,100,000 ha) of early-successional habitat by spring of 2020. To achieve this objective, this plan calls for increasing the proportion of PA's young forest age classes from 11.6% to 17.3%. To provide maximum benefits to grouse, stepping down this landscape-level increase in young forest to the local level will require testing the efficacy of new management strategies tailored to Pennsylvania's unique mix of forest types, and actively pursuing proven techniques identified in the national Ruffed Grouse Conservation Plan:

- Use of even-aged forest management
- Targeted and intensive aspen management
- Clumping residual trees if trees are to be retained in clearcut patches
- Retaining basal area <10-15 ft^2/acre in shade intolerant forest types
- Retaining basal area $\leq$ 25 ft^2/acre in shade-tolerant forest types
- Maintaining mosaics of interspersed young and mature stands in oak forests
- Promoting small-patch habitats (2.5-10 acres) where appropriate

Spatially-distributing habitat patches for close proximity of food and cover
Reducing canopy cover in moist sites to promote shrub / herbaceous understory
Retaining clumps of conifers or ericaceous shrubs for winter cover
Planting seedlings, particularly aspen, on surface mine reclamation sites

In addition to population and habitat objectives, the plan includes a human dimensions objective which involves conducting surveys and outreach to assess and increase the knowledge and satisfaction of hunters, habitat managers, and other stakeholders regarding the ruffed grouse resource and its management. The plan contains information on grouse biology, habitat needs, populations, and recreation, and can be used as a reference for other planning purposes (e.g., development or implementation of comprehensive state game lands plans, development of private lands plans, planning activities on other PA public lands). Achieving the ambitious objectives for ruffed grouse populations, habitats, and the human dimensions of grouse management will require coordinated planning, research, and management efforts among state and federal agencies, large-scale landowners, and other stakeholders such as non-governmental conservation organizations and sporting groups.

SECTION I. MANAGEMENT GOAL, OBJECTIVES, AND STRATEGIES

GOAL: *To increase grouse populations for hunting and viewing by improving the condition and distribution of young forest habitats in PA and supporting the implementation of the national Ruffed Grouse Conservation Plan.*

Three objectives are identified to accomplish this goal – a population objective, a habitat objective, and a human dimensions objective. Strategies and time frames for completion (see Appendix 1) are listed for each objective.

Population Objective: Increase grouse populations to 215,000 males by 2020.

Strategies –Knowing the effects of hunting on the population is necessary to identify the maximum level of hunting recreation that does not result in overharvest of the resource. The other major strategies necessary for increasing grouse populations are addressed under the Habitat Objective.

1.1 Estimate statewide grouse hunter numbers and harvests.
- 1.1.1 Annually conduct the Game-Take Survey.

1.2 Monitor trends in indices of grouse populations, both overall and in good habitat.
- 1.2.1 At 5-year intervals, review and analyze Christmas Bird Count trends.
- 1.2.2 Annually conduct the Grouse Cooperator Survey.
- 1.2.3 Annually conduct the PGC Summer Grouse Sighting Survey.
- 1.2.4 Review additional population monitoring tools used in other jurisdictions, and implement in PA if appropriate.
- 1.2.5 Identify, assess, and manage factors limiting grouse populations.

1.3 Conduct research to clarify the effects of harvest on grouse populations in relation to habitat quality.

1.4 Except for any experimental manipulations needed to meet research objectives, annually recommend a grouse season maintaining current length, timing, and statewide structure until research results are available.

1.5 If warranted based on research results, recommend adjustments to season length and / or bag limits at appropriate scale (statewide, grouped WMUs, or individual WMUs) to avoid additive mortality from harvest.

1.6 Monitor grouse population response to targeted habitat treatments in order to assess effectiveness of various management approaches.

1.7 Pursue a multi-species approach to plan implementation, integrating grouse management objectives with other high priority species efforts, as appropriate, to maximize benefits to multiple ESH-dependent wildlife.

Habitat Objective: Create 905,000 additional acres (366,000 ha) of young forest by 2020.

Strategies – Habitat management, specifically creating young forests, has been shown to increase populations of grouse and other species dependent upon young forest habitats. This objective includes promoting management of early-succession forests on both private and public lands.

2.1 Identify funding sources to support non-commercial forest management practices that benefit grouse.
- 2.1.1 Develop and/or continue partnerships for habitat funding .
- 2.1.2 Annually budget monies from the Game Fund for non-commercial forest habitat management.
- 2.1.3 Explore non-traditional funding sources (such as climate change funds and wetlands conservation funds, among others) to support management of early-successional habitats and their multiple species values.

2.2 Monitor statewide early-successional forest trends.
- 2.2.1 Annually review available forest inventory data (USFS, DCNR, PGC).

2.3 Implement targeted management of priority scrub-shrub habitats capable of supporting grouse.
- 2.3.1 Manage priority scrub oak thickets with fire and other appropriate treatments.
- 2.3.2 Provide technical assistance to public and private landowners managing priority scrub-shrub sites.
- 2.3.3 Identify sites for establishing high-quality shrubland habitat on newly-reclaimed areas.
- 2.3.4 Encourage the conversion of small grassland sites [<15 acres (<6 ha)] to shrublands.

2.4 Develop a strategic approach to monitoring response of multiple species to early-successional habitat management activities.

2.5 Incorporate grouse habitat management in public and private land management planning and implementation.
- 2.5.1 Identify the best remaining grouse forests where large-scale, early successional habitat can be created.
- 2.5.2 Identify priority riparian areas to receive targeted enhancement of riparian thicket habitats.

2.5.3 Identify the optimum size, shape, and arrangement of grouse management treatments (including prescribed burning) in mixed oak forests of the southcentral and southeast regions.

2.5.4 Explore methods for increasing grouse abundance in the southwest region where the combination of northern hardwoods and mixed mesophytic forests should be capable of providing high-quality grouse habitat.

2.6 Create 8,000 additional acres (3,000 ha) of young forest grouse habitat on State Game Lands annually [statewide 10-year target of 80,000 acres (30,000 ha)].

2.6.1 Disseminate habitat management information and provide outreach programs for PGC habitat management staff.

2.6.2. Collaborate with Bureau Wildlife Habitat Management staff and Regional staff to identify areas for targeted grouse management.

2.6.3. Collaborate with Bureau Wildlife Habitat Management staff and Regional staff to identify opportunities to incorporate grouse management into ongoing operations on Game Lands.

2.6.4. Implement grouse management objectives identified in Comprehensive Game Lands Plans.

2.6.5. Use prescribed fire on appropriate sites as a method to maintain early-successional habitat and improve forest habitat for grouse and other wildlife.

2.7 Foster the creation of 16,000 additional acres (7,000 ha) of young forest grouse habitat on other public lands annually [(statewide 10-year target of 160,000 acres (70,000 ha)].

2.7.1. Disseminate habitat management information and provide outreach programs to public land management partners.

2.7.2. Meet with biologists, foresters and/or policy staff of other public land management agencies to seek areas of collaboration and mutual interest.

2.8 Foster the creation of 66,000 additional acres (30,000 ha) of young forest grouse habitat on private lands annually [(statewide 10-year target of 660,000 acres (300,000 ha)].

2.8.1 Cooperate with existing programs to improve grouse habitat.

2.8.2 Develop and/or deliver technical assistance programs for private landowners as needed.

2.8.3 Disseminate habitat management information and provide outreach programs to partners working with private landowners.

2.9 Develop one or more new grouse management areas (to benefit multiple early-successional habitat species) per PGC region and in cooperating DCNR Forest Districts.

2.9.1 Work with interested PGC Habitat Management staff and DCNR District Foresters to identify the agency capacity needs for developing Grouse Management Areas.

2.9.2 Review SGL Comprehensive Plans to identify those Game Lands that specify grouse management as a priority.
2.9.3 Identify DCNR managers with an interest in establishing special early-successional habitat management areas.
2.9.4 Work with land managers to develop the landscape criteria used to select and delineate a grouse management area.
2.9.5 Collaborate with land managers as they identify appropriate harvest rotations and planning units within the Management Area(s) in order to arrive at realistic cutting schedules that will sustain grouse and other early-successional habitat species.
2.9.6 Use select sites as Demonstration Areas to distribute information on site-appropriate habitat management and to exemplify the PGC's commitment to grouse management.

2.10 Assess the effect of various forest management/regeneration techniques (appropriate for forest type and site) on grouse populations in order to guide the creation and maintenance of high-quality ESH.

Human Dimensions Objective: Assess and increase the knowledge and satisfaction of hunters, habitat managers, and other stakeholders regarding the ruffed grouse resource and its management.

Strategies – Widespread knowledge and support of the importance and techniques of active management will be required if the population and habitat objectives are to be achieved. Expanded outreach and partnership efforts will help meet this need. An increased understanding of the attitudes and preferences of hunters and other stakeholders will help guide management choices in cases where multiple biologically acceptable alternatives exist.

3.1. Conduct human dimension studies to determine grouse hunter preferences, knowledge, and satisfaction regarding population levels, hunting seasons and bag limits.
3.1.1. Every 5 years, starting in 2013, conduct surveys of PA license buyers to obtain detailed information on their activities and opinions relative to grouse hunting.
3.1.2. Modify Grouse and Woodcock Cooperator Survey to more fully assess participation and satisfaction.
3.1.3. Evaluate the feasibility of modifying the Game Take Survey to include questions assessing grouse hunting participation and satisfaction across a broad cross-section of PA hunters.
3.1.4. Subject to avoidance of adverse biological effects on the grouse resource, incorporate human dimensions results into season recommendations.

3.2 Identify barriers and opportunities in fostering public support and participation in management of young forest habitats – identify key messages and delivery mechanisms to foster public support and participation.

3.3 Develop effective communication strategies on the need for young forest management and distribute educational materials through various media.

3.4 Educate the public and policy makers about forest disturbance (active forest management) and the ecological value of young forests to grouse and other wildlife.

3.5 Continue to develop partnerships (e.g., Ruffed Grouse Society (RGS), DCNR-Bureaus of State Parks (BSP) and Forestry (BOF), USFWS, US Geological Survey-including PA Cooperative Fish and Wildlife Research Unit, regional initiatives, etc.) in order to accomplish research, funding and habitat strategies.

3.6 Distribute grouse management information through various media, field days and demonstration area tours, private landowner assistance programs, and other public contact opportunities.

3.7 Make use of Grouse Management Areas as demonstration areas for public and private land managers.

- 3.7.1. Every other year, conduct at least one workshop or field trip per Region for public land managers at a Grouse Management Area.
- 3.7.2. In cooperation with partners, conduct workshops on grouse habitat management for organizations representing interested land owners and managers.

3.8 Build partnerships with resource extraction and public utility operators for maintenance of high-quality early-successional habitat conditions along powerlines, pipelines, utility rights of way, natural gas well pads, and other corridors.

- 3.8.1 Develop and/or distribute BMPs tailored to these partners and encourage their implementation.

3.9 Annually evaluate progress of Plan implementation and provide ongoing communication with partners and stakeholders.

ACKNOWLEDGEMENTS

"To know the grouse is to love it
And loving it, to wish it well."

- Gardiner Bump, 1942.

We wish to express our sincere gratitude to the many biologists, land managers, and policy makers whose work – stretching back nearly 100 years – has contributed to our understanding of ruffed grouse ecology and management. From the Great Lakes to the Southern Appalachians, resource managers have applied their intellect and their passion to help uncover the mysteries of grouse management. We have relied upon their work, and that of our predecessors in the PA Game Commission, to develop this management guidance for ruffed grouse populations and the young forest habitats they require.

We are indebted to Lincoln "Abe" Lang, John Kriz, Bill Drake, Steve Liscinsky, and the many others within the PGC, the USGS Pennsylvania Cooperative Fish and Wildlife Research Unit, and the Penn State University School of Forest Resources who have worked for decades on behalf of Pennsylvania grouse management. We salute the many land managers who have maintained grouse management areas over the years in spite of financial and personnel shortages.

In the early development of this plan, important data and insights were provided by those listed above as well as colleagues in the Ruffed Grouse Society and the U.S. Forest Service. During internal review and revision we received constructive suggestions on content and editorial issues from a number of PGC reviewers including Bob Boyd, Bill Capouillez, Roger Coup, Cal DuBrock, John Dunn, Ben Jones, Dave Henry, Eric Miller, John Morgan, Carl Roe, Samara Trusso, and Justin Vreeland. We deeply appreciate input received from individuals and organizations during the public comment process. The depth of thought in these comments reflects the passion that Pennsylvanians have for the State Bird and for the recreational benefits that grouse provide.

We salute you, Bird of Thunder
For providing the incentive, and excuse
For hundreds of hours afield,
And permitting us to breathe deeply
Of the damp leaf scented fall air
Which rightfully belongs to you.
May every Spring
From now, until Eternity,
Throb with the drum roll of your wings.

- Roger M. Latham, Northwoods Journal

All data contained herein are subject to revision from corrections, improved analyses, and / or regrouping of data.

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SECTION II. BACKGROUND

Taxonomic Description

Twelve subspecies of ruffed grouse (*Bonasa umbellus*) form functional populations in North America (Johnsgard 1983). Pennsylvania has two of these: *B. u. umbellus*, the Eastern subspecies, is found in the eastern part of the state and *B. u. monticola*, the Appalachian ruffed grouse, is found throughout the rest of the state.

The grouse, being a galliform, is a chicken-like bird. The species name *umbellus* comes from the umbrella-like ruff of dark feathers on either side of the neck. The bird weighs about a pound and a half, is 15-20 inches long, and has a wingspan of about two feet. Its tail is from 4½ to 7½ inches long. Males, or cocks, weigh a little more than hens and have longer tails and more prominent ruffs. The plumage of both sexes is brown above, sprinkled with white and black, while the breast and undersides are white with horizontal dark brown bars. The tail has a subterminal dark band between two narrower grayish bands. When viewed closely, the patterns of grays, blacks, browns and buffs found in the grouse's plumage are quite intricate and a study in subtle coloring. The grouse has at least two color phases, gray and reddish-brown, with the latter more prevalent in PA. Grouse are monomorphic, meaning individual birds look alike and the plumages of the sexes are quite similar. However, by using a combination of tail measurements, and the appearance of rump feathers and primary wing feathers, one can usually determine if the birds are male or female, juvenile or adult (Larson and Taber 1980, Gullion 1984a). Gender can also be identified by internal examination of the sex organs when field dressing a harvested bird (Brenner 1989).

History and Distribution

The ruffed grouse is North America's most widely distributed non-migratory upland game bird (Bump et al. 1947). They are found coast to coast, throughout much of Canada and the northern United States (Figure 1). While found in a variety of forest types, their overall geographic range corresponds closely to that of *Populus* tree species, primarily aspens. Grouse populations do extend into the central and southern Appalachians where aspen is rare, but these populations never achieve the high densities and high reproductive success found in the core of their range.

Grouse were historically found throughout PA. Their disappearance was noted in the lower settlements of the state by 1752 and was attributed to forest land clearing along with increasing human populations in that area (Bartram 1791). The same trend followed in western counties as more land was brought under intensive cultivation. Subsequent timber harvesting and marginal farming throughout the mountains resulted in more edge and young forest stages of forest growth (i.e. improved grouse habitat), and grouse became more abundant in these areas. As cut-over forest land and reverting farmland grew back to trees, grouse expanded their range to essentially statewide again. Today, breeding grouse are found in all PA counties except Chester, Delaware and Philadelphia

(Cornell Lab of Ornithology 2009). The *potential* range of grouse in PA largely corresponds to our 16.8 million acres (6.7 million ha) of forest, although a proportion of this acreage consists of small, isolated forest fragments that are unlikely to support sustainable grouse populations. Because overall forest acreage in Pennsylvania has changed little in recent decades, with increases in some areas and decreases in others, potential grouse habitat is likewise relatively stable, with some small-scale losses due to intensive development and the corresponding fragmentation and/or elimination of forested land, particularly in southeastern PA. However, there have been some declines in *currently occupied* grouse habitat due primarily to increasing age of forestland in PA, which translates into decreased habitat suitability for grouse. These trends in current occupancy are discussed in more detail in the "Grouse Populations" section.

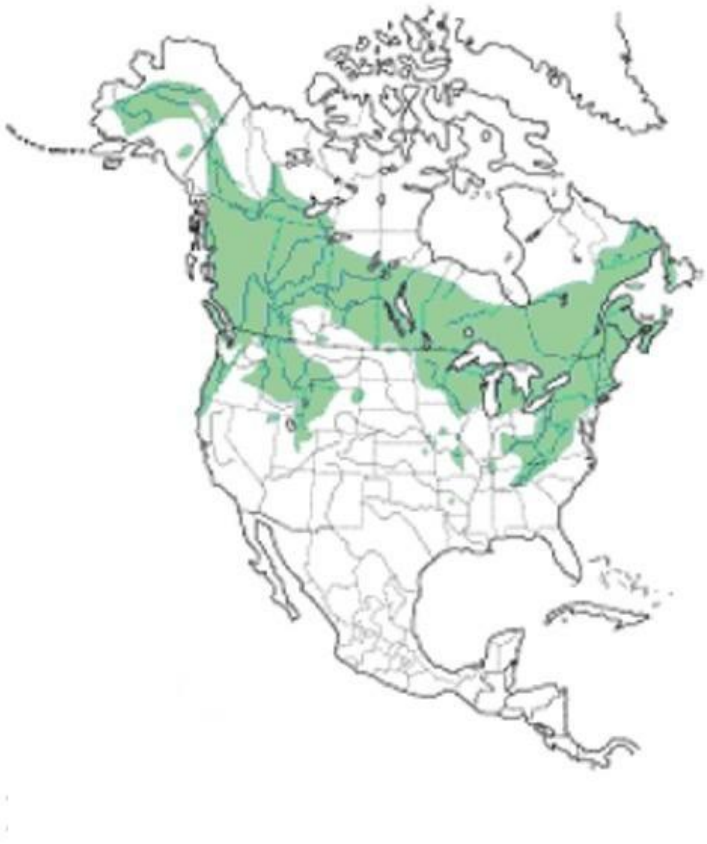


Figure 1. Range (in green) of ruffed grouse in North America (Association of Fish and Wildlife Agencies 2008).

Biology

Male ruffed grouse are territorial and defend an area from other males exclusively for their own breeding purposes (Johnsgard 1989). The species' mating system has been described as "dispersed lekking" (Bergerud and Gratson 1988). Males defend territory and attract females with a drumming display. The bird stands on a log, stone, or mound

of dirt and beats the air with his wings. The drumming sound he makes is caused by the sudden compression and release of air pressure as the wings are brought forward and upwards, stopping suddenly in front of the breast. Grouse have been known to drum every hour of the day and every day of the year, but drumming activity is most intense from early April through May. Each male guards his drumming territory throughout the nesting period, during which time he may fertilize several females. By mid-June the male's aggressiveness has diminished and drumming activity drops off, but he stays in the area of his display site. There is often a resurgence of drumming during the mid-autumn brood dispersal period when older males reclaim their territories, and young males establish theirs.

There are no known factors that delay the onset of breeding. Mating lasts only a few seconds and is the only real social contact between sexes. The female leaves the area in a short time, and the male does not participate in nesting, incubation, or brood rearing (Craven 1989, Johnsgard 1989).

Characteristics of good nesting cover have been described by Bump et al. (1947), Gullion (1977), Maxson (1978), Thompson et al. (1987), Larson et al. (2001), and Tirpak et al. (2008). Nesting hens choose relatively open habitats providing a view to detect approaching predators. Being well camouflaged they do not need thick cover for concealment. The nest site chosen by the female is commonly at the base of a solid object, such as a tree or stump, with trees >6 inches dbh in forested stands > 40 years old frequently used.

It takes about 17 days for a female to lay an average clutch of 11 eggs. Incubation starts when the last egg is laid, and takes about 24 days. In PA, the mean incubation start date is 28 April and the majority of hens will begin incubation within the period 21 April – 8 May. The eggs hatch synchronously, usually within a few hours of each other. Early in incubation a hen may leave her nest with little protest, but later on she becomes very protective of the nest. Losses from nest predation, and disturbances that force hens to abandon nests account for most nesting failures for ruffed grouse. Predation rates likely depend on the quality of the nesting habitat. Losses due to egg chilling, egg infertility, or nest desertion are minor factors.

Grouse chicks are precocial and leave the nest as soon as they are dry. The hen may move the chicks 1/4 mile per day by the time they are three or four days old (Johnsgard et al. 1989). Chicks begin flying at about day five and their survival rates increase dramatically at this point because they are able to roost in trees, rather than beneath the hen’s wings on the ground (Tirpak et al. 2005). The hen may lead her brood up to a few miles from the nest to a summer brood range during their first 10 days of life. During this period, the chicks’ diet is almost exclusively invertebrates. The chicks grow from about ½ ounce at hatching to a fully-grown 20 ounces at 16-17 weeks. Brood habitats typically consist of forested or shrub stands and associated openings that provide abundant herbaceous forb cover, open ground, and available insects. Completely open areas where dense herbaceous cover inhibits movement are not used by broods.

Brood breakup is not a sudden event. At about 12-15 weeks the young spend more time traveling independently of their mother and siblings. Travels are generally confined to the brood range. The second phase of brood breakup is dispersal from the brood area, generally occurring in late September. At this stage the broods become more independent and birds begin to break away to find their own home range. This dispersal is a gradual process over several weeks until the birds settle into their permanent home areas. Females tend to travel farther-two to three miles-than males, which go one to two miles. Males stop when they reach the first suitable habitat without other males. Females also travel farther at other times, when searching for mates and when they are raising broods. It is theorized that the shorter dispersal period for males results in less predation, compensating for the greater vulnerability of males during breeding season.

Home range size for grouse varies by sex, age, and season, but tends to be relatively small, varying from 15-130 acres (6-52 ha) in the Appalachians (Brander 1967, Maxson 1974, Scott 1995, Devers et al. 2007, Whitaker et al. 2007).

Male grouse tend to have smaller home ranges, especially during spring breeding (Craven 1989, Storm et al. 2003). Males probably select their home range for the protective cover and drumming habitat within it. Researchers agree that good drumming habitat includes high densities of woody stems for protection from avian predators, and sparse growth of very low shrubs to allow clear views of ground predators. The amount of drumming habitat may be minimal, such as a log and a 10-foot radius, or it may be as large as several acres. Generally, the core area of defended territory within the home range is 5-10 acres (2-4 ha) and the male grouse may spend his entire life within an area of 20-30 acres (8-12 ha) (Archibald 1975, McDonald 1993).

Female grouse have larger home ranges across all seasons. This is believed to be a result of females basing home range selection on food availability, combined with the greater nutritional demands of nesting and brood-rearing. In marginal habitats, such habitat selection occurs at the expense of protective cover; for example, female home ranges in oak-hickory forests increased during years of low mast abundance (ACGRP 2004).

Ruffed grouse have been called browsers because of the variety of plant foods they select (Bump et al. 1947, Barber et al.1989). Chicks need a great deal of animal protein for body and feather development early in life. For the first few weeks they feed heavily on insects and other small animals, gradually shifting to a diet of green plants and fruits as they become larger. Adult birds continue to eat some animal foods and have been known to consume salamanders, frogs, and small snakes. The specific foods that grouse eat vary with the plants found in a region, and there are large differences found between areas of the state (Lang 1989, Lang et al. 1992).

In the summer grouse consume insects, fruits like blackberries and blueberries, as well as green leaves and seeds. During summer, young birds eat relatively more animal matter compared to adults (Bump et al. 1947, Barber et al.1989). During autumn, when insects become scarce, fruits and seeds like acorns, beechnuts, cherries, grapes, hawthorns, and apples are eaten, along with various buds and leaves. In winter, if the ground is bare of

snow, grouse continue to feed on a wide variety of remaining hard mast, green leaves, and fruits. With snow cover, buds form the basis for the winter diet, along with catkins and available freeze-dried fruits such as grape, cherry, greenbrier, and rose (Lang 1989, Lang et al. 1992). Spring is also a transition time for foods and grouse eat items such as nuts and herbaceous greens as the snow melts, along with the new greens of the season.

Grouse are found throughout the forested landscape in PA, with the exception of some isolated forest fragments. However, they only reach higher (huntable) densities where early-successional forests are part of that landscape. High stem densities (> 5,000 stems per acre) of regenerating trees or tall shrubs provide the cover for drumming, broods, winter, and escape. These young forest habitats are particularly important as breeding and brood habitat (Gullion 1984b, Stoll et al. 1999, Storm et al. 2003). Within the home range of the bird, the best year-round cover is provided where thick, young forest cover is distributed throughout a contiguous forested area.

SECTION III. GROUSE POPULATIONS

Population Trends

Little quantitative data exists on grouse populations prior to World War II, but more extensive information is available from more recent decades as a result of the establishment of a variety of monitoring programs. These include volunteer-based all-bird surveys that record grouse along with many other species (Christmas Bird Count, Breeding Bird Atlases, Breeding Bird Survey), as well as grouse-specific efforts administered by the PGC (grouse hunter cooperator survey, summer grouse sighting survey). It should be noted that results of these surveys are actually indices of populations, rather than counts or estimates of the absolute number of grouse in a given area. However, when taken together these indices do offer substantial insight into the status of grouse populations, especially in terms of long-term trends.

Christmas Bird Count

The National Audubon Society's Christmas Bird Count (CBC) records numbers of all birds seen within 15-mile diameter count circles, each surveyed by volunteers during a single day in early winter. Because effort varies between volunteer groups, count circles, and years, the results are standardized to 'birds observed per party-hour' to allow comparisons. CBC data for ruffed grouse in Pennsylvania show some variability from year to year, but a general downward trend is evident since the 1980s (Figure 2). Numbers of grouse per party-hour from 2005-2009 are only about half those of numbers from 1980-1985.

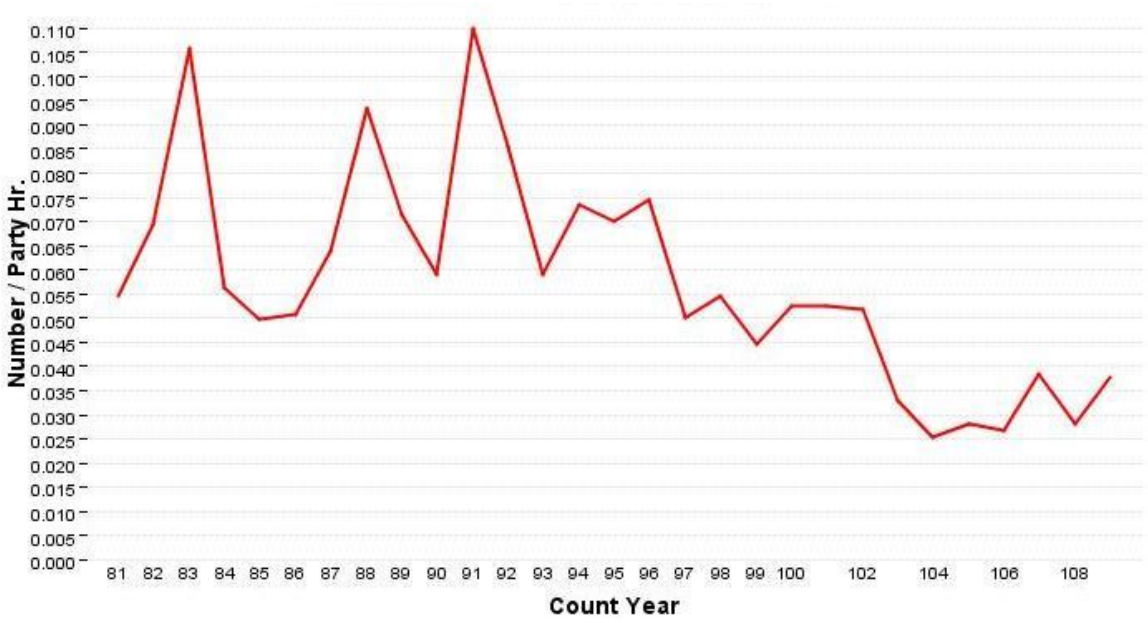


Figure 2. Number of ruffed grouse observed / party-hour on CBC in PA from 1980 (count year 81) to 2009 (count year 110), from National Audubon Society 2009.

Breeding Bird Atlas

Networks of professional and volunteer ornithologists have made two concerted Breeding Bird Atlas (BBA) efforts since 1980 to conduct grid surveys of the entire state. These Atlas efforts record breeding evidence for as many species as possible and provide information on distribution (and changes in distribution) of birds across the state. Techniques were applied to correct percent changes in occupied blocks between Atlases for differences in effort. Pennsylvania contains over 4,900 atlas "blocks" of about 9 square miles each. In the first PA BBA (1983-1989), ruffed grouse were recorded on 2,782 atlas blocks, including 1,416 blocks with "confirmed" evidence of breeding (Brauning 1992). By comparison, during the recently-completed second PA BBA (2004-2008), grouse were recorded on 1,869 total blocks (33% fewer by absolute difference and 30% fewer when corrected for effort) and "confirmed" in only 661 blocks (53% fewer by absolute difference) (Cornell Lab of Ornithology 2009). Comparing distributional data from the two BBAs (Figure 3) indicates little change in the potential range of grouse in PA (at a coarse scale, grouse are present in a nearly identical number of counties and Atlas regions), but the amount of occupied range has decreased (distribution of grouse at the finer scale of Atlas blocks is much more patchy now than it was in the 1980s). Declines were especially severe in areas with less overall forest cover (southeastern and western tier counties). Statistically, these changes represent a contraction and northward shift in the range of grouse in PA, but it is important to realize that across most of the state, potential range remains abundant and could be expected to be re-occupied given improved habitat quality (i.e. an increase in the proportion of forest in young age classes). The BBA provides abundance estimates for some species based on point count data; however, this methodology is not adequate for grouse and no estimates of total grouse populations can be derived from BBA data. Still, a reduction in the overall grouse population in PA over the past two decades can be inferred from the fact that they are no longer as widespread.

Grouse distribution and abundance in Pennsylvania appear to be governed by complex interactions among total forest cover, vegetative species composition, and proportion of forestland in young age classes. All of these factors must be considered for the management of grouse populations and habitat in different portions of the Commonwealth.

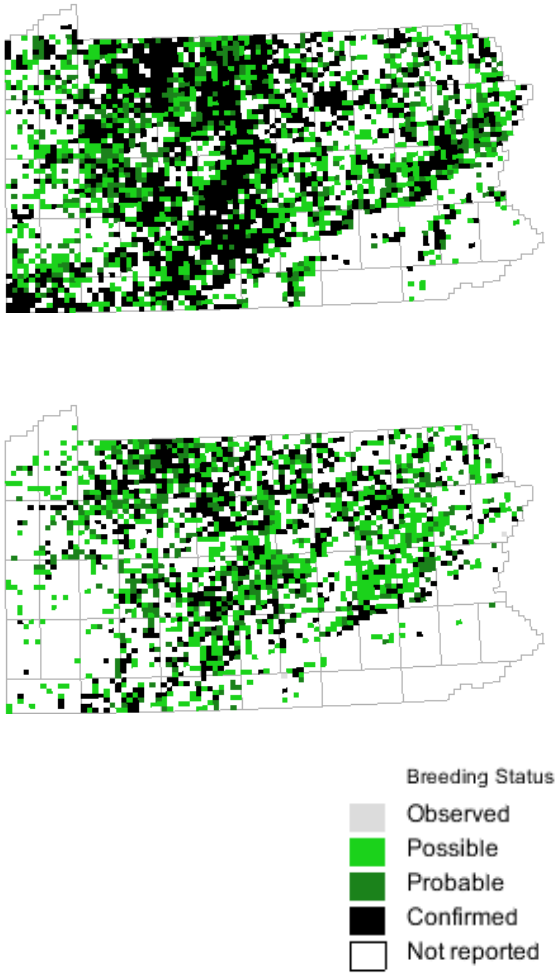


Figure 3. Ruffed grouse breeding status in PA BBA blocks, 1983-1989 and 2004-2008 (Brauning 1992 and Cornell Lab of Ornithology 2009).

Breeding Bird Survey

The North American Breeding Bird Survey (BBS) provides long-term data on population trends of many avian species. However, because the BBS is conducted primarily in June, well after the peak of ruffed grouse drumming activity, sample sizes from BBS routes are generally too small and unreliable to be useful for tracking grouse populations (Association of Fish and Wildlife Agencies 2008).

PGC Cooperator Survey

Since 1965, the PGC has conducted an annual survey of avid grouse hunters ("cooperators") that record county of hunt, hours hunted, grouse flushed and grouse harvested. Because grouse hunters generally frequent only good grouse habitat (i.e. young forest stands), flushing rates do not reflect total numbers of birds statewide, unlike CBC or BBA results which do provide statewide population indices. Populations in good habitat, as measured by the Cooperator Survey, have been relatively stable over the past

40 years (Palmer 2009). The longest downward trend ran from 1968 through 1976, when flushing rates dropped by 37%. While annual flushing rates vary, generally within a range of less than 20%, recent (2006-2009) population densities of hunted grouse are at or only slightly below the average for the past four decades on a statewide basis. However, flushing rates and trends vary dramatically among regions (Table 1).

Table 1. Flushing rate averages and trends by PGC regions.

Region	Long-term average flushes / hr.	2006-09 average flushes / hr.	Long-term trend in flushes / hr.
NW	1.58	1.84	Increasing
NC	1.40	1.69	Increasing
NE	1.16	1.16	Stable
SW	1.57	1.09	Decreasing
SC	1.34	1.08	Decreasing
SE	1.00	0.70	Decreasing

The northwest and northcentral regions have high flush rates that have increased over time and remained above long-term regional averages in recent years. The northeast region has maintained flush rates that are below the statewide average, but relatively stable in both the long- and short-term. The southwest region has a high long-term average flush rate, but this is due to very high rates in earlier decades, as rates have been decreasing over time, and below statewide and regional averages in recent years. Both the southcentral and southeast regions have exhibited decreasing flush rates over time, long-term averages below statewide figures, and recent rates below these regional averages. Within regions, county flushing rates are higher where more contiguous forest habitat is found (PGC, unpublished data).

Although the cooperator survey is not designed to track overall population trends, it is of value in providing an index to the relative quality of grouse hunting, "good" to "poor", as densities cycle above and below the long-term average. Moreover, by demonstrating that grouse populations have held their own over time where suitable habitat exists, the cooperator survey strongly suggests that the overall downward trend documented in other surveys is driven by changes in landscape-level habitat conditions, rather than by factors such as hunter harvest, predation, or disease. But while the ability of hunters to select suitable habitat can allow flush rates to be relatively unresponsive to minor changes in habitat availability, this situation cannot be sustained indefinitely. Ultimately, if habitat quality declines beyond a certain point, flush rates must eventually follow suit. The declining trends evident in southern Pennsylvania flush rates may be an example of this phenomenon.

PGC Grouse Summer Sighting Survey

Since 1981, the PGC has conducted a Grouse Summer Sighting Survey in which agency foresters and surveyors record numbers of broods and individual grouse they observe while working in wooded areas on State Game Lands during the months of June, July, and August. Data from this survey primarily is used to develop a preseason hunting

forecast. Although results exhibit substantial annual variability, they can predict with about 80% accuracy whether flush rates in the subsequent hunting season will be above or below average (PGC, unpublished data). This forecast information is communicated to hunters during pre-season mailings to Cooperators and press releases targeting the hunting public.

Population Dynamics

Grouse mortality varies with season, weather, food availability, and population factors, as well as across the species' extensive range (Small et al. 1991). Annual mortality rates generally have been estimated indirectly by changes in population estimates rather than by direct accounting of actual losses (Small 1989). Reported mortality rates vary widely (Rusch 1989). Some examples include: 25% in Wisconsin (Small et al. 1991); 34% in Wisconsin (Dorney and Kabat 1960); 42-50% in New York (Bump et al. 1947); and 38-46% in the Appalachian region (Devers et al. 2007). The specific magnitude, sources and timing of various individual mortality factors throughout the year are less well known. In addition to hunting losses, grouse are susceptible to diseases, parasites, accidents, and predation.

Predation (avian and mammalian) is the major mortality factor, accounting for 58% in Wisconsin (Small et al. 1991) to 84% in the southern Appalachians (Devers et al. 2007). Avian predation was 40 and 44% of total mortality in Wisconsin and the southern Appalachians, respectively. The leading cause of adult grouse mortality is avian predation (which may account for 70-80% of all predation), with peak predation rates occurring during spring and fall raptor migrations (ACGRP 2004). Although all classes of avian predators may prey upon grouse, owls (both great horned and barred) and Cooper's hawk sightings have the highest correlation with grouse predation rates (ACGRP 2004). Chick mortality is about equally split between predation and exposure (ACGRP 2004). Ruffed grouse in high-quality habitats can fulfill all or most of their seasonal needs in one locality and are thus less-susceptible to predation (ACGRP 2004).

The wide distribution of grouse within their habitat, and their primarily solitary nature, suggest that infectious diseases are not likely a major mortality source. However, these same characteristics make the actual extent of disease mortality difficult to document. Should any factors conspire to concentrate birds, mortality would be expected to increase with potential severe negative effects on populations. As an illustration, high rates of mortality observed in captive ruffed grouse at a Pennsylvania location in 2003 were confirmed to be caused by West Nile Virus (Animal Diagnostic Laboratory 2003).

Reproduction is determined by how many hens lay eggs, the number of eggs they lay, and the number of eggs that hatch. The average clutch size for grouse nests is 11 eggs, and approximately 70% of hens successfully nest. Although mortality is constantly occurring in both adult and juvenile segments of the population, annual reproduction results in fall numbers generally double those found in spring, with about 60% of the fall population comprised of juveniles (Bump et al. 1947, Rusch et al. 1984). No known relationship exists between percentage of young in fall populations and annual changes in

grouse numbers. In general, no strong evidence indicates changes in grouse numbers are related to differences in reproduction per adult (Rusch 1989).

A theoretically-stable grouse population can remain stable with up to 60% mortality. Whether hunting mortality is *compensatory* (i.e. does not reduce grouse populations in subsequent years because it is compensated for by reduced mortality from other sources, and / or increased productivity), *additive* (i.e. leads to reduced future populations by increasing total mortality above what can be compensated for by reduced mortality from other sources / increases in productivity), or some *combination* of the two (depending on magnitude and timing of harvest), has been extensively debated and studied, but not fully resolved (Palmer and Diefenbach 1993, Devers et al. 2007). Results of the Appalachian Cooperative Grouse Research Project (Devers et al. 2007) indicated hunting mortality is compensatory, at least up to a harvest rate of 30%. Those researchers suggested that hunting mortality could be additive at rates above 30%, depending on mortality rates from other causes. They also stated that further research is needed to determine when harvest mortality becomes additive. Implications of this issue for PA are discussed in more detail in the "Harvests and Population Management" section.

Habitat quality is a crucial influence on grouse populations. Habitat can affect mortality rates, reproductive rates, or both. The importance of habitat to grouse numbers is demonstrated by the response of grouse numbers to good food and cover conditions (Association of Fish and Wildlife Agencies 2008). Cade and Sousa (1985) summarized breeding male densities from a number of studies throughout the range; in northern regions, optimal aspen cover may support 20-40 drumming males per 100 ha, compared to 2-8 drummers per 100 ha in peripheral portions of the range (Georgia, Indiana, Iowa, Missouri, Ohio). In Wisconsin, one study area providing high-quality grouse habitat consistently supported densities twice as high as those on a second area with lower habitat quality. Even with the high-quality area itself, grouse abundance in the best habitat was 4-10 times that of poorer-quality habitat (Kubisiak et al. 1980). In oak-dominated forests, acorn availability is an important influence on populations; female fat levels, hatching success, and chick survival all increased in years following good production of mast (Devers et al. 2007).

Especially revealing in regard to the importance of habitat is research comparing grouse population responses on treatment sites (where habitat is actively manipulated) to numbers on companion control (unmanipulated) sites. In aspen-dominated habitat in Minnesota, drumming male densities in treatment sites were 6-19 times higher than densities in the uncut control forest (Gullion 1990). In an oak-dominated forest with a substantial broad-leaved evergreen shrub component in Tennessee, density of drumming males increased fourfold at treatment sites which were 12% clearcut, while remaining stable at an adjacent unharvested control area (Dimmick et al. 1998). In PA, a long-term study at SGL 176 in Centre County demonstrated that managing aspen and mixed oak habitats with small patch cuts resulted in densities of grouse (both drumming and flush counts) that were twice as high as those in an adjacent control area (Storm et al. 2003).

A complicating factor in evaluating the effects of various mortality, reproduction, and habitat influences on grouse is the fact that their population dynamics exhibit a gradual variation across the range, from a fairly regular, dramatic 10-year cycle in the northern portion, to irregular fluctuations at the southern extent (Association of Fish and Wildlife Agencies 2008, Devers et al. 2007). Long-term data from good habitat suggests that grouse populations in PA are mildly cyclical: Cooperator flush rates tend to alternate between periods of increasing and decreasing trends, with each period lasting several successive years. Cooperator flush rates hit high levels at some point during each decade from the 1960s through 1990s.

The magnitude of difference between population highs and lows, and the regularity with which each occurs, are generally not as marked in PA as is the case farther north (Palmer 2009). However, periodic scarcities of extreme proportions were noted in the state in 1897, 1907, 1917, 1928, 1936, and 1945 (Bump et al. 1947). The underlying mechanism(s) for the cyclical aspect of grouse populations is unclear (Zimmerman et al. 2008), but the consequence for grouse population analysis is that potential rates of increase are not fixed, and vary widely among years.

Harvests and Population Management

Seasons and Bag Limits

Historically, as with most wildlife species, the ruffed grouse was hunted both for sustenance and for the market. Adams and Dauphin counties established the first grouse season from December 1 to January 1, 1839. The first statewide season was set from December 1 to January 1, 1858. In 1869, snaring of game birds was prohibited. Following the establishment of the PGC, grouse in PA received the first meaningful protection in 1897 when a law was passed prohibiting the sale of game birds. The daily bag limit for grouse was set at 10. By 1915, the season ran from October 15 through November 30, with daily, weekly, and season bag limits of five, 20 and 30, respectively. Because of disappointing hunting seasons resulting from grouse scarcities, the PGC closed the hunting seasons in 1918, 1929, and 1946. From 1930 through 1959 (with the exception of the 1946 closure), hunting season lengths varied between one and five weeks, mainly in November. The first winter season addition (six days) occurred in 1960. Impacts of these early seasons and bag limits on grouse populations are unknown, but protection itself, in the form of established seasons and bag limits, likely was necessary to manage grouse and other wildlife.

Changes to grouse season and/or bag limits have been made 29 times since 1915 (Table 2). Recent seasons have included a fall season of 6 weeks, a mid-December season of approximately 2 weeks, and an after-Christmas winter season of 4-5 weeks, for a total of 12-13 weeks of grouse hunting. The daily bag limit of two birds has remained unchanged since 1930. The trend toward expansion of post-Christmas hunting in PA has been controversial. Late winter hunting has an additive mortality effect in some cases and may be too liberal for maximum grouse populations on a localized basis (Small et al. 1991).

Due to data limitations, grouse harvest management in Pennsylvania has been conducted on a statewide basis. At this level, the long-term stability of cooperator survey flushing rates and the lack of evidence of a population response to a 75% decrease in overall harvest in the past 30 years (Boyd and Weaver 2010) suggest that present harvest levels, under prevailing seasons and bag limits, are not causing population declines. However, the precise impacts of winter seasons (and other harvest management variations) on grouse populations in PA are unknown, primarily because they have not been well studied or evaluated (Palmer and Diefenbach 1993). Given the large discrepancies between habitat types and trends and flush rate patterns in different parts of Pennsylvania, the appropriateness of a "one size fits all" statewide grouse season should be more rigorously evaluated. Conceivably, our current approach may be too liberal for grouse populations in poor, fragmented habitat, and / or too conservative for populations in better quality, more contiguous habitat.

Research should be conducted to assess the effects of harvest on grouse in geographic portions of Pennsylvania that differ in habitat quality and grouse population levels. Due to the limitations of available population indices, such research will likely require determining fates of individually marked birds using banding and / or radiotelemetry. Metrics used to evaluate whether mortality is additive or compensatory should include the 30% criterion proposed by Devers et al. (2007), as well as differences in annual survival rates between areas experiencing different levels of harvest. Experimental manipulations of season length may be necessary to adequately research this topic. Except for any such experimental manipulations, grouse season recommendations should continue to follow the current length, timing, and statewide structure until research results are available. At that time, if warranted by research findings, adjustments to season recommendations should be made at the appropriate level (statewide, grouped WMUs, or individual WMUs) to avoid additive mortality. Future liberalizations could occur in some areas if they would increase hunter satisfaction and research indicates they would not cause negative biological effects.

Table 2. PA grouse seasons and daily bag limits changes (no Sunday hunting), 1915-2009.

Year	Daily Bag limit	Approximate Season length
1915	5	7 weeks (October 15 – November 30)
1917	4	6 weeks (October 20 – November 30)
1918	-	Closed season
1919	4	6 weeks (October 20-November 30)
1921	3	4 weeks in November
1925	3	2 weeks in November
1928	3	3 days (Thurs. – Sat.) per week for 7 weeks (October 15 – November 30)
1929	-	Closed season
1930	2	1 week in November
1931	2	15 selected days in November
1935	2	4 weeks in November
1936	2	3 weeks in November
1937	2	2 weeks in November
1939	2	3 weeks in November
1940	2	4 weeks in November
1946	-	Closed season
1947	2	1 week in November
1949	2	6 selected days in November
1950	2	2 weeks in November
1952	2	4 weeks between October 29 and November 29
1956	2	5 weeks between October 19 and November 29
1959	2	4 weeks starting October 31
1960	2	4 weeks in Fall (October-November) + week after Christmas
1965	2	6 weeks in Fall + week after Christmas
1968	2	6 weeks in Fall + 2 weeks after Christmas
1970	2	6 weeks in Fall + 3 weeks after Christmas
1982	2	12 counties - 6 weeks in Fall + 1 - 2 weeks after Christmas 55 counties - 6 weeks in Fall + 4 - 5 weeks after Christmas
1994	2	6 weeks in Fall + 4 - 5 weeks after Christmas
2001	2	8 weeks between October and Christmas + 4 - 5 weeks after Christmas

Hunter Participation

During the mid-1980s, PA had about 435,000 grouse hunters. By the mid-1990s that number averaged around 250,000, and by 2009 was down to 104,000 (Boyd and Weaver 2010). Despite declines in participation, the ruffed grouse is the most popular small game bird in Pennsylvania. Overall grouse hunter numbers and harvests should continue to be monitored annually via the PGC Game-Take Survey.

In addition to the need to better evaluate the biological aspects of grouse seasons, an improved understanding of the related human dimensions issues will benefit grouse management in Pennsylvania. Other than the approximately 500 avid hunters involved in the cooperator survey, we lack data on the demographics, knowledge, preferences, and satisfaction of the 100,000 grouse hunters in PA. With the recent implementation of the point-of-sale license system, we have a database that allows us to conduct human dimensions surveys of hunters more effectively than previously. Surveys of PA grouse hunters may identify opportunities for harvest regulation changes, outreach programs, and other efforts that would improve knowledge, participation, and satisfaction. In particular, clarification of the factors (e.g. flushing grouse, harvesting grouse, hunting pressure, accessibility of hunting opportunities) that are most important to a "quality" grouse hunting experience in PA will enhance our ability to select appropriate management options in those cases where multiple biologically acceptable alternatives may exist. Should a majority of hunters favor more conservative seasons than currently offered, such adjustments could be made prior to availability of research results on effects of harvests. However, more liberal seasons (if preferred) should not be implemented unless and until research indicates such changes will not result in additive mortality.

Population Estimates

Despite the variety of surveys providing information on grouse population trends, we have no empirically-determined estimates of total grouse populations in PA. The 2008 Ruffed Grouse Conservation Plan, a North American plan developed by the Association of Fish and Wildlife Agencies Resident Game Bird Working Group, provides a comparison of ruffed grouse habitat conditions and estimated populations between 1980 and 2005, across the continent's grouse range. The North American plan utilizes the North American Bird Conservation Initiative Bird Conservation Regions (BCRs) as the geographic assessment unit to ensure consistency with other planning efforts on avian species (Figure 4), and has habitat acreage goals by BCR (each of which is often a composite of portions of multiple states and/or Canadian provinces). Pennsylvania includes portions of four BCRs, though one (BCR 30) is generally considered insignificant for management of terrestrial habitats in PA (Figure 5).

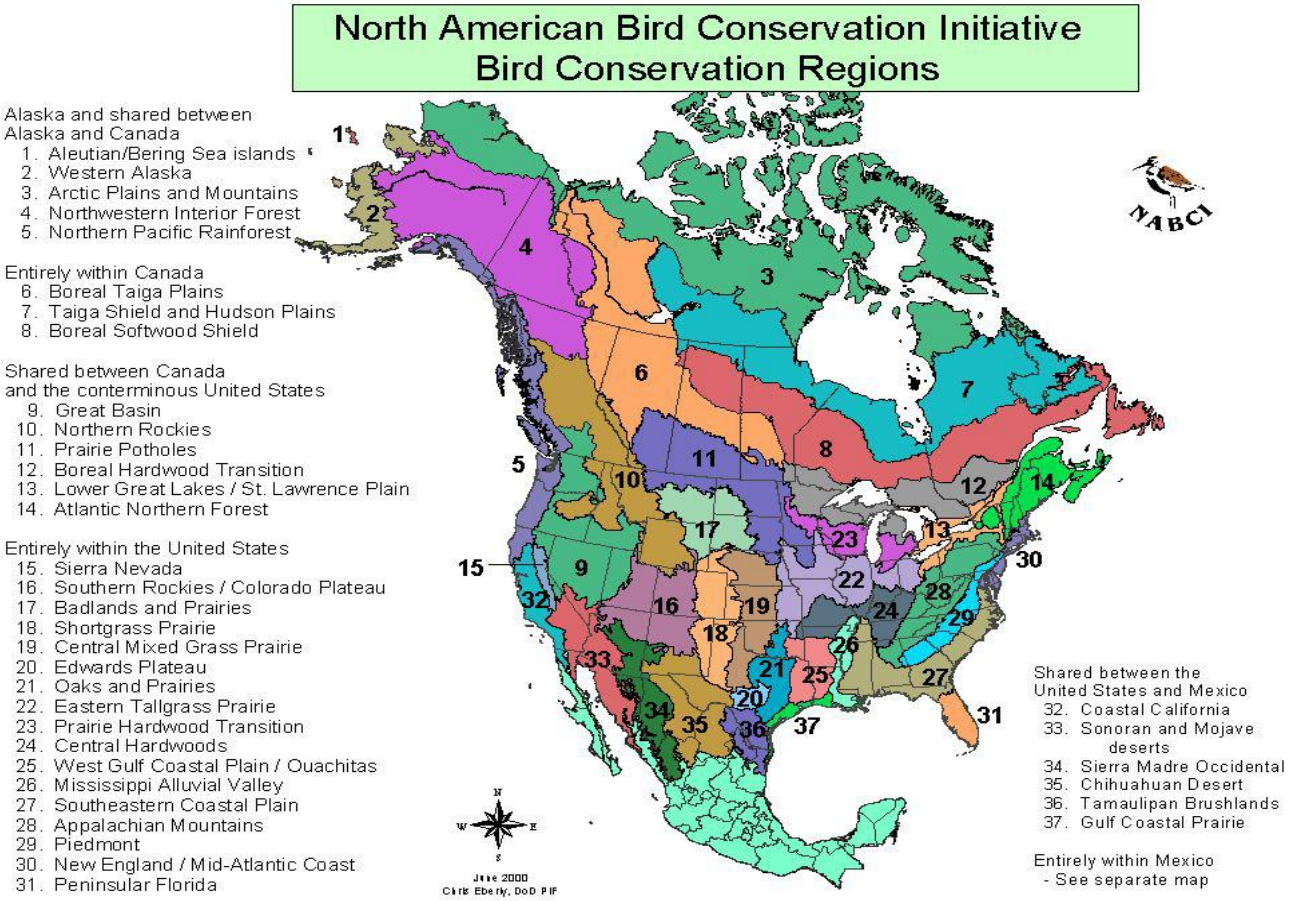


Figure 4. Bird Conservation Regions in North America (USFWS 2000).

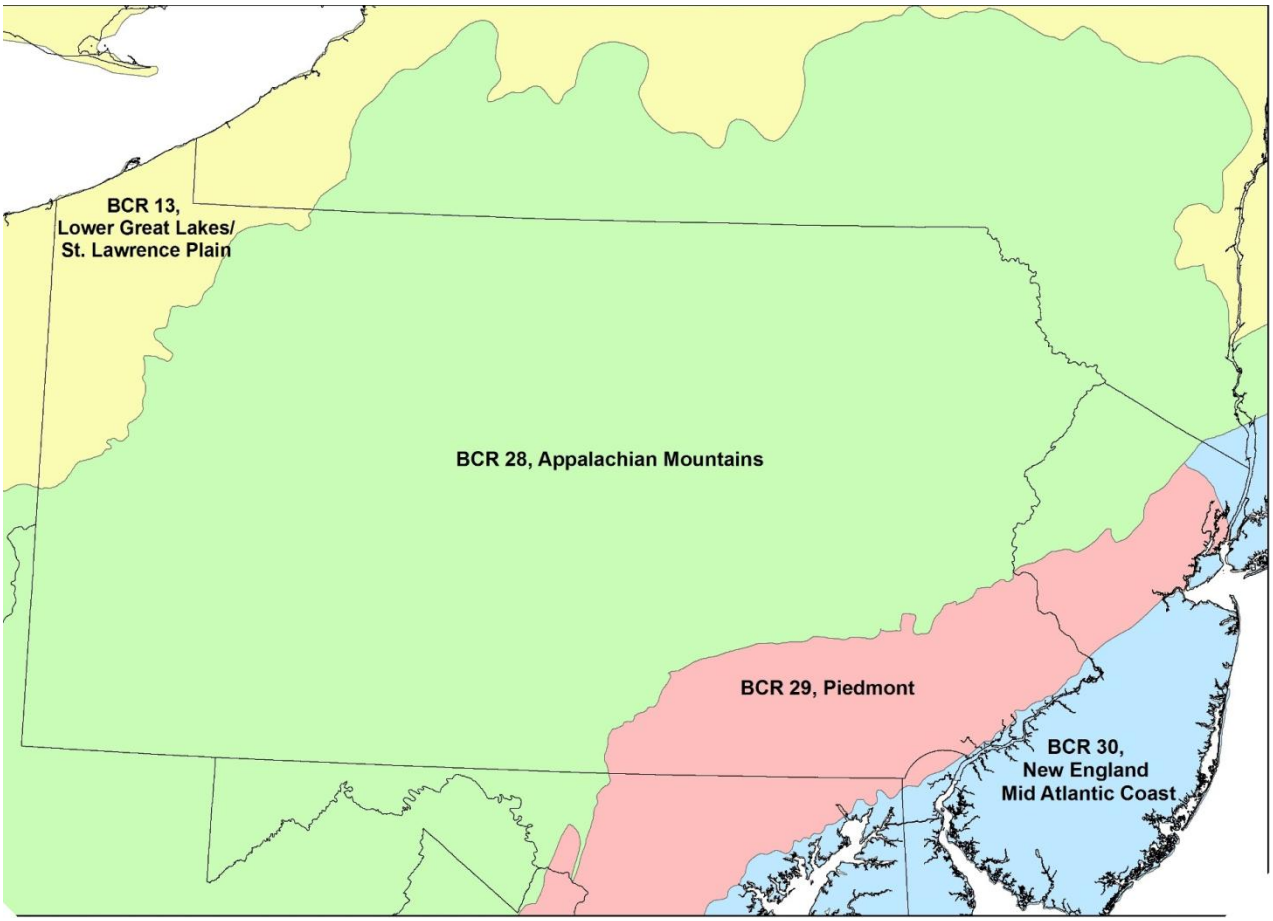


Figure 5. Bird Conservation Regions in PA (USFWS 2000).

Populations also were calculated by state and province because those are jurisdictions for resource management agencies. Forest Inventory and Analysis (FIA) data were used for forest types and size classes (with the small-diameter class in that data set equating to young forest).

Our plan follows the general approach of the North American plan in using derived population estimates and goals based on drumming male densities, by forest type, from published research. However, we used two major adaptations that resulted in our population estimates and goals differing from those listed for PA in the North American plan. First, based on expert opinion, we adjusted drummer density estimates for the oak and aspen-birch forest types (Table 3). Second, we substituted more accurate FIA data, which differed from that used in the North American plan primarily by including a substantially higher acreage of young forest (small-diameter size class) in 1980.

Using the procedure described in the North American plan with our density and FIA adaptations, the spring drumming male population (Y) was derived from past (1980) and current (2007) habitat potential and was estimated as:

$$Y = \Sigma F_{1-n} [m (Fo / 100) + 2m (Fy / 100)]$$

Where: Y = Total Drumming Males; F = Forest type; m = Drumming Males / 100 acres (40 ha) for forest type; Fo = Acres of forest type ("old": large- and medium-diameter class); and Fy = Acres of forest type ("young": small-diameter size class).

Estimated PA drumming male grouse populations were slightly more than 227,000 and 197,000 for 1980 and 2007, respectively. This represents a 13% decline in the population during that time period. Although CBC and BBA data indicate a larger percentage decline in grouse numbers than does this habitat-derived estimate, the various data sources are not necessarily in conflict because each reflects different population segments and seasons. Trends in all available indices and estimates of grouse numbers should continue to be monitored, and additional monitoring programs used in other jurisdictions should be evaluated and implemented in PA if appropriate.

Table 3. Drumming density by forest type used in PA (adapted from Association of Fish and Wildlife Agencies 2008).

Forest type	Drumming males/100 acres (40 ha)
Pine	0.5
Spruce-fir	1.0
Oak-Pine	0.8
Oak	1.0[a]
Elm-ash-red maple	1.1
Northern hardwoods	1.0
Aspen-birch	2.0[b]

[a] 0.9 in North American plan
[b] 3.5 in North American plan

Population Goals

The North American plan seeks to sustain grouse populations at, or restore them to, near 1980 levels by 2025. The choice of 1980 as a base year for comparison was made to reflect grouse habitat and populations that, while below the levels of the 1960's and 1970's (when early-successional habitat due to farm abandonment was at a peak likely unattainable today), nevertheless provided abundant recreational opportunities. Accomplishing this objective will require each state and province to reach individual targets. The 2025 population target level for PA is 226,000 males (an increase of 29,000 males from current estimates). For the term of this plan, our PA population objective is to increase the number of male grouse to 215,000 by spring 2020. This requires 18,000 new males by 2020, 62% of the total new males needed to reach the 2025 population target level for PA.

SECTION IV. GROUSE HABITAT

Importance of Early-successional Habitats

Habitat loss and degradation are major problems for grouse throughout the eastern portion of their range, including PA. Early-successional habitat (i.e. young forest) is ephemeral. For most sites, habitat creation and maintenance depends on periodic forest disturbance to provide the dense stands of young forest required for abundant grouse populations.

As a habitat specialist, grouse populations respond dramatically to habitat conditions across the landscape. Unfortunately, the proportion of PA forest classified as early-successional and young forest has declined about 40% since the 1980s, and overall grouse populations have responded accordingly as indicated by the approximate 30-50% decline in CBC and BBA indices during that same period. The long-term decrease in young forests in PA (Ferguson 1968, Considine and Powell 1980, McWilliams et al. 2004; Figure 6) has been attributed to several sources, including changing land management objectives and techniques, decline in farm abandonment, advancing natural plant succession, increased urbanization and industrialization, increased suppression of wildfire and forest pests, and changing attitudes of landowners.

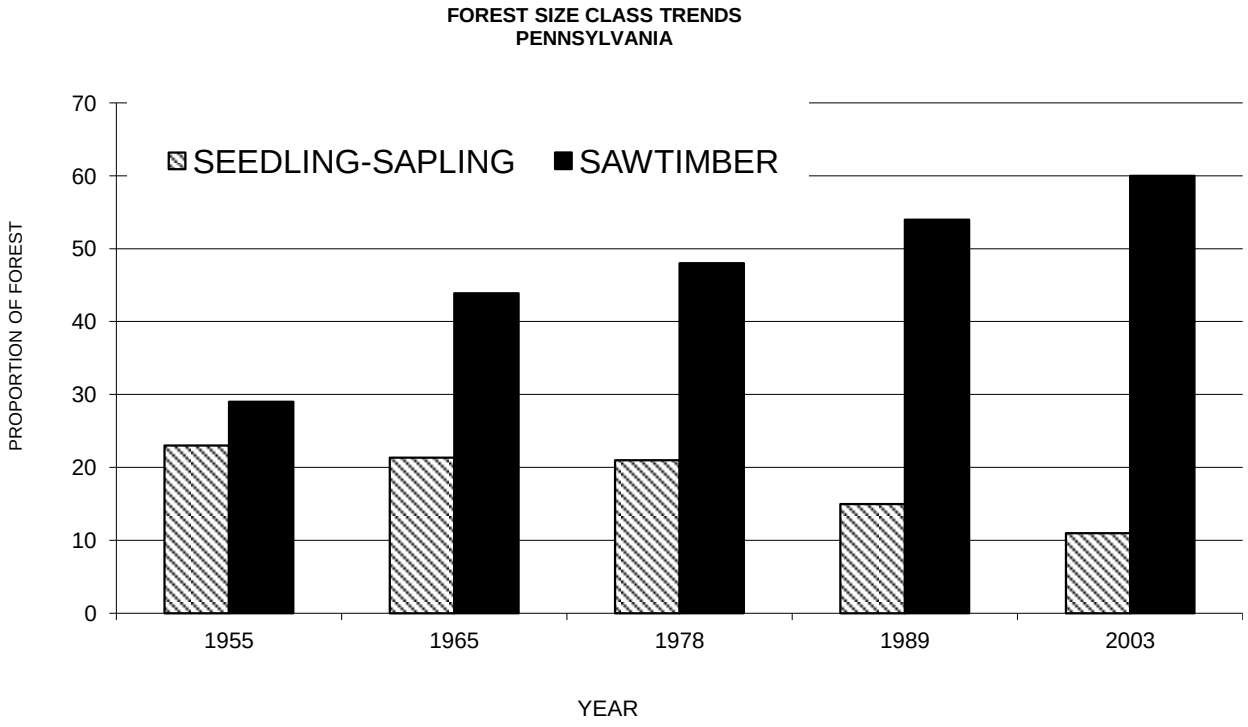


Figure 6. Forested land trends in PA, 1965-2003 (Ferguson 1968, Considine and Powell 1980, McWilliams et al. 2004).

Public misconceptions about forest management have promoted the belief that wildlife inhabiting mature forests is the most highly-imperiled. In many cases, the exact opposite is true: In the Northeast U.S., almost half of all species using young forest/shrub habitats are declining (Sauer et al. 2005). In response to these population declines, early-successional habitats in eastern deciduous forests have been identified as one of the 20 most-threatened bird habitats in the United States – the only habitat occurring in PA to receive that distinction (American Bird Conservancy 2006).

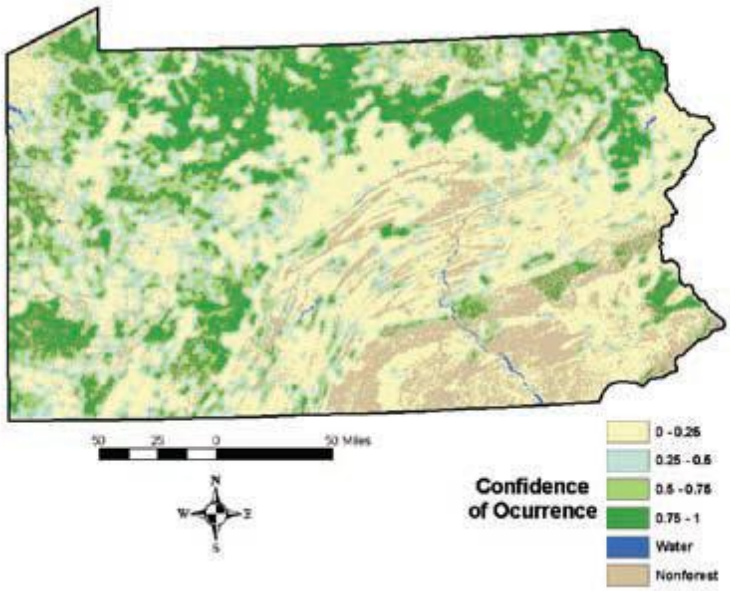
Grouse and other species that depend on early-successional habitat will continue to decline without programs to create young forest. Active and targeted management programs in any of PA's forest types can supply the necessary components. Managed landscapes provide opportunities to protect and restore an appropriate mix of young and old forest components, thereby providing the habitat mosaic associated with increased grouse populations.

In summary, abundant grouse populations require young forest patches in the proper arrangement across a forested landscape (Gullion 1990, Dimmick et al. 1998, Storm et al. 2003). In most sites, early-successional habitat is short-lived. Thus, habitat management to encourage huntable grouse populations requires a commitment to the ongoing establishment of an early-successional habitat component on the landscape. Large-scale young forest habitats are historically-valuable grouse habitats that have been lost from the modern landscape. Therefore, the planning of habitat management activities at the landscape scale is very important. Commercial timber harvests and other proactive habitat management practices must be implemented at an adequate scale and at appropriate intervals to ensure a continuous supply of quality ruffed grouse habitat on the landscape.

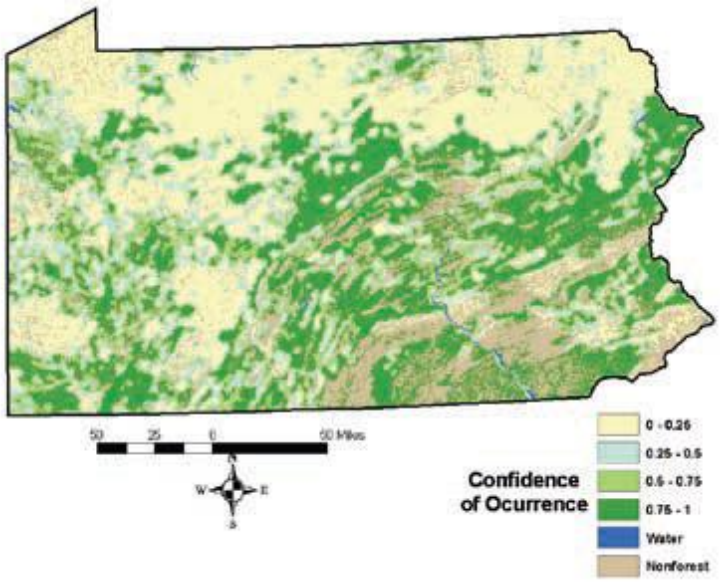
Grouse Habitats in PA

Pennsylvania occupies the southern sweep of the grouse's core range, and as such has attributes of both core and peripheral habitat conditions for grouse. Northern PA boasts the northern hardwood and aspen components similar to the core of the grouse range, while southern and eastern PA are more dominated by the mixed oak community types of the Appalachian Oak Forest (Figure 7).

In PA, the highest grouse flush rates (flushes per hour in good habitat) consistently occur in the northern regions of the Commonwealth supporting northern hardwood forest types (Figure 7). Based on Hunter Cooperator Surveys submitted after the 2010-2011 season, flush rates in the northwest and northcentral regions of the commonwealth are well above the statewide average, while all other regions are below statewide average of 1.3 flushes/hour (Figure 8). These figures are in keeping with other studies, in which reported densities of grouse in central PA generally fall between the high densities reported in the Lake States and the lower densities reported in the southern Appalachians and southeastern states (Cade and Sousa 1985, Kubisiak 1985, Storm et al. 2003).



Northern Hardwoods



Mixed Oak

Figure 7: Distribution of Northern Hardwoods and Mixed Oak forest types in PA (from McWilliams et al. 2004).

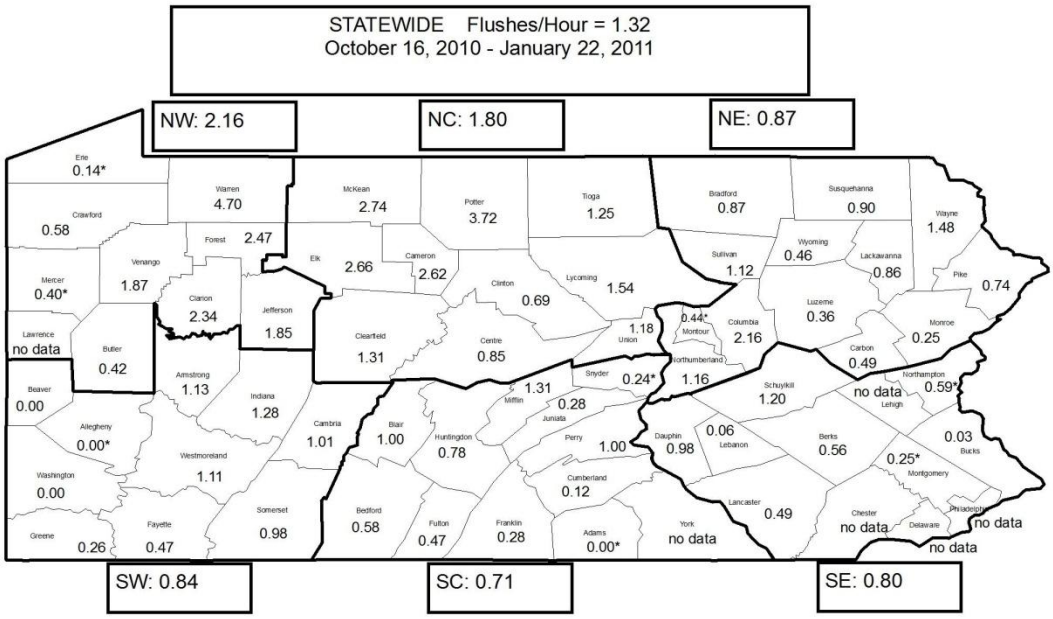


Figure 8: Grouse flushes per hour by region and county, as reported by cooperating hunters during the 2010-2011 grouse season. Results are typical for the decade of the 2000's.

PA forest types vary in their ability to support abundant grouse populations. Adult survival is a critical component of population growth and viability. Adult ruffed grouse in oak-hickory forests exhibit survival rates comparable to those reported from aspen/northern hardwood habitats in the core of the range, and higher survival than in mixed mesophytic forests (ACGRP 2004, Devers et al. 2007).

In addition to adult survival, the dynamics of Pennsylvania's grouse populations depend on reproduction (gains) and mortality (losses). Factors affecting reproduction include nesting and re-nesting rates, nest and hen success, clutch size, fertility rates, hatching success, and chick survival. Grouse populations in mixed oak communities exhibited extremely low productivity and recruitment compared with other forest types – particularly in nesting rate, re-nesting rate, and chick survival (Table 4). This multi-state investigation verified that "oak hickory forests provide low quality reproductive habitat, mixed-mesophytic forests provide intermediate quality reproductive habitat, and the northern hardwood forests provide high quality reproductive habitat" (ACGRP 2004). Particularly in years following low mast production, females enter the reproductive season in poor condition and lay low-quality eggs which produce less-robust chicks (ACGRP 2004).

Table 4: Comparison of grouse reproductive parameters in oak-hickory and mixed-mesophytic forests in the central Appalachian region compared with aspen/northern hardwood forests of the Great Lakes Region (from ACGRP 2004).

Parameter	Oak-Hickory	Mixed Mesophytic	Northern Hardwood
Nest Rate	86%	100%	100%
Re-nest Rate	3%	45%	>50%
Clutch Size	9.4 eggs	10.7 eggs	>11 eggs
Nest Success	63%	70%	>50%
Chick survival	21%	39%	>50%
	To 35 days	To 35 days	To 84 days

Regardless of forest type, one commonality is the need for an early-successional component. Each of these forest types has unique ability to support grouse populations as well as unique management needs, but *active* and *targeted* management of young forest habitat is required: Continued declines in young forest habitats and the isolation of these habitats limit ruffed grouse recruitment and therefore population densities (Dessecker and McAuley 2001).

Northern Hardwoods

Northern hardwood forests are dominated by black cherry, red maple, and American beech, among others. This forest type occurs throughout the northern portions of Pennsylvania, with a heavy infusion of northern red oak, white oak, and chestnut oaks in the central portion of the area (US FIA data 2007). Where aspen occurs in abundance in these forests, grouse feed heavily on aspen buds, twigs and catkins to meet their nutritional requirements throughout the year, and particularly during winter and pre-breeding season (Gullion 1970, Lang 1989). In addition to aspen, these forests provide high-quality winter diets consisting of the leaves and seeds of herbaceous plants, cherry, beech, and birch buds, acorns, and the fruits of grape, greenbrier, and numerous other soft mast producers (Lang 1989, Lang et al. 1992).

Studies conducted in northeastern states (particularly NY and PA) support the value of aspen, but also indicate equal, if not greater and more preferred use of buds of other northern hardwoods species. These include black cherry, hop hornbeam, apple, and birch. The relative importance of buds from these other tree species has long been overlooked, underemphasized or lost, because of the focus on aspen (Woehr and Chambers 1975). A study of winter diets of ruffed grouse in NY found that black cherry buds were present in 100 percent of all winter fecal samples and comprised 55-65% of the winter diet. In spring, aspen catkins were a more prominent part of the diet, occurring in as much as 92% of spring droppings (Woehr and Chambers 1975). The importance of cherry has also been shown in PA, where cherry ranked quite high in importance in every region except the northeast and southeast (Lang 1989).

Cherry's enduring ability to send up seedlings from seeds buried in the soil make it a highly-available food source at or near snow level. An understory of tiny black cherry

seedlings is common in numerous mixed deciduous forests. Even-aged management of northern hardwoods that provides both dense stands of saplings and stump sprouts for cover, as well as fruit near the ground, provides optimal conditions for grouse. Not surprisingly, in the counties where northern hardwoods are actively managed and harvested, such as in the northwest and northcentral, grouse populations prosper (Figure 8, Figure 9). Counties in these areas (McKean, Elk, Potter, Forest, Warren, Clarion, Cameron) consistently produce the highest abundance of grouse in good habitat as indicated by PGC Grouse Cooperator Surveys.

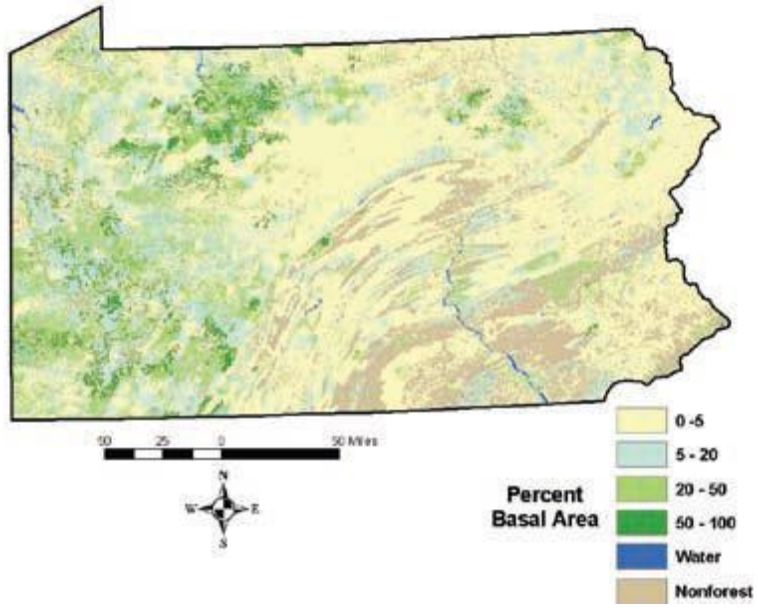


Figure 9: Distribution of black cherry basal area, Pennsylvania 2004 (McWilliams et al. 2004). Counties in areas where black cherry is abundant (McKean, Elk, Potter, Forest, Warren, Clarion, Cameron) consistently produce the highest abundance of grouse in good habitat as indicated by PGC Grouse Cooperator Surveys.

Mixed Mesophytic

Mixed mesophytic is a term applied to much of the forest of the southern Appalachian Mountains and the area immediately to the west of the Appalachian Mountains, including southwestern PA. While it includes many components of the northern hardwoods forest type, the term ‘mixed’ indicates that the forest is not typically dominated by a few particular species. Instead, a diverse number of moist habitat tree and shrub species comprise the forest. The dominant species vary from place to place in the landscape depending on the physical conditions of the area, such as slope direction, slope position, and soil characteristics. Dominant trees in typical PA upland sites include sugar maple, shagbark hickory, American beech, yellow-poplar, black cherry, white oak, northern red oak, and basswood. Bottomlands are represented by increased abundance of sycamore and ash, while the moist, cool microclimates of steep-sided stream valleys and steep, low-

elevation north slopes feature eastern hemlock as the dominant woody plant. Mixed mesophytic forest types have been identified as providing intermediate reproductive quality to ruffed grouse (ACGRP 2004). The southwest region of PA has mixed mesophytic forest as well as a northern hardwoods component (Figure 7), and as such may seem to be under-producing grouse based on vegetative composition potential alone. However, forests in this region tend to be less contiguous than in the northern tier, and the resulting constraints on grouse dispersal and recolonization of unoccupied patches may dictate that a larger proportion of forest in young age classes is required to sustain grouse at the same densities as in areas with similar species composition, but greater overall forest cover. Methods for increasing grouse abundance in the southwest region should be more-fully explored.

Mixed Oak

Recent studies in the southern Appalachian Mountains revealed that acorns and beechnuts are extremely important as a food source in oak-dominated forests. Acorns and beechnuts are among the most energy-rich forages available for grouse in these forest types and appear to be highly selected for when available (ACGRP 2004). These high protein food sources serve as somewhat of a surrogate for the buds of northern hardwoods.

Large variation in food habits and grouse body condition can be strikingly evident within areas that contain multiple habitat types. In a PA ACGRP site, for example, "grouse collected from one side of the study site where habitat was diverse and generally considered ideal had high fat levels, whereas grouse collected on the other side of the area where oak and mountain laurel were dominant habitat components had extremely poor body condition in 2 of 3 years" (Long 2007).

Also, acorn and beechnut abundance is not consistent from year to year. Appalachian grouse populations vary according to acorn abundance with reduced hatching success and recruitment occurring after low mast-production years (Devers et al. 2007). Since hard mast, especially acorns, appears to drive grouse populations in the Appalachians (Devers et al. 2007), proper management of PA's mixed oak forests is another high priority.

Scrub-shrub

Scrub-shrub habitats, also referred to as brush or thickets, are defined as areas dominated by shrubs and trees less than 16 feet (4.9 m) tall (Homer et al. 2004). Temporal thickets, represented by young forest and reverting farmland, are important habitat for a variety of wildlife and require periodic management activities to keep them from succeeding beyond the early-successional stage.

Other 'temporary' thicket types are more long-lasting. With stable water levels, the edges of some emergent marshes are often fringed with shrubs. Forested wetlands may support trees that are stunted and are structurally-similar to shrub-dominated sites. Significant amounts of scrub-shrub habitat exist along powerline and pipeline corridors (Litvaitis et

al. 1999). Reclaimed strip mines can also make important contributions to grouse if they are allowed to succeed to shrub cover and are managed to maintain that shrub stage over the long term. These areas are important because of their size, and effort should be made to develop a decision-making process whereby managers decide which sites are best-suited as grasslands and which sites are best-suited as shrublands (PGC PFBC 2005). Historically, many surface mines were important sites for aspen establishment and management, as the species was able to survive on the mineral soils and full sun that resulted from the site reclamation practices of that time (Gullion 1970).

Permanent scrub-shrub sites, or naturally-occurring shrublands, include the unique barrens habitats found in PA. Five barrens habitats are identified -- central Appalachian scrub oak-pitch pine, ridgetop acidic, serpentine, Appalachian shale, and mesic till barrens that are distinguished by the specific soils on which they occur (Orndorff and Coleman 2008). Most barrens are located on ridgetops where soils are well drained, sandy and acidic. Frequent disturbance (especially fire) and thin soils limit tree growth on these sites. Healthy barrens have early-successional structure with abundant ground cover, shrubs, herbaceous pockets, and scattered trees. An array of wildlife food and cover are provided by hard pines, scrub oak, blueberry, huckleberry, blackberry, and herbaceous plants. Among the barrens habitats, those with a scrub oak component are particularly relevant to grouse management, since these oaks produce an abundance of acorns in close proximity to cover. Scrub oak barrens are also one of the most-threatened barrens types (Orndorff and Coleman 2008).

Other Key Habitat Components

Aspen

Aspen is important to grouse in every stage of the tree's life cycle. Young aspen stands (1-20 years) produce excellent protective cover, since aspen stem density may approach 30,000 stems per acre following timber harvest. Aspen stands are sought out by grouse in winter and during the critical pre-breeding season of March / April (Gullion 1970, Lang et al. 1992). Buds from mature male aspen are an important food source in winter and early spring when pre-breeding condition is being established (Gullion and Svoboda 1972). Availability of high quality food improves female condition, egg quality, and chick survival. In PA aspen is still an important grouse food where it occurs. In fact, during the recent multi-state Appalachian grouse study, aspen flower buds were found in the crops of all birds from the PA study site (Clearfield and Elk counties) (ACGRP 2004).

In the core of the grouse range, populations reach their highest densities where aspen comprises a significant component of the forest and is actively managed (Gullion 1984b). The highest densities of grouse are found in states with a significant aspen component in their forests (Thompson and Dessecker 1997). Aspen forests of the Great Lake states commonly support 4-8 drumming males/40 hectares, while forests of the central and southern Appalachians support just 1-2 birds/40 hectares (Kubisiak 1985, Thompson and Dessecker 1997).

Aspen currently makes up less than 2% of PA forests at the stand level, although more than 11% of stand level in the important 'small diameter' size class (McWilliams et al. 2004). Historically, aspen comprised a much higher proportion of Pennsylvania's forests - a result of the abundance of aspen following the vast clearcutting of the late 1800s. With changing land management, that aspen has largely blinked out and been replaced by mixed hardwoods. Currently, PA is still losing aspen from our forest stands, a result of inadequate management of this important wildlife resource. It is easier to maintain than to re-seed aspen – so management must occur before the clone dies at roughly 40-70 years of age.

Although aspen is not a major forest type in PA, aggressive aspen management has been shown to pay dividends in grouse abundance. In the intensively-managed grouse study area in central PA, drummer densities reached 25.6 drumming males per 100 hectares in aspen-scrub oak stands, compared with 16.4 drummers/100 ha in mixed oak stands 5-20 years after cutting (Storm et al. 2003).

Though not abundant, aspen is still widely distributed in PA, both in relatively pure aspen stands and (possibly of more importance) as a component within other forest types. Aspen thus represents a continuing management opportunity. Where it occurs, aspen should be aggressively managed for the high-quality habitat it provides. Aspen management should be a high-priority focus because with more aspen, PA forests would likely support more grouse in better breeding condition (Gullion1970, Lang et al. 1992).

Soft Mast

In addition to aspen buds and acorns, PGC studies have identified the critical importance of soft mast as a winter food source for grouse. This finding is important, since winter represents the season when food supply is most critical to grouse survival. In a 4-year PGC study of winter grouse foods (1984-1988), the dominance of grape was apparent, as was that of blueberry/huckleberry, both of which were found in more crops than any other species – and were important regardless of PA region (Lang et al. 1992). Further emphasizing the importance of these species to grouse is the fact that the buds, twigs, remnant fruits and wilted leaves are all eaten (Lang et al. 1992).

A variety of soft mast was important in all regions of the state, with fruit, buds and twigs of grape, blueberry/huckleberry, rose, teaberry, juneberry, hornbeam, and hop hornbeam being consumed in great quantities by grouse in December and January (Lang 1989). In NY, grouse sought out hop hornbeam, apple, and black cherry even when aspen was more abundant and available to them (Woehr and Chambers 1975). During the energy-demanding months of winter, grouse select tree buds that have the highest carbohydrate and/or protein content (Woehr and Chambers 1975). In spring, grouse switch to items offering higher fat content as they enter the season of increased synthesis of reproductive hormones and egg yolk material, which are derived from fatty compounds (Woehr and Chambers 1975).

Other prevalent winter food items are green leaves and evergreen ferns, occurring in nearly one-half of all winter grouse crops examined in PA (Lang 1989). Considering that

crops were collected in December and January, and given the limited abundance of green leaves in winter, it is clear that grouse seek out this winter "salad" (Lang et al. 1992). Thus, occurrence of soft mast and evergreen herbaceous plants and ferns in an area must be considered integral for the maintenance of ruffed grouse populations.

There is strong evidence that grouse choose winter and spring food items based on nutrient levels rather than simple availability (Woehr and Chambers 1975). It is becoming increasingly clear that nutrition and condition of breeding females influences the population dynamics of ruffed grouse (Long 2007). Because substantial variation in nutritional ecology is evident between forest types and regions, land managers should select habitat management activities that will fulfill the local nutritional needs of grouse as well as providing cover.

Thermal Cover

Conifers can be an important component of grouse winter habitats, especially in PA where the 8 or more inches of deep powder necessary for 'snow roosting' is not assured. Dense conifer cover reduces wind speeds and thermal radiation loss (Thompson and Fritzell 1988). Clumps of young conifers are more beneficial than older trees. Young conifers provide cover for grouse as well as songbirds and rabbits (Trimble et al. 1974). As the pines mature, self-prune, and shade out understory plants, the structure of the stand becomes more homogenous and the wildlife value declines.

Habitat Management

General Considerations

Huntable grouse populations in all forest types require active habitat management to maintain an interspersion of age classes in close proximity. The highest densities of birds occur where they can find all they need within an 8-10 acre (3-4 ha) covert (Gullion 1970). Grouse response to management has been thoroughly studied in both the core and periphery of the species' range (Gullion 1983, 1984b, Kubisiak 1985, Barber et al. 1989, ACGRP 2004). Optimum habitats for ruffed grouse include young (6- to 15-year old), even-age deciduous stands that typically support 20-25,000 woody stems/ha (Gullion 1984a, Kubisiak 1985, Stoll et al. 1999, Dimmick et al. 1998).

In most sites, high-quality young forest habitats are available to grouse for approximately one decade because stem densities decrease rapidly through natural thinning as succession proceeds. Thus, ongoing creation of young forest is a prerequisite for maintaining huntable grouse populations (Dessecker and McAuley 2001). This condition is best attained by regularly (every 10-20 years) creating a new reproduction cut in a management compartment. However, there are a host of variables that may compromise such an objective, including the price of pulp and timber, insect infestations, public acceptance, deer abundance effects, and presence of advanced regeneration on the site.

Intensive habitat management research has been conducted in PA at a number of locations, including sites with a high aspen component, mixed oak stands, and northern

hardwoods (Storm et al. 2003, Devers et al. 2007). Regardless of the forest type being managed, grouse require areas of high stem density. Thus, even-age silvicultural systems (clearcut, seed tree, shelterwood) are the most appropriate methods to create grouse habitat (Dessecker and McAuley 2001). Provision of interspersed age classes in close proximity is also needed in order for populations to thrive (Gullion 1990, Dimmick et al. 1998, Storm et al. 2003). Group selection treatments can produce stem densities comparable to clearcut regeneration harvests, but patch sizes are generally too small to provide secure cover for grouse (Dessecker and McAuley 2001). In general, the greatest amount of overstory removal will yield the greatest degree of understory development, a critical habitat component for grouse (Dessecker and McAuley 2001).

Management activities designed to intersperse age classes will prove most beneficial to ruffed grouse in the Appalachians. In Pennsylvania's maturing forest landscape, interspersion is achieved through forest management practices that arrange various forest age classes and small openings in close proximity. For example, young regenerating stands in the 0 - 5-year age class provide brooding habitat in summer and soft mast in fall. Stands in the 6 - 20-year age class also provide soft mast in addition to fall cover, nesting cover and some brooding habitat. Mixed hardwood forests >40 years of age produce hard mast, nesting cover and if thinned and/or burned, provide herbaceous groundcover and invertebrates for broods. Ideal habitat conditions result when landscapes are a mosaic of various age classes. This condition is best attained by regularly (every 10-20 years) creating a new regeneration cut in the management unit. Timber management, both commercial and non-commercial, is the tool through which such conditions are attained.

Management of young forest habitats is a *prerequisite* for maintaining abundant grouse in an area (Dessecker and McAuley 2001). In PA, drumming males begin to use harvested forest patches 5-7 years following cutting (Storm et al. 2003). Both females with broods and male grouse prefer less than 10-year-old cuts with high stem densities. In PA's longest-running habitat management study, sites used by females with broods averaged >21,000 stems/ha while males used sites with 7,500 stems/ha as active drumming sites (Storm et al. 2003). Thus, timber harvest and other forest disturbance should remove sufficient basal area and stems from a stand to allow understory development. Timber harvest practices commonly used in the eastern U.S. leave residual basal areas that exceed the levels necessary to allow development of quality understory habitat (Dessecker and McAuley 2001). In addition to the amount of residual basal area retained, the spatial distribution of residual trees within a harvest unit also can significantly affect regeneration stem densities. Residual basal area maintained in discrete patches will minimize shading of regenerating hardwoods and therefore minimize effects of this shade on regeneration stem densities (Dessecker and McAuley 2001).

The arrangement of habitat on the landscape is another important consideration. Pennsylvania has tens of thousands of linear early-successional habitats (i.e. miles of 'edge' habitat) in the forms of public roadways, forest roads, pipeline rights-of-way, and electric transmission lines. Edge habitats can be both positive and negative for ruffed grouse. At a local scale, edge habitats in the form of forest roads or pipelines are

beneficial for grouse broods because herbaceous cover and sapling density are typically highest in edge habitats (Fraver 1994). However, these sites may serve as "sink" habitats which attract grouse and other early-successional species by the habitat provided, but then expose them to higher mortality levels through predation.

At the landscape level, there is a negative relationship between the density of roads and brood survival (Tirpak et al. 2008). Although ruffed grouse strongly select road edges as brooding sites, grouse survival actually decreases as the number of roads in the landscape increases (Tirpak et al. 2008). This pattern is because predation is higher in forests that are heavily bisected by roads. Predators can easily travel along linear corridors such as pipelines and roads, efficiently covering more ground and exploiting new areas.

Predation of grouse, turkeys, and other ground nesting birds will likely increase as new roads, pipelines, utility corridors, well pads, and right-of-ways are created in Pennsylvania's forests (Major et al. 1999, Keyser et al. 2001). Predation is a major cause of chick mortality, especially within the first 5 weeks post hatch (Larson et al. 2001; Smith 2006). In areas of high edge density (edge miles per square mile) and high fragmentation (small habitat patches) it may be possible for predators to impact the reproductive capability of the local grouse population to sustain itself over the long term. Ruffed grouse in high-quality habitats can fulfill all or most of their seasonal needs in one locality and are thus less-susceptible to predation (ACGRP 2004).

As new roads and pipelines are created throughout forests in PA, the more suitable the habitat becomes for predators. In Pennsylvania, road densities above 4%–5% were associated with the lowest daily survival rates. This proportion of road may represent a threshold value above which the benefit of increased arthropod availability is offset by higher predator abundance (Tirpak et al. 2008).

Placement of treatment units within a site must also be considered in order to maximize the effectiveness of management actions. Topography of the Appalachians creates diverse vegetation communities defined by soil type, thickness, and moisture. With heterogeneity in soil characteristics, various communities, associated ecotones, and forest types often occur in close proximity. The greatest diversity often occurs on midslope transition zones between xeric uplands and mesic lower slopes (Berner and Gysel 1969). By placing timber harvests on midslope positions, managers can supply diverse food sources while creating young, dense cover in close proximity. Timber harvest on midslopes also can create corridors between upper and lower elevation habitats and connect disjunct patches.

Consideration should also be given to regenerating (or at least thinning) stands on lower slopes, bottomlands, and along riparian zones, which are preferred habitats for ruffed grouse during winter and summer if a relatively dense stem density and/or well-developed understory is present. Grouse broods will use bottomland clearcuts and other dense stands (Thompson et al. 1987, Scott et al. 1998, Rusch et al. 2000, Fettinger 2002), as well as mature stands with well-developed understories (Haulton et al. 2003, Jones 2005). Where management can be done without increasing siltation into the stream,

thinning of riparian zones can benefit grouse, woodcock and other wildlife by enhancing herbaceous understory through increased daylighting. Care must be taken, however, not to alter the nutrient or temperature regimes of sensitive headwater or first order streams.

It is difficult to provide generalized management prescriptions because of the complexity of factors that determine grouse habitat quality. However, the national Ruffed Grouse Management Plan and the Appalachian Cooperative Grouse Research Project (ACGRP) have developed the following general recommendations for improving grouse habitat:

- Promote the use of even age forest management prescriptions (National Plan).
- Distribute habitat patches spatially so that food sources and important protective habitats are in close proximity to one another or connected by corridors or small patches of adequate protective cover (National Plan).
- Where moist pockets are present, reduce canopy cover to promote the establishment of a shrub understory and herbaceous food plants (National Plan).
- Retain clumps of dense-needled conifers or ericaceous shrubs to provide protection from inclement winter weather where such protection is limited (National Plan).
- Release sources of soft mast from competition by overtopping trees and shrubs to enhance food production (National Plan).
- Incorporate shrub and tree seedling plantings into surface mine reclamation practices where appropriate (National Plan).
- Create herbaceous forest openings of less than 2 acres (1 ha) and/or renovate existing openings by eradicating perennial cool-season grasses; allow natural seed bank to activate or plant with annual cool-season grains, legumes and other forbs beneficial to grouse (ACGRP).
- Plant forest roads with annual cool season grains, legumes and other forbs beneficial to grouse; avoid planting perennial cool-season grasses (ACGRP).

Both of these large scale efforts can inform grouse management in PA, but the specifics of developing site management prescriptions will be an ongoing process of communication and collaboration between biologists and land managers. Further refinement of this information into Best Management Practices documents based on PA's unique mix of forest types - and targeting our diverse public and private land managers - is warranted.

Northern Hardwoods/Mixed Mesophytic

In both northern hardwood and mixed mesophytic forests, "traditional" grouse management will likely be most successful (ACGRP 2004). In these forest types, grouse benefit from habitat interspersion, but may not benefit from a pattern of small block timber harvests to the same degree as in aspen forests. Scattered small-block harvest units on landscapes dominated by mature forest will provide patches of habitat, but these isolated islands likely provide only limited security from predators (Dessecker and McAuley 2001). Timber harvest techniques that provide a diversity of young stands interspersed across a large spatial scale should be emphasized (ACGRP 2004).

In mixed-mesophytic and northern hardwood forests, clearcutting regenerates numerous desirable species for ruffed grouse and traditional even-aged grouse management is preferred on these sites (Harper et al. 2006). Black cherry regenerates best under even-aged silvicultural treatments (Marquis et al. 1984). Clearcutting is generally used where advanced regeneration is abundant.

Shelterwood cuts are used where seedlings are scarce and provide good conditions for establishment from soil-stored seed. However, competing herbaceous vegetation, especially bracken and hay-scented fern in areas of deer over-abundance, are often favored by shelterwood cuts. These species inhibit black cherry seed germination and seedling growth through allelopathy (Horsley 1977, Drew 1988). Retention of *limited* (<4.9 m^2/ha) residual trees may not affect regenerating stem densities in developing stands of northern hardwoods (Smith et al. 1989).

In addition to the amount of residual basal area retained, the spatial distribution of residual trees within a harvest unit also can significantly affect regeneration stem densities. Residual basal area maintained in discrete patches will minimize shading of regenerating hardwoods and therefore minimize effects of this shade on regeneration stem densities (Dessecker and McAuley 2001). Residual basal areas >4.9 m^2/ha can reduce regeneration stem densities and should not be maintained within harvest units designed to provide quality habitat for ruffed grouse (Thompson and Dessecker 1997).

Regenerated stands are best located adjacent to a mature stand of desirable mixed mesophytic or northern hardwoods which will provide buds and soft mast in proximity to cover. Group selection harvests might be positioned within mature mesic stands containing black cherry, serviceberry, and grape with a well-developed understory. Close proximity of brood cover (group selection cuts) with soft mast and herbaceous groundcover would be beneficial for broods through late summer and early fall (Harper et al. 2006).

In addition to the information above, the national Ruffed Grouse Management Plan developed the following recommendations when managing northern hardwood forests:

- Improve and expand aspen and aspen-birch forest stands wherever possible. If residual trees are to be retained in clearcut patches, basal area should be ≤10-15 ft^2/acre (1–1.5 m^2/ha) and residual trees should be clumped.

- Promote small-patch habitats (2.5–10 acres or 1–4 ha) in aspen, northern hardwoods, and mixed mesophytic forest types, but total acreage treated should be commensurate with landscape needs of grouse, meeting proportional requirements for early-successional forest.

These forest treatments allow rapid growth of yellow poplar, black cherry, sugar maple, black and yellow birch, American basswood, yellow buckeye, white ash, American beech, and northern red oak. There is little evidence of nutritional constraint in these forest types, so management of these sites for ruffed grouse are not constrained by oak management concerns (Harper et al. 2006).

Mixed Oak

The importance of acorns in some forest stands brings about one of the major conundrums of managing grouse in Pennsylvania: the balance between young forest with dense cover and older forests that produce acorns. In these sites, managers should strive to provide both food (acorns) and cover (young, dense stems) in close proximity, by using timber harvest techniques that create a diversity of young-aged stands interspersed among mature forests (ACGRP 2004).

When creating young forest habitat in stands where oak regeneration is the highest priority, managers should follow SILVOAK guidelines to ensure the presence of oak into the future. Within these silvicultural guidelines, there are numerous options to maximize habitat for grouse.

To provide the contrasting needs of acorns from mature oaks and cover from young stands, managers have a menu of treatments to choose from (AGCRP 2004). Shelterwood, irregular shelterwood, and group selection are important techniques in oak and mixed hardwood silviculture. Each could have utility in creating grouse habitat. Depending on objectives, managers can influence conditions by adjusting percent canopy cover and species retention in shelterwood and irregular shelterwood (i.e., two-aged) stands. For plans concentrating on grouse habitat (and other wildlife in general), retention of mature trees in both the white and red oak families will decrease probability of mast crop failure in a given year (Harper et al. 2006). Retention of other trees and shrubs including flowering dogwood, black gum, serviceberry, pin and black cherry, and witch hazel can prove beneficial without negatively impacting growth of commercial species (Miller and Schuler 1995). Alternative regeneration methods can promote oak regeneration ensuring hard mast production in the future stand. As an esthetic alternative to clearcutting, shelterwood, irregular shelterwood, and group selection also may provide opportunities to regenerate mature stands that would not be possible via traditional clearcutting.

There is an abundance of literature concerning the optimal size of timber harvest units for ruffed grouse (Gullion 1977, Kubisiak et al. 1980, McCaffery et al. 1996, Storm et al. 2003, Harper et al. 2006). Recommendations of 1 – 25 acres (0.5 – 10 ha) in mixed oak forests allow good interspersion of young forest habitats with other important features. Considering harvesting economics, some managers recommend larger cuts, up to 40 acres or more. Research has shown grouse will use any size stand (at least some portion of it) large enough to allow regeneration, although they do not generally use the center of large clearings (Sharp 1963, Macdonald et al. 1994, Fearer and Stauffer 2003). Interspersion of quality habitats within a relatively small area is the most important consideration when managing for ruffed grouse. Therefore, in areas where grouse management is a focus, optimum harvest units should be relatively small (less than 25 acres (10 ha) for even-aged and two-aged regeneration methods) and well distributed across the management area (Harper et al. 2006).

While maximum reported grouse densities have been associated with 10-15 year old aspen stands, data from PA indicate that mixed oak forests managed with 5-acre (2 ha) patches in a checkerboard arrangement (to maximize interspersion) sustained grouse populations at levels similar to those found in the Lake States (Storm et al. 2003). However, in forests managed on a 60-100 year rotation, grouse will benefit from habitat interspersion, but may not benefit from a pattern of small block timber harvests to the same degree as in aspen forests. Scattered small-block harvest units on landscapes dominated by mature forest can provide patches of habitat, but these isolated islands likely provide only limited security from predators (Dessecker and McAuley 2001). The optimum method(s) for managing mixed oak forests to benefit grouse population stability and abundance remains untested across PA's unique mix of forest types (Storm et al. 2003).

Since hard mast may regulate grouse populations in the Appalachians, management of our mixed-oak forests for grouse needs to include residual trees reserved in a spatial arrangement that does not inhibit regeneration of high stem densities. Timber harvest units (patch cuts) of various ages distributed across a landscape have been shown to meet the needs of grouse in both aspen (Gullion 1984b, Storm et al. 2003) and in mixed oak (Storm et al. 2003).

Prescribed fire is another management option that has great potential to benefit ruffed grouse, especially in oak-hickory forests where controlled burning can enhance understory structure important for winter foraging and brooding habitat (Rogers and Samuel 1984, Pack et al. 1988, Jackson et al. 2006). In western Virginia, prescribed fire demonstrated positive results in young hardwood clearcuts, increasing invertebrate abundance and soft mast-producing plants (Whitaker et al. 2004). Given the predominance of oak forest types in PA, further research to identify the optimum size, shape, and arrangement of grouse management treatments (including prescribed burning) in oak forests is a research priority under this plan.

As a starting point, the national Ruffed Grouse Management Plan and the Appalachian Cooperative Grouse Research Project (ACGRP) developed the following recommendations when managing oak forests:

- In oak- or maple-dominated or other moderately shade-intolerant forests, if residual trees are to be retained in clearcut patches, residual basal area should be $\leq$25 ft^2/acre (2.3 m^2/ha) and residual trees should be clumped (National Plan).

- In Appalachian oak forests, maintain a mosaic of young stands (<20 years old) well interspersed with mature stands (>40 years old) to provide both protective cover and a source of hard mast (National Plan).

- In Appalachian oak forests, utilize shelterwood and two-age management techniques to maintain a mosaic of young stands (<20 years old) well interspersed with mature stands (>40 years old) to provide both protective cover and a source of hard mast (ACGRP).

- In sites being managed for oak regeneration as well as grouse, if residual trees are to be retained in regenerated patches, residual basal area should be $\leq$25 ft^2/acre (2.3 m^2/ha) (ACGRP)

Maintaining the oak component in some sites is difficult (Stromayer and Warren 1997, McWilliams et al. 2004). Gradual loss of oak, an integral component of grouse habitat in some portions of PA, will continue in our forests unless corrective steps are initiated and maintained over time. One of the major factors preventing forest regeneration is over-browsing by white-tailed deer (Stromayer and Warren 1997, Waller and Alverson 1997). Foresters in the Allegheny National Forest have shown that high deer densities have depressed the regeneration of several valuable hardwood species to well below acceptable stocking levels (Waller and Alverson 1997, Tilghman 1989). In many areas of PA, sustained deer browsing has eliminated the seedlings and saplings of all tree species, leaving a grass and fern-dominated understory. The shade created by the ferns prevents future germination of seedlings, further deterring regeneration (Waller and Alverson 1997, Horsley and Marquis 1983). Invasion of exotic species in over-browsed areas is also apparent, especially in southeastern and southcentral Pennsylvania (Waller and Alverson 1997). Keeping the deer herd in balance with forested ecosystems is critical to allow for adequate regeneration following timber harvests.

Scrub-shrub

The wildlife value of thickets changes as the thicket ages or is invaded by tree species. Aged thickets are characterized by the dominance of small trees and large shrubs with few ground-level branches. The value of thickets to grouse decreases as thickets age.

Because of their importance to a diversity of wildlife, naturally-occurring barrens are a high-priority target for management of early-successional habitat where they occur. Fire

plays an integral role in maintaining the integrity of barrens systems. In the absence of fire, trees that are minor components in healthy barrens expand and change habitat structure from early-successional to closed canopy forest (Orndorff and Coleman 2008). Without fire, understory diversity is lost to the shading effect of trees and overly-dense shrubs. As a result, barrens have nearly disappeared with remaining pockets highly-threatened and in poor condition (Orndorff and Coleman 2008).

Among the barrens habitats, those with a scrub oak component are particularly relevant to grouse management, since these oaks produce an abundance of acorns in close proximity to cover. Scrub oak barrens are also one of the most-threatened barrens types (Orndorff and Coleman 2008). Reintroducing fire to scrub oak barrens is central to the management of these important habitats. Although mowing and other mechanical treatments are useful, they are most successful when used in conjunction with prescribed fire (Jones 2010). When fire-intolerant plants are burned, scrub oak and huckleberry regain their position on the barrens. Seemingly-vanished plants often appear from reserves buried in the seed bank. Barrens management occurs in two stages, restoration and maintenance, with initial stages intended to reduce built up vegetation layers and latter phases to maintain early-successional structure (Jones 2010). In maintaining barrens conditions, the frequency of burns is based upon current site conditions and desired habitat condition.

Aspen

Silvicultural practices that diversify habitat through rotational harvest of aspen create maximum grouse densities in the core of the grouse range (Gullion 1984b), as well as in PA (Storm et al. 2003). A patchwork of 2-5 acre (1-2 ha) clearcuts implemented at 10-year intervals over a 40-year rotation has been shown to support the highest densities of grouse, and is more beneficial to grouse than large harvest units (Dessecker and McAuley 2001). The small harvest units provide grouse with patches of protective cover (6-15 yr. old stands) interspersed with mature stands that provide male flower buds for grouse during winter. (Dessecker and McAuley 2001). Clearcuts in these sites are critically important, since aspen regeneration can be reduced dramatically by residual stems. As little as 2.5-3.7 m^2/ha can reduce aspen regeneration growth by 40 percent (Perala 1977).

In Pennsylvania, significant aspen acreage has been lost over time due to forest succession and a lack of the targeted management necessary to maintain robust stands. This is particularly true on private non-commercial forest lands, where forest management is generally less-intensive than on public or commercial lands. However, it is possible to expand and rejuvenate aspen forests by manipulating surrounding cover and promoting clone expansion. In areas where aspen represents a remnant population in a stand, management techniques have been developed to encourage expansion of aspen clones while retaining the important bud-bearing mature trees (Gullion 1970). Getting this habitat management information into the hands of public and private land managers should be an important component of public outreach for grouse management.

Targeted and aggressive aspen management can help restore this vital habitat component for ruffed grouse and many other species in PA. Currently, many of these activities will

be conducted non-commercially. Therefore, seeking funding for non-commercial operations should be a top priority in restoring grouse populations.

Soft Mast

Geographic and site differences contribute to differences in total soft mast production because these factors influence the presence and relative abundance of various fruit-producing species. However, management generalities have been identified. Even aged treatments such as clearcuts and shelterwood cuts provide abundant soft mast the first few years after harvest.

Soft mast production under different silvicultural systems (clearcut, shelterwood cut, group selection, single tree selection versus non-harvested), during the third year post-harvest, was dramatically greater than in mature, unharvested sites (Perry et al. 1999). Regenerating sites continue to produce over time, with sites in fifth year post-harvest exhibiting as much as a 10-fold increase compared to first year post-harvest (Greenberg et al. 2007). In a study in North Carolina, biomass of fleshy fruit was 5.0- 19.6 times greater in young regenerated stands 3-5 years postharvest than in mature closed-canopy forest (Greenberg et al. 2007). Perry et al. (1999) estimated 80-100 kg/ha dry fruit biomass in regenerated and clearcut stands 5 years after harvest.

Clearcuts, shelterwood cuts, and group selection harvests provided the greatest amounts of soft mast, with shelterwood cuts producing initial total soft mast levels comparable to traditional clearcuts (Perry et al. 1999). However, canopies close as these stands mature, thereby reducing soft mast production. Without additional management such as burning or thinning, soft mast production declines significantly in clearcuts and shelterwood cuts as canopies eventually close (Greenberg et al. 2007). Studies suggest that fruit production in clearcut stands begins to decline 3-6 years after harvest (Campo and Hurst 1980, Stransky and Roese 1984).

Abundant light, soil disturbance, and reduced competition created by reductions in tree basal area provide optimal conditions for fruit production by many species and for colonization by disturbance-associated species that are prolific fruit producers (Greenberg et al. 2007). In general, increased basal area retention results in lowered soft mast production. Fruit production in clearcuts and shelterwood cuts, where basal area reduction is heaviest, remains high for at least five years when compared to controls and other silvicultural treatments where higher basal area was retained (Perry et al. 1999). Not surprisingly, unharvested stands and buffer zones adjoining riparian areas produced little soft mast when compared with harvested sites (Perry et al. 1999).

Maintaining soft mast production as stands mature is a challenge. In shelterwoods, disturbance and reduction of basal area associated with removal of all or most of the seed trees in successive treatments may increase soft mast production. Group-selection management provides moderate amounts of soft mast, and stands may be expected to produce moderate, yet sustained, soft mast yields if new openings are created over time. Single tree selection can provide moderate amounts of soft mast, but mast levels decrease

as stands progress toward a more uneven-aged structure with a well-developed mid-story (Perry et al. 1999).

Soft mast management goes beyond the production of berry-producing shrubs. Stump sprouts of fruit-producing tree species also produce more fruit in young recently regenerated stands than in mature forest (Greenberg et al. 2007). Flowering dogwood, American holly, black cherry, sassafras, and black gum all produced fruit from stump sprouts within 1-3 years postharvest (Greenberg et al. 2007). Fruit production by these tree species could likely be increased if land managers left some as reserve trees and/or avoided herbicide treatment of stump sprouts (while ensuring that the density of these species does not impede other stand-regeneration objectives). Further, winter habitat quality can be improved by retaining American holly, sumac, and greenbrier, and other species that hold fruit during winter months.

Thermal Cover

Optimal conifer cover is created by planting trees in either clumps or bands of five or more rows (Riley 1957, Rafaill and Vogel 1978). Planting conifers such as white pine, Virginia pine, or white spruce in 1 acre clumps creates winter cover for ruffed grouse (Riley 1957). Across the landscape, there should be about 1 to 5 acres of these clumps within each 40 acre unit (Rafaill and Vogel 1978).

Conifers can be planted on a 6'x6' spacing in clumps or in a band that is 60' wide. Planting the trees close together encourages lower branch intertwining, which can serve as a shield against the wind (Ruffed Grouse Society – unpublished report). Coniferous species to plant for ruffed grouse habitat include white spruce, Norway spruce, and white pine. Eastern red cedar is an excellent roost tree (Thompson and Fritzell 1988) but will likely only grow in the very southern portions of Pennsylvania. Grouse avoid roosting in hollows or other depressions where cold air settles and will move to higher elevations to roost (Whitaker 2003). For this reason conifers should be planted at higher elevations or on the uphill side of the managed area.

Habitat Goals

The national Ruffed Grouse Management Plan quantified habitat management objectives needed to restore populations to near 1980 levels by the target year of 2025. The 2025 grouse habitat target for PA is 3,272,000 acres (1,324,000 ha) - an increase of 1,437,000 acres (581,000 ha) from current estimates of occurrence. For the term of this plan, our over-arching habitat goal is to increase the amount of small-diameter size class (i.e. young) forest to 2,741,000 acres (1,109,000 ha) by 2020. This requires 905,000 new acres (366,000 ha) of young forest (or 90,500 new acres (37,000 ha) annually), 63% of the total new acreage needed to reach the 2025 habitat target level for PA. This acreage is in addition to what needs to be cut to maintain the 1,836,000 acres (743,000 ha) of commercial forest currently in the younger age classes. PA now has approximately 11.6% of its forest in young age classes and fulfillment of the plan would result in an additional 5.7% in that forest size class, for a total of 17.3% in early-successional stands.

The objectives and strategies of this plan are ambitious, and success depends largely on state agency capacity, landowner outreach and education, provision of technical assistance to landowners and stakeholders, and resources allotted to implementation. The decline of young forest in PA is a result of long-term changes in land use, private forest ownership and management, changing societal values, suppression of natural disturbance regimes, and other factors beyond the control of the PGC. These obstacles should not dissuade us from striving to implement the recommendations of this plan on PGC lands and the lands of public and private partners, for implementing this plan will improve conditions for many wildlife species.

Implementing the recommendations of this plan on PGC lands and the lands of public and private partners will improve conditions for many priority species. Increased attention to grouse habitat management will pay immediate and multiple dividends for ruffed grouse as well as American woodcock and many Species of Greatest Conservation Need identified in PA's Wildlife Action Plan (Table 5). There is substantial overlap between habitat needs of grouse and those of other priority wildlife species. In many cases, each acre of newly created habitat will contribute not only to habitat goals in this plan, but also to those in PA's woodcock management plan, as well as conservation priorities identified for nongame species in the Wildlife Action Plan.

Table 5. Conservation priority species associated with temporal shrublands, early-successional forest and/or naturally-occurring barrens, as identified in Pennsylvania's Comprehensive Wildlife Conservation Strategy (i.e. PA Wildlife Action Plan)

IMMEDIATE CONCERN	***SPECIFIC HABITAT REQUIREMENTS***
Allegheny Woodrat – R *Neotoma magister*	Sandstone and/or limestone rock habitats in unfragmented oak-hickory forest communities
Northern Bobwhite Quail *Colinus virginianus*	Scattered shrubs and briars interspersed with moderately dense herbaceous or grassy vegetation in York, Lancaster, Chester counties
Olive-Sided Flycatcher *Contopus cooperi*	Clearings within old growth conifer forest, sphagnum bogs, burned over forest, swampy lake edges, and beaver meadows
Spotted Turtle – R *Clemmys guttata*	Soft-bottomed aquatic habitats, including small streams, marshes, swamps, and vernal pools with upland forests or open habitats
Timber Rattlesnake – R *Crotalus horridus*	Sandstone and/or limestone rock habitats in unfragmented oak-hickory forest communities
HIGH LEVEL CONCERN	***SPECIFIC HABITAT REQUIREMENTS***
Appalachian Cottontail –R *Sylvilagus obscurus*	High elevation flat ridgetops dominated by mountain laurel with interspersed grassy openings; small, recently planted pine plantations with significant grass and forb cover; young clearcuts; also low elevation beaver meadows w/ thickets.
Eastern Spotted Skunk *Spilogale putorius*	Dry oak, Virginia pine, and pitch pine forested rocky ridges and ravines; reverting farmland
Golden-Winged Warbler -R *Vermivora chrysoptera*	Mosaic of herbaceous patches and shrubby thickets located along a forest edge, often at higher elevations; increasingly found in higher elevation bogs and forested wetlands
Long-Eared Owl *Asio otus*	Conifer (hemlock) woods intermingled with field and meadow
Mountain Earth Snake-R *Virginia valeriae pulchra*	Deciduous/mixed forests - moderate to steep hillsides with an abundance of rocky cover and vegetation
Northern Coal Skink – R *Eumeces anthracinus anthracinus*	Open habitat (less than 50 percent canopy cover by trees) where rocks and logs provide abundant cover
PA VULNERABLE	***SPECIFIC HABITAT REQUIREMENTS***
Yellow-Bellied flycatcher *Empidonax flaviventris*	Conifer forests and wetlands in higher elevations and northern counties; nest within large blocks of forested wetlands

Table 5. Conservation priority species associated with temporal shrublands, early-successional forest and/or naturally-occurring barrens, as identified in Pennsylvania's Comprehensive Wildlife Conservation Strategy (i.e. PA Wildlife Action Plan)

MAINTENANCE CONCERN	***SPECIFIC HABITAT REQUIREMENTS***
American Woodcock *Scolopax minor*	Moist habitats with small, scattered openings and dense stands of shrubs and young trees
Blue-Winged Warbler *Vermivora pinus*	Early-mid successional forests and thickets with openings; areas marked by patches of herbs, shrubs, and trees and often located near a forest edge
Brown Thrasher *Toxostoma rufum*	Brushy mosaic habitats ("odd areas" -hedgerows, multiflora rose thickets, overgrown fields and pastures, and forest edges); prefer large (>0.5 hectares) overgrown fields with open foraging areas, thick brushy nesting areas, abundant song perches
Prairie Warbler *Dendroica discolor*	Brushy second growth, dry scrub, low pine-juniper, mangroves, pine barrens, burned-over areas, and sprout-lands
Snowshoe Hare *Lepus americanus*	Dense thickets (>2-meter stem height); 5-15 years after clear-cutting in northern hardwoods and mixed-oak forests; natural scrub oak barrens
Whip-poor-will *Caprimulgus vociferus*	Early to mid successional and open, forested habitats near clearings
Willow Flycatcher *Empidonax traillii*	Low-elevation shrub swamp, wet meadow, and brushy habitats along streams and the edges of ponds and marshes; sometimes dry upland sites
Wilson's Snipe *Gallinago delicata*	Wet meadows and poorly drained pastures where cattle maintain the vegetation in a cropped condition
Yellow-Breasted Chat *Icteria virens*	Low, dense shrub habitats with an open or partially open tree canopy in regenerating clearcuts, forest edges, abandoned farmland, burned forest, and shrubby margins

Cooperative Partnerships

Accomplishing habitat management needs for grouse on a statewide basis will require not only participation by public land managers, but also an aggressive private lands initiative. Technical assistance and funding to both public land managers and private landowners will need to be provided. Private lands initiatives should include existing incentives for landowners to conduct forest habitat management for grouse and other wildlife species associated with young forest stands. A coalition of partnerships will be necessary to provide the extensive outreach to landowners that will result in implementation of effective habitat management.

In addition to informing landowners, we must make sources of technical assistance and funding available to them. Most forest management practices that benefit grouse will occur as part of commercial cuts providing profit to the landowner. Some situations, however, will require management of non-commercial species such as aspen and these may require financial incentives for the landowner to manage grouse habitat.

There are existing programs at the federal, regional, state, and local levels attempting to provide private forest landowners with technical assistance and funding and specifically

targeting early-successional forest habitat. These programs represent clear opportunities for collaboration in achieving grouse management objectives.

At the federal level, the U.S. North American Bird Conservation Initiative (NABCI) Committee is a coalition of government agencies, private organizations and bird initiatives in the U.S. that is dedicated to securing the long-term health of native bird populations (see the North American Bird Conservation Initiative website http://www.nabci-us.org/). The overall strategy is called All-Bird Conservation with benefits for all species and those habitats that support them. Information about land birds of conservation concern can be found at the Partners in Flight website: www.PartnersInFlight.org.

The USFWS Division of Bird Habitat Conservation offers both Standard Grants (large-scale projects) and Small Grants to protect bird habitat. Funding, derived via the North American Wetlands Conservation Act, is largely delivered through grants for wetlands protection, which could be useful for grouse conservation because the program also covers associated uplands - and early-successional habitats near wetlands can be ideal environments for grouse.

The USFWS also coordinates the State Wildlife Grants Program. This program has supported regional projects directed at working across state jurisdictional lines to address large-scale management issues through the Northeast Regional Conservation Needs program, which has funded an early-successional habitat project. The PGC also uses State Wildlife Grant funding to support wildlife diversity biologists in each of PA's six regions who deliver the Private Landowner Assistance Program (PLAP). PLAP provides technical assistance to landowners wishing to improve habitat for species of concern, including early-successional species such as woodcock. State Wildlife Grants have also supported regional shrub/young forest habitat projects in the Northeast. Clearly, habitat management for grouse can be furthered by all of these programs when partnerships are pursued.

There are also several initiatives occurring at the regional level that can provide direct synergy with grouse management objectives. The Appalachian Mountains Joint Venture Golden-Winged Warbler Initiative, the Appalachian Mountain Woodcock Initiative and the Northern Forests Young Forest Initiative, coordinated by Wildlife Management Institute, are region-wide efforts to address the plight of species depending on young forest habitats. Initiative partners are heavily involved in creating Best Management Practices documents for wildlife dependent upon young forests, developing demonstration areas, increasing landowner interest and awareness, and providing technical and financial assistance to private landowners. Though these initiatives are focused primarily upon other early-successional species (i.e. golden-winged warblers, American woodcock) their goals and objectives should further grouse management. By providing technical assistance to private landowners and leveraging local, state and federal funding and partners, these programs represent important partners in pursuing grouse management objectives and collaboration with these efforts is identified as an implementation priority of this plan.

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service provides technical and financial cost-share assistance to private landowners through various programs funded by the Farm Bill. Farm Bill support of the Wildlife Habitat Incentive Program (WHIP), Forestry Incentives Program (FIP), Environmental Quality Incentives Program (EQIP), and Forest Stewardship Program (FSP) funds, can further habitat activities that benefit grouse. The U.S. Fish and Wildlife Service's (USFWS) Partners for Fish and Wildlife Program has prioritized early-successional habitat and is actively assisting private and public land managers in getting this habitat established in PA.

State-level opportunities for partnership also abound. Penn State University Forestry Extension offers a Pennsylvania Forest Stewards Program, which is a network of volunteer forest landowners providing outreach and information on forest management to other private forest landowners. In PA we also have the Tree Farm Program. This program, sponsored by the Pennsylvania Forestry Association and coordinated by the DCNR Bureau of Forestry, targets private forest landowners to promote the growing of renewable forest resources on private lands while protecting environmental benefits and increasing public understanding of the benefits provided by productive forests. Outreach and education are central to the Tree Farm mission.

Many local stakeholders are also pursuing habitat improvement for young forest species. The Penn State Center for Watershed Stewardship (CWS), in cooperation with USFWS Partners for Fish and Wildlife and a local conservation association, has launched a private landowner outreach program in Centre County whereby they are enlisting landowners to collaborate in the development of a comprehensive watershed stewardship plan to improve streamside, and in particular, young forest habitats along Muddy Creek. To date, they have 13 interested landowners, representing roughly 900 acres, involved in the program (Lysle Sherwin, PSU CWS, personal communication). This type of multi-parcel management is the key to making large scale habitat improvement on private lands across the Commonwealth, and opportunities for collaboration with these efforts should be pursued. If successful, this may serve as an excellent model for conducting this type of outreach in other localities.

There are a variety of state and local partners who are actively involved in habitat improvement and conservation for this important game species and others in the habitat suite. Organizations such as the Ruffed Grouse Society's national and local chapters, Woodcock Limited, and Habitat for Wildlife are important partners in their support and active involvement in habitat creation, restoration and maintenance as well as supporting research and population management objectives.

Suitable habitat for grouse can exist in such heavily-managed systems as utility corridors. Establishment of permanent early-successional habitat and/or periodic maintenance disturbances are part of the long term management of these facilities. In Pennsylvania, Marcellus shale development is a new form of forest disturbance. Marcellus shale development will result in the creation of additional miles of permanent edge through forested areas. If natural gas development occurs with care and proper reclamation, it can

result in an increase in high-quality early-successional habitat. However, care must be taken that these edge corridors do not become habitat 'sinks' where grouse are attracted to the physical habitat structure only to be faced with unsustainable levels of predation. Thus, building partnerships with resource extraction and public utility operators for maintenance of shrubby conditions along powerlines, pipelines and other corridors is timely. Best Management Practices documents should be distributed to these partners and the PGC should encourage their implementation.

Finally, managers must remain vigilant regarding large-scale emerging issues that can affect grouse populations. Grouse are a cold-adapted species which develop 'snowshoes' (i.e. pectinations) on their feet during winter, reach their highest abundance in northern forest types, and roost in deep powdered snow to conserve energy and avoid predators. The effect of climate change on ruffed grouse is unknown but is likely to be detrimental if warming persists in causing annual snowfall accumulations and days of snow cover to decline. Therefore, opportunities to collaborate with Federal and State climate change planning efforts should be pursued. Such opportunities may include enhanced adaptation planning for grouse and early-successional habitats, as well as seeking funding for adaptive management, habitat enhancement, technical assistance to landowners, improved agency capacity, and/or enhanced research and monitoring.

Changes to energy production, some of which are driven by climate change concerns, should be monitored. These include natural gas development in both Marcellus and Utica formations, biomass energy incentives and facility developments, and efforts to find markets for low use wood - all developments that may impact grouse habitat over large areas. All can provide opportunities and challenges in managing this important wildlife resource, and the PGC should seek opportunities to collaborate with involved stakeholders in these sectors.

SECTION V. RECREATIONAL SIGNIFICANCE AND PUBLIC INTEREST

Hunting and Viewing

The ruffed grouse is the most popular small game bird in PA. In 2009, the number of grouse hunters ranked third among all small game (including migratory species) participants in PA (Boyd and Weaver 2010). Among bird hunters, only turkey had more participants, with grouse hunters outnumbering pheasant hunters and waterfowl hunters in both number of participants and days afield (Boyd and Weaver 2010). PA had slightly more than 104,000 grouse hunters in 2009. Approximately 76,000 grouse were harvested in PA during the 2009 season.

The number of grouse hunters has been decreasing steadily since the mid-1980s, when about 435,000 hunters pursued grouse. Harvests are also down from the almost 525,000 taken in 1988, and the 100,000+ grouse harvested annually just 8-10 years ago (Boyd and Weaver 2010). Though current participation is below previous levels, a return of abundant grouse in quality habitats, and enhanced outreach efforts to hunters, will likely foster an increase in participation levels.

Grouse hunting participation remains high and, not surprisingly, economic contributions of grouse hunters are significant. Retail sales from grouse and pheasant hunting in PA accounted for $143 million in 2006, resulting in $75 million in salaries, wages, and income, supporting more than 3,000 jobs, generating more than $18 million in state and local tax revenue, and thus creating $247 million in economic multiplier effect (Southwick Associates 2007). Assuming that hunting expenditures are proportional to numbers of hunters and hunter days by species, PA grouse hunter expenditures account for more than half of that spending, resulting in approximately $79 million in retail sales per year in PA (Southwick Associates 2007).

Pennsylvania is fortunate to have higher flush rates than all surrounding states (Figure 10), and thus the opportunity to actively manage for abundant grouse populations persists. Ruffed grouse provide millions of days of recreation each year for people in the eastern United States. With average age of hunters increasing, competition for leisure time increasing, and the increasing costs of hunting travel (i.e. gasoline), Pennsylvania may realize multiple benefits from an increased focus on grouse management. For example, the PGC Game Bird Section was recently contacted by a sporting goods retailer in the southeastern US wishing to know of prime PA grouse hunting destinations. He explained that customers wanted a grouse destination closer-to-home than the Great Lakes states. With targeted habitat management across large spatial scales – and targeted communications - Pennsylvania could establish itself as an important grouse hunting destination in the East.

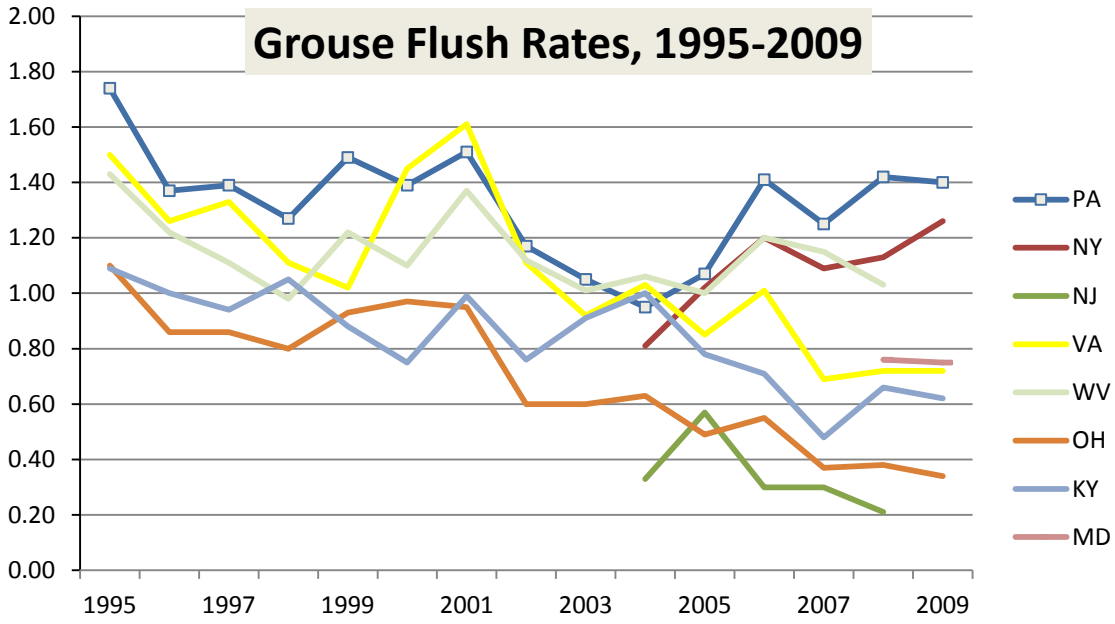


Figure 10: Grouse flushing rates in Pennsylvania compared with surrounding states.

Other outdoor enthusiasts such as hikers, bird watchers, dog trialers and photographers also appreciate encounters with ruffed grouse. The number of days they spend in their pursuits, relative to grouse, is unknown. Anyone who spends appreciable time in the woods has heard and appreciated the drumming of male grouse. Hunting and nonhunting enthusiasts, public and private forest landowners, and sporting and other conservation organizations like the Ruffed Grouse Society and Audubon Society, are all stakeholders with an interest in the management of our state bird. It is likely that targeted information and outreach efforts could increase stakeholder appreciation of grouse and an increased awareness of the habitat management efforts necessary to improve grouse populations. Given current public perceptions on forest management, this outreach is vital to successful implementation of the habitat objectives of the National and PA grouse management plans.

As the state bird and a dramatic species, grouse have a unique opportunity to appeal to non-consumptive stakeholders such as local Audubon organizations and outdoor recreation organizations. Though this brown bird is not 'showy' in the sense of bright coloration, grouse represent a great opportunity for environmental education programming - a species that produces dramatic drumming and thundering flight for wildlife watchers. Non-consumptive partners can be crucial in furthering public support for early succession management to PGC's non-traditional audiences. Opportunities for collaboration should be pursued.

Education/Outreach

A variety of species are declining throughout the eastern United States as abundance of shrub-dominated and young forest habitats decrease. These trends are likely to continue on non-industrial private forest lands as ownership fragmentation increases and tract size decreases and on public forest lands due to societal attitudes toward proactive forest management, especially even-age treatments (Dessecker and McAuley 2001).

One of the greatest challenges ahead in dealing with the decline of young forest habitat and associated bird species is convincing the public that action is needed and that such efforts are not contradictory to maintaining diverse ecosystems (Litvaitis et al. 1999). Species associated with temporal shrublands require brushy cover, a habitat type not generally favored by private land owners or the forest industry because of its lack of economic return. Furthermore, these habitats require active management to prevent forest succession.

Outreach targeted at both professional and private audiences could help highlight the importance of these habitats and encourage their long-term maintenance and management. Important components of a public (and professional) outreach message would include: 1) most species using this habitat type are in decline; 2) shrubland-associated species are not typically sensitive to patch size, unlike grassland-dependent species, therefore even efforts on small properties can improve local populations if placed in proper landscapes; 3) this habitat occurs in Pennsylvania largely as a result of human disturbance either through forestry practices or former agricultural land, so active management is required.

Public Lands

PA has almost one fourth of its forest land in public ownership. Habitat management for grouse on public lands will require the PGC to communicate and coordinate with state, federal and local government agencies to affect management on these diverse public lands. The Game Commission can lead the way by establishing one or more new Special Wildlife Management Areas targeting grouse and habitat cohorts (also known as Grouse Management Areas, GMAs) in each region. Local PGC personnel (e.g. land managers, foresters, and biologists) will generally be best-positioned to identify specific locations and management prescriptions for these management areas and/or demonstration areas. But in each case there should be an explicit focus on either illustrating proven techniques and best management practices or testing the effectiveness of different management prescriptions.

Efforts should be made to evaluate success of these GMAs by implementing pre- and post-treatment population monitoring of grouse and other target species. Those used as Demonstration Sites can be assessed by reviewing the level of use and effectiveness of public outreach efforts via pre- and post-testing or follow-up evaluations with participants. Though labor intensive, population monitoring and public outreach via demonstration sites provide an ideal opportunity to engage public and private land

managers, land owners, consumptive and non-consumptive stakeholders and volunteers, thereby furthering public recognition of the importance of young forests. The PGC should lead by actively pursuing grouse habitat management objectives on State Game Lands, thus not only providing ample grouse management areas and demonstration sites but also setting an example for other landowners.

Many State Parks are realizing the overlap between consumptive and non-consumptive interests and have become actively involved in the habitat restoration efforts targeting woodcock. Collaboration on grouse management would carry multiple benefits to multiple species.

Private Lands

The majority of timberland in PA is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals. Outreach will play a critical role in PA, because there is a lack of understanding – even among some public land managers - that grouse and the entire early-successional bird suite is more threatened, due to more widespread and greater declines in populations, than any other species suite (grassland suite is in a similar predicament). Managers, environmentalists, and the public need to be educated that shrub lands and young forest habitats are important to grouse and need to be actively managed, and that these habitats provide critical diversity in many forested areas.

Informational materials highlighting best management practices should be developed and distributed. Provision of regular information through newspaper, radio, web-based and television outlets, and a program to develop and make public use of demonstration sites throughout the state would be beneficial in helping to educate the public. Combining efforts with other PGC activities focusing on early-successional habitats and species would give the greatest return in providing habitat guidance to those interested in managing for this suite of wildlife.

Implementation of this Plan

Implementing the recommendations of this plan on PGC lands and the lands of public and private partners will improve conditions for ruffed grouse and many other priority species. Increased attention to grouse habitat management will pay immediate and multiple dividends for ruffed grouse as well as American woodcock and many Species of Greatest Conservation Need identified in PA's Wildlife Action Plan (Table 5). There is a substantial overlap between habitat needs of grouse and those of other species dependent upon young forest. In many cases, each acre of newly created habitat will contribute not only to habitat goals in this plan, but also to those in PA's woodcock management plan, as well as the conservation priorities identified in the Wildlife Action Plan. In fact, PA's Wildlife Action Plan identifies "Targeted Management of Early-Successional Forest Habitats" as a Statewide Priority Conservation Action.

In most sites, high-quality young forest habitats are available to grouse for approximately one decade because stem densities decrease rapidly through natural thinning as succession proceeds. Thus, ongoing creation of young forest habitat is a prerequisite for maintaining huntable grouse populations (Dessecker and McAuley 2001). This condition is best attained by regularly (every 10-20 years) creating a new regeneration cut in a management compartment. However, there are a host of variables that may compromise this objective, including the price of pulp and timber, insect infestations, public acceptance, deer abundance effects, the forest management capacity of public agencies and private landowners, and presence of advanced regeneration on the site. Some of these factors are already being addressed by public and private land managers, while strategies for addressing others are presented as part of this plan.

Though the barriers to progress are many, the payoff is great for PA's wildlife, and the time to focus is now. Many specific strategies are identified below. Some are underway, while others await attention. Managers should also remain alert for newly emerging opportunities (e.g. biomass energy production, low use wood markets) to further the creation and management of early-successional habitats and their multiple species benefits.

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APPENDIX 1. IMPLEMENTATION SCHEDULE FOR MANAGEMENT PLAN FOR RUFFED GROUSE IN PENNSYLVANIA, 2011-2020.

	By End of Year										
Objectives and Strategies	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Responsible Bureau or Region**
Population Objective											
Strategy:											
1.1 Estimate statewide grouse hunter numbers and harvests.	●	●	●	●	●	●	●	●	●	●	BWM
1.1.1. Annually conduct the Game-Take Survey.	●	●	●	●	●	●	●	●	●	●	BWM
1.2 Monitor trends in indices of grouse populations, both overall and in good habitat.	●	●	●	●	●	●	●	●	●	●	BWM/Regions
1.2.1. At 5-year intervals, review and analyze Christmas Bird Count trends.					●					●	BWM
1.2.2. Annually conduct the Grouse Cooperator Survey.	●	●	●	●	●	●	●	●	●	●	BWM
1.2.3. Annually conduct the PGC Summer Grouse Sighting Survey.	●	●	●	●	●	●	●	●	●	●	BWM/Regions
1.2.4. Review additional population monitoring tools used in other jurisdictions, and implement if appropriate.		●	●								BWM
1.2.5. Identify, assess, and manage factors limiting grouse populations.	●	●	●	●	●	●	●	●	●	●	BWM

Objectives and Strategies		By End of Year										Responsible Bureau or Region
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Population Objective												
	Strategy:											
1.3	Conduct research to clarify the effects of harvest on grouse populations in relation to habitat quality.				●	●	●	●				BWM/Regions
1.4	Maintain recommendation for current structure of statewide grouse season until research results are available.	●	●	●	●	●	●	●				BWM
1.5	Recommend adjustments to season length and/or bag limits at appropriate scale (statewide, grouped WMUs, or individual WMUs) to avoid additive harvest mortality.								●	●	●	BWM
1.6	Monitor grouse population response to targeted habitat treatments in order to assess effectiveness of various management approaches.	●	●	●	●	●	●	●	●	●	●	BWM/Regions
1.7	Pursue a multi-species approach to implementation in order to maximize benefits.	●	●	●	●	●	●	●	●	●	●	BWM, BWHM, Regions

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.1 Identify funding sources to support non-commercial forest management practices that benefit grouse.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM
2.1.1. Develop and/or continue partnerships for habitat funding.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM
2.1.2. Annually budget monies from the Game Fund for non-commercial forest habitat management.	●	●	●	●	●	●	●	●	●	●	Executive Office/BWHM
2.1.3. Explore non-traditional funding sources to support management of early-successional habitats.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM
2.2 Monitor statewide early-successional forest trends.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM
2.2.1. Annually review available forest inventory data (USFS, DCNR, PGC).	●	●	●	●	●	●	●	●	●	●	BWM/BWHM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.3 Implement targeted management of priority scrub-shrub habitats capable of supporting grouse.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM
2.3.1. Manage priority scrub oak thickets with fire and other appropriate treatments.	●	●	●	●	●	●	●	●	●	●	BWHM
2.3.2. Provide technical assistance to public and private landowners managing priority scrub-shrub sites.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM
2.3.3. Identify sites for establishing high-quality shrubland habitat on newly-reclaimed areas.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM
2.3.4. Encourage the conversion of small grassland sites [<15 acres; <6 hectares] to shrublands.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.4 Develop a strategic approach to monitoring species' response to early-succession habitat management activities.	●	●									BWM/BWHM/ Regions
2.5 Incorporate grouse habitat management in public and private land management planning and implementation.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM
2.5.1. Identify the best remaining grouse forests where large-scale, early succession habitat can be created.	●	●									BWM/BWHM
2.5.2. Identify priority riparian areas to receive targeted enhancement of riparian thicket habitats.			●	●							BWM/BWHM
2.5.3. Identify optimum size, shape, and arrangement of grouse mgmt treatments (including prescribed burning) in mixed oak forests of the SC and SE regions.					●	●					BWHM/BWM

	By End of Year										
Objectives and Strategies	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Responsible Bureau or Region**
Habitat Objective											
Strategy:											
2.5.4. Explore methods for increasing grouse abundance in the SW region where the combination of northern hardwoods and mixed mesophytic forests should be capable of providing high-quality grouse habitat.							●	●			BWHM/BWM
2.6 Create 8,000 additional acres (3,000 ha) of young forest grouse habitat on SGLs annually.	●	●	●	●	●	●	●	●	●	●	Regions/BWHM
2.6.1. Disseminate habitat management information and provide outreach programs for PGC land management staff.		●		●		●		●		●	BWM/BWHM
2.6.2. Identify SGL areas for targeted grouse mgt.	●	●	●	●	●	●	●	●	●	●	Regions/BWHM/ BWM
2.6.3. Identify opportunities to incorporate grouse management into ongoing operations on Game Lands.	●	●	●	●	●	●	●	●	●	●	Regions/BWHM/ BWM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.6.4. Implement grouse management objectives identified in Comprehensive Game Lands Plans.	●	●	●	●	●	●	●	●	●	●	Regions/BWHM
2.6.5. Use prescribed fire on appropriate sites as a method to maintain early-succession habitat and improve forest habitat.	●	●	●	●	●	●	●	●	●	●	BWHM/Regions
2.7 Foster the creation of 16,000 additional acres of grouse habitat on other public lands annually (statewide 10-year target of 160,000 acres).	●	●	●	●	●	●	●	●	●	●	Executive Office/BWM
2.7.1. Disseminate information and outreach programs to public land management partners.		●		●		●		●		●	BWM/BWHM
2.7.2. Meet with biologists, foresters and/or policy staff of other public land management agencies to seek areas of collaboration.		●		●		●		●		●	Executive Office/BWM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.8 Foster the creation of 66,000 additional acres of young forest grouse habitat on private lands annually.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Regions/Partners
2.8.1. Cooperate with existing programs to improve grouse habitat.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Regions
2.8.2. Deliver technical assistance programs for private landowners.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Regions
2.8.3. Disseminate information and outreach programs to partners working with private landowners.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Regions/Partners

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.9 Develop one or more new grouse management areas (to benefit multiple early-succession habitat species) per PGC region and cooperating DCNR Forest Districts.	●	●	●	●	●	●	●	●	●	●	Regions/BWHM/ BWM/BIE/ Partners
2.9.1. Identify agency capacity needs for developing Grouse Management Areas.	●	●									BWM / BWHM/Regions/ Partners
2.9.2. Review SGL Comprehensive Plans to identify those Game Lands that specify grouse management as a priority.	●	●									BWHM/Regions/ BWM
2.9.3. Identify DCNR managers with an interest in establishing special early-successional habitat management areas.	●	●									BWM/Partners
2.9.4. Work with land managers to develop the landscape criteria used to select and delineate a grouse management area.	●	●	●								BWM/BWHM/ Regions

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Habitat Objective											
Strategy:											
2.9.5. Identify appropriate harvest rotations and planning units within Management Area(s) to arrive at realistic cutting schedules that will sustain grouse and other ESH species.			●	●	●						BWHM/ Regions/BWM
2.9.6. Use select sites as Demonstration Areas to distribute information on site-appropriate early-succession habitat management.					●	●	●	●	●	●	BWM/BIE/ BWHM/Regions
2.10 Assess the effect of various regeneration techniques (appropriate for forest type and site) and monitor grouse population response.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Regions

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Human Dimensions Objective											
Strategy:											
3.1 Conduct human dimension studies.		●	●	●				●			BWM/BIE/ Executive Office/Regions/ Partners
3.1.1. Every 5 years, starting in 2013, conduct surveys of PA license buyers to obtain detailed information on their activities and opinions relative to grouse hunting.			●					●			BWM/BIE
3.1.2. Modify Grouse and Woodcock Cooperator Survey form to more fully assess participation and hunter satisfaction.	●	●									BWM
3.1.3. Evaluate feasibility of modifying Game Take Survey to assess grouse hunting participation across a broad cross-section of PA hunters.	●	●									BWM
3.1.4. Incorporate human dimensions results into season recommendations where feasible.								●	●	●	BWM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Human Dimensions Objective											
Strategy:											
3.2 Identify barriers and opportunities in fostering public support and participation in ESH mgt and identify key messages and delivery mechanisms.	●										BWM/BWHM/ BIE/Partners
3.3 Develop effective communication strategies on the need for young forest management and distribute educational materials through various media.	●	●	●	●	●	●	●	●	●	●	BWM/BIE/ Partners
3.4 Educate the public and policy makers about active forest management and the ecological value of young forests to grouse/other wildlife.	●	●	●	●	●	●	●	●	●	●	BIE/BWM/ Partners
3.5 Continue to develop partnerships in order to accomplish research, funding and habitat strategies.	●	●	●	●	●	●	●	●	●	●	Executive Office/Partners/ BWM/BWHM

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Human Dimensions Objective											
Strategy:											
3.6 Distribute grouse mgmt information through various media, field days and demonstration area tours, private landowner assistance programs, and other public contact opportunities.	●	●	●	●	●	●	●	●	●	●	BWHM/ BWM/BIE
3.7 Make use of Grouse Management Areas as demonstration areas for public and private land managers.					●	●	●	●	●	●	Regions/BIE/ BWM/BWHM
3.7.1. Conduct at least one workshop or field trip per Region for public land managers at a Grouse Management Area.	●		●		●		●		●		Regions/BWHM/ BWM
3.7.2. Conduct workshops on grouse habitat management for organizations representing interested land owners and managers.	●	●	●	●	●	●	●	●	●	●	BWM/BWHM/ Partners

Objectives and Strategies	By End of Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Responsible Bureau or Region
Human Dimensions Objective											
Strategy:											
3.8 Build partnerships with resource extraction and public utility operators for maintenance of high-quality early-successional habitat conditions along powerlines, pipelines, utility rights of way, natural gas well pads, and other corridors.	●	●	●	●	●	●	●	●	●	●	BWHM/BWM
3.8.1. Distribute BMPs tailored to utility partners and encourage their implementation.	●	●	●	●	●	●	●	●	●	●	BWHM/BIE/BWM
3.9 Annually evaluate progress of Plan implementation and communicate with stakeholders	●	●	●	●	●	●	●	●	●	●	BWH/BWHM

APPENDIX 2: SUMMARY OF PUBLIC COMMENTS

The preliminary Management Plan for Ruffed Grouse in Pennsylvania 2011-2020 was made available for public comment beginning June 28, 2011. A news release and posting on the PGC's webpage announced the comment period, and several large newspaper outlets carried additional coverage. The document was available electronically through the webpage or in printed format by request. Comments could be submitted via the webpage, by e-mail, or in writing. Comments were received through September 13, 2011.

We received correspondence from 93 correspondences from 90 individuals. In addition, three partner agencies / organizations submitted written comments: Ruffed Grouse Society (RGS), DCNR Bureau of Forestry (BOF), and Pennsylvania Audubon (AUD). Most replies contained more than one comment. For example, "This plan is sound. I would support a habitat stamp. This plan will benefit multiple species." was divided into 3 comments. We identified a total of 327 unique comments (157 distinct themes, with many of these repeated by multiple respondents), demonstrating the high level of interest and passion that grouse hunters and other stakeholders have for this species. These comments were grouped into the following categories: Support Plan, Population Management, Hunting Regulations, Habitat Management, Public Outreach and Education, Implementation, and Other/Nonrelated. It is interesting to note that although the Ruffed Grouse Society distributed specific talking points to its membership for use in commenting on the plan, only two respondents repeated these talking points in a recognizable manner. However, the RGS outreach to its membership likely increased the overall response rate which was beneficial to the PGC's goal of seeking input.

Seventy-five comments explicitly expressed *support for implementing the plan*. No comments stated lack of support for implementation, nor did any dismiss the need for the plan. Respondents generally commented on the plan's thoroughness, and there was common consensus that its implementation would result in multiple benefits to game and nongame species, local economies, and the future of hunting. There was repeated appreciation that ruffed grouse were set to receive targeted management attention, which many viewed as lacking in the past and/or overdue. Several voiced dissatisfaction with the relative priority that PGC has placed on other species in recent years at the perceived expense of grouse management. Several commended the PGC on undertaking a focused effort to manage grouse and their habitats and stated that the plan would be a good example to other states, as well as improve the recruitment and retention of hunters.

Forty-five comments were received regarding grouse *population management*. Many cited declines in grouse numbers over time, while one person reported increasing numbers. Apart from comments on effects of hunting and habitat on populations (which were grouped under their own separate categories), a number of comments addressed various other risk factors that could affect grouse populations. Of these, the majority of respondents cited concerns over predation and competition with other species. Smaller numbers of respondents mentioned other factors, such as disease and constant disturbance from various sources, which could plausibly impact grouse populations, though the extent to which they represent significant population impacts is unknown but considered minimal. Many of the public comments highlight the need for educational materials to be developed on the topics. Some point the way to intriguing research possibilities.

While various respondents called for research into population and habitat issues, there was also the view that habitat management should not wait for research projects to be conducted.

There was some sentiment, primarily from RGS, that PGC indices of grouse populations need to be improved. Methods to assess grouse populations on a large landscape scale are limited and each have their own issues regarding cost/benefit, feasibility and reliability, and statistical rigor. PGC has considered various population indices in the past, and we identified in Plan Strategy 1.2.4 that we would continue to assess our approach to measuring grouse populations and implement new ones in PA as appropriate.

Thirty-three comments were received relating to grouse *hunting regulations*. Twenty-two of these comments related to season length or bag limits. Of these, 77% supported a reduction in season length (primarily) or bag limit, with particular emphasis placed on reductions in the southern tier. Eighteen percent expressed support for the current season length, and 1 additional commenter wanted an increase in bag limits. It is important to note that at least two reviewers support a reduction in season length if research shows that harvests are an additive mortality factor for grouse - but would not support a reduction based solely on hunter opinion surveys. Of remaining comments, several called for restrictions on the manner and method of harvesting grouse, including regulations to limit the manner of take (only birds on the wing, shotgun only) or hunting party size. There seems to be a perception that some hunters are taking grouse opportunistically (and unethically in the view of those providing comment).

Ninety-five comments concerned *habitat management*. Of these, the majority expressed general support for improving early-successional habitat (ESH). Several respondents provided detailed advice on habitat management practices they supported or opposed. Many identified locations where habitat was particularly good or in need of improvement. Several hunters recognized that ESH/small game habitat is improving in some areas due to lower deer numbers, and there were several statements of support for the Deer Management Assistance Program (DMAP). There was a high level of support for even-aged forest management, particularly large harvests well-spaced on the landscape. There was a concern among many respondents that current forestry practices do not produce high-quality grouse habitat, and an observation that seemingly-suitable habitats remain unoccupied in some areas. Several compliments were received on current management practices occurring on specific SGLs.

In addition, RGS provided detailed comments on the management of various forest types found in PA. Most of these issues are already found in the plan (included implicitly under the directive that land managers should 'follow SILVAH guidelines'). In total, RGS's habitat management comments highlight the need for differing management approaches to create high-quality ESH based upon the forest type in which management occurs. This fine-tuned approach to ESH management should continue to be a priority as the grouse plan is implemented in various forest types and sites across Pennsylvania.

Eleven comments provided suggestions for *public outreach and education*. Many included specific ideas for products, processes, and traditional/non-traditional stakeholder groups to include in outreach efforts. Some of the more-detailed suggestions may be useful as we proceed with development of products and processes to disseminate information.

Fifty-eight comments provided suggestions regarding *plan implementation*. Clearly, reviewers were eager to see the plan implemented and requested that the PGC and partners allocate the resources (funding, personnel, and time) necessary to carry out the plan. Many suggested particular partnership opportunities for the PGC to consider. There was stated support for a dedicated stamp to support research and habitat management, but also the recognition that other funding would still be required since there are not enough upland bird hunters (i.e. stamp buyers) to support a comprehensive program. There was also the suggestion that PGC develop a way to assess success/failure/progress on plan implementation in terms of acreage created, population response of grouse (and other species), or a combination of measures. There was concern that PGC lacks capacity and programming to meet the private lands acreage goals for the plan, and various suggestions were provided to enhance private lands programs and/or their effectiveness. Integrating implementation of the grouse plan with those of woodcock, quail, golden-winged warbler and other priority ESH species was identified as one way to improve the efficiency of implementation while ensuring multiple species benefits. Many comments highlighted the need for information and outreach on a variety of topics, targeting both consumptive and non-consumptive users. In implementing the plan, we will continue to seek ways to develop information on pertinent topics and effectively disseminate the information to stakeholders. Enhanced coverage of topics in *Game News*, and perhaps directly to the 500+ Grouse and Woodcock Hunter Cooperators would be an efficient way to target educational materials to traditional constituents, while other avenues will need to be pursued to reach non-traditional audiences.

A side benefit of the public comment process was the opportunity to identify avid grouse hunters who were not participants in the PGC's Grouse Cooperator Survey, and request their enrollment. This resulted in the recruitment of 37 new cooperators, which will enhance our ability to monitor grouse population trends in good habitat, and to communicate with important constituents via the annual newsletter provided to participants.

<u>Changes to Grouse Plan Resulting from Public Input</u>

The public response to the PA Grouse Management Plan clearly showed support, with 100% of reviewers stating a desire to manage and maintain grouse populations and grouse habitat. Based on public input, four new strategies were included in the final plan, and an additional strategy was re-worded. Though these new strategies were considered implicitly during plan development and are consistent with the content of the preliminary plan, stating them explicitly in the final plan clarified and expanded upon certain aspects of the existing objectives. The changes were as follows:

1. Under the population objective, we added a new strategy (1.2.5) to identify, assess, and manage additional factors (not directly related to hunting or habitat) that may limit grouse populations.
2. Under the population objective, we re-worded strategy 1.6 to more adequately reflect the fact that these monitoring efforts will not occur solely in grouse management areas.
3. Under the population objective, we added a new strategy (1.7) affirming our intent to integrate grouse management with other high-priority species efforts so as to maximize benefits to the full suite of wildlife species dependent on young forests.

4. Under the habitat objective, we emphasized the importance of assessing the effects of various forest management techniques on grouse populations (previously included as a sub-strategy under a broader strategy), by elevating such research to the level of a separate new strategy (2.10).
5. Under the human dimensions objective, we added a strategy (3.9) to annually evaluate (and communicate to partners and stakeholders) our progress on Plan implementation, similar to our practice in regard to existing management plans for other species.

Other than these strategy additions, public comments did not significantly change the plan. The overall direction, goals, and major objectives remained identical to those presented in the preliminary plan.

PUBLIC COMMENTS ON THE PA GROUSE MANAGEMENT PLAN			
COMMENTS		**NUMBER**	**OBJECTIVE / STRATEGY**
SUPPORT PLAN		**75**	ALL
1.	Plan well done.	11	
2.	Efforts to improve the habitat and increase the number of Grouse are worthwhile.	5	
3.	Plan is a good example for other states.	4	
4.	Good plan, but perhaps too late.	3	
5.	The ruffed grouse deserves increased management attention.	11	
6.	Spend more effort on grouse and less on pheasants and quail.	5	
7.	Spend more effort on grouse and less on deer, bear, and turkey.	4	
8.	This plan will benefit multiple species.	16 + RGS, BOF, AUD	Strategy 1.7
9.	Bringing back the grouse population will increase hunter participation and recruitment.	5	Strategy 3.1
10.	Improved populations will attract hunters from other states.	1	Strategy 3.1
11.	Implementation will benefit local economies.	RGS/BOF	
12.	General support for PGC wildlife management.	3	
13.	Specific support for acreage goals.	2	
POPULATION MANAGEMENT		**45**	
14.	Current population indices need improvement.	RGS/BOF	Strategy 1.2
15.	Improve population assessments (drumming counts).	2	Strategy 1.2
16.	Grouse population changes in remote areas may not be effectively detected by BBA or CBC.	RGS	Strategy 1.2
17.	RGS willing to assist in development of more robust population indices and surveys.	RGS/BOF	Strategy 1.2
18.	I believe harvest figures are much lower than you cite.	1	
19.	Do not need to improve population assessments.	1	
20.	Consider predator impact on the birds (hawks, fishers, coyote, fox, and other furbearers most cited).	6	Strategy 1.2.5
21.	Predators need to be controlled.	3	
22.	Consider impact of competing species on grouse populations (nest predation, competition for mast, etc.).	3	Strategy 1.2.5
23.	Consider impact of constant disturbance on grouse populations (deer hunters in overlapping special seasons, ATVs, wind turbines most cited).	4	Strategy 1.2.5
24.	Consider disease impacts (WNV most often cited).	2	Strategy 1.2.5
25.	Consider re-nesting issues and weather impact on chick mortality.	1	Strategy 1.2.5

26.	Consider wind turbine effects on grouse mortality.	1	Strategy 1.2.5
27.	Consider impacts of climate instability – grouse are disappearing from southern portions of their range in Appalachians and PA.	1	Strategy 1.2.5
28.	Consider trap and transfer of grouse into suitable but unoccupied areas.	2	
29.	Consider raising and stocking grouse.	1	
30.	Focus on improving the number of healthy grouse pairs in the spring.	1	Strategy 1.2.5
31.	Isolated grouse populations may need extra protection to maximize genetic diversity as they recover.	1	Strategies 1.3, 1.5
32.	Support study of hunting impact on grouse.	AUD	Strategy 1.3
33.	Research on hunting impacts will only be useful if a large-scale project.	1	Strategy 1.3
34.	Use Cornell University's eBird program to identify grouse "hotspots" and gain insight into habitat these birds truly prefer.	1	
35.	Study ratio of scrub/forested habitat intermixed with agricultural fields that appeal to grouse.	1	
36.	DCNR BOF willing to assist in landscape level planning.	BOF	Strategy 3.5
37.	Prioritize habitat management over research.	4	Strategy 3.9
38.	Pennsylvania is not a "super" state for grouse – our habitats will not support numbers on the level of states in the Upper Midwest.	1	
HUNTING REGULATIONS		**33**	
39.	Support for reducing or eliminating the late season.	6	Strategies 1.4, 1.5, 3.1
40.	The season needs to be shortened immediately in the southern tier.	3	Strategies 1.4, 1.5, 3.1
41.	Support for shortening the hunting season.	2	Strategies 1.4, 1.5, 3.1
42.	Support for PGC closure of grouse hunting in certain areas or for a year or two across the entire state.	1	Strategy 1.4
43.	It should be against the law to shoot a Ruffed Grouse in Area 2A.	1	Strategy 3.1
44.	General concern about over-harvest.	1	Strategy 3.1
45.	Err on the side of caution when setting harvest regulations until / during hunting mortality study.	AUD	Strategies 1.3, 1.4
46.	Support a shortened season, but only if research shows that existing seasons and bag limits result in additive mortality – not based upon a hunter survey.	2	Strategy 1.5

47.	Late season could impact grouse / but hunter numbers low in late season.	1	Strategy 1.4
48.	Support for the current late season.	2	Strategy 1.4
49.	Do not support lengthening the # of hunting days, hunting hours, or bag limits.	1	Strategy 1.4
50.	Support for reduced bag limit.	1	Strategy 1.4
51.	Support single bird bag limit in southern tier.	1	Strategy 1.4
52.	Support increased bag limit.	1	Strategy 1.4
53.	Make it illegal to shoot a gamebird any way but in full flight. Being big game, turkeys would be exempt from this.	2	Strategy 3.1
54.	Limit grouse shooting to shotgun only, to prevent deer hunters from taking pot shots from treestands.	1	Strategy 3.1
55.	Limit hunting party size.	1	Strategy 1.4
56.	Clarify the rules for hunting grouse around wind turbines on SGLs.	1	Strategy 3.1
57.	Should not allow the Ruffed Grouse Society to commercially sell or auction hunts for wild birds.	2	Strategy 3.1
58.	Concerns about unethical and illegal harvests.	1	Strategy 3.1
59.	Reinstate dog training closure during nesting season.	1	
HABITAT MANAGEMENT		**95**	
60.	Clarify math used to derive habitat goals.	RGS	Habitat Objective
61.	Goal should be 25% of our forests less than 25 years old. This would provide a 100 year harvest schedule, which if properly managed would provide a very diverse habitat in our woodlands.	1	
62.	Identify how acreage of ESH creation/maintenance will be tracked.	1	Strategy 3.9
63.	General support for improving early succession habitat.	9	Habitat Objective
64.	Mature timber monoculture does not sustain healthy wildlife populations.	1	
65.	Increased ESH on the landscape will provide more room for all hunters and limit conflicts.	1	Strategy 3.1
66.	Define how ESH target areas will be selected and ensure no impact to other habitat types (i.e. interior forest habitat).	AUD	Strategies 1.7, 2.6, 2.7, 2.8
67.	Support for increased forest management to create ESH on SGLs. Locations cited: SGL 39. Northcentral Region/ WMU 2G.	5	Strategy 2.6
68.	Support for increased forest management to create ESH on other public lands. Locations cited: Tiadaghton S.F. Bald Eagle S.F. Michaux S.F. Buchanan, Rothrock, Tuscarora S.F.	6	Strategy 2.7

69.	BOF eager to collaborate on ESH planning on State Forest lands.	BOF	Strategies 1.7, 2.7, 3.5
70.	Support for increased forest management to create ESH on private lands.	1	Strategy 2.8
71.	Expand program and funding details regarding how goals can be accomplished on private lands.	AUD	Strategy 2.8
72.	Detailed input info specific forest mgt practices. Specifically: Retain mast producing trees in ESH. Stop gypsy moth spraying program. Stop spraying all forest undergrowth. Shorten rotation of cuts to create ESH. Stop crop tree release program. Top-dress replanted roads with limestone. Support for prescribed burning. High-quality seeded roads important.	8	Strategy 1.6, 2.10
73.	<u>Northern Hardwoods Forest Type:</u> • Separate Allegheny hardwood and northern hardwood forest types in planning and implementation. • Follow SILVAH guidelines in forest management. • Black cherry/red maple savannahs represent possibilities for artificial regeneration (thermal cover or native shrub underplanting, aspen conversion,) or conversion to brood areas with warm season grasses.	RGS	Strategy 1.6, 2.10
74.	<u>Mixed Mesophytic Forest Types</u>: • Utilize even-aged management systems in mixed mesophytic forest types rather than thinning. • Precommercial thinnings of stands have not been proven to be beneficial to ruffed grouse.	RGS	Strategy 1.6, 2.10
75.	<u>Even-aged mgt:</u> • Provide no less than 50% sunlight to the forest floor to promote the desired herbaceous and woody stem regeneration in even-aged systems. • Residual trees should only be left if a seed source is needed for advanced regeneration or as a diversity component.	RGS	Strategy 1.6, 2.10
76.	<u>Riparian areas:</u> • Use group selection rather than thinnings within these areas to promote herbaceous understory development in gaps.	RGS	Strategy 1.6, 2.10

77.	<u>Mixed Oak:</u> • Maintaining regeneration into the next stand at the desired stocking is where the use of prescribed fire + shelterwood combination can be useful.	RGS	Strategy 1.6, 2.10
78.	<u>Rights of way and forest roads:</u> • Should not be considered in the calculation of the total acreage of ESH due to their linear nature and lack of data on productivity.	RGS	Strategy 3.8
79.	Support for increased even-aged forest management.	7	Strategy 1.6, 2.10
80.	Recent forestry techniques are not producing high quality ESH / support clear cutting.	1	Strategy 1.6, 2.10
81.	Support for large contiguous cuts.	5	Strategy 2.6
82.	Ensure that corridors of suitable habitat connect larger cuts.	1	
83.	Support for small patch or "checkerboard" cuts.	3	Strategy 1.6, 2.10
84.	Prioritize creation of high stem densities and food rich environments (grapes, aspen, etc.).	2	Strategy 1.6, 2.10
85.	Grouse brood decline is due to foresters spraying all the forest undergrowth.	1	Strategy 1.6, 2.10
86.	Aggressively address the problem of non-native invasive plants in the SE/SC regions.	1	Strategy 1.6,
87.	Support research into the size and type of cutting that is most beneficial to grouse.	1	Strategy 1.6, 2.10
88.	BOF willing to assist in studies to identify optimum management techniques for ESH.	BOF	Strategy 3.5 Strategy 1.6, 1.7, 2.10
89.	Habitat condition improving due to lower deer numbers. Locations cited: WMU 2G. Pike/Monroe counties. Potter County.	6	
90.	Support for deer fences as a way to improve ESH quality.	2	

91.	Increased deer hunting in ESH will balance browsing effects by deer.	1	
92.	Leave cut timber in a more 'hunter-accessible' arrangement.	2	
93.	Leave forests alone and streams unpolluted and ruffed grouse will be fine.	1	
94.	Development and farmers plowing fenceline to fenceline have taken away game habitat.	1	
95.	Focus on increasing the value of mine lands to grouse/ESH.	1	Strategy 3.8
96.	Incorporate habitat enhancement for grouse in concert with existing and planned Wild Turkey habitat projects.	1	Strategy 3.5
97.	Support for creation of Grouse Management Areas.	1	Strategy 2.9
98.	Concerned that Grouse Management Areas will direct too much hunting pressure to high-quality habitat.	1	Strategy 2.9
99.	Comments on specific ESH species / forest tree health.	1	
100.	Compliments on the management of SGLs. Locations cited: SGL 252. SGL 28. SGL 12, 36, 219, 250, 172.	5	Strategy 2.6
101.	Compliments on the management of Susquehannock State Forest.	1	
102.	Grouse not present in suitable habitat. Locations cited: Southern Venango, Butler and Beaver counties. Southern Fulton county.	4	Strategy 1.2.5, 1.6
103.	Habitat is stable or increasing.	1	
PUBLIC OUTREACH AND EDUCATION		**11**	
104.	Must educate public about proper forest management.	1	Strategy 3.3
105.	Disseminating information in a science based and logical manner may well sway any potential negative opinion.	1	Strategy 3.3
106.	Use information on benefits to nongame species / nonconsumptive users in public outreach regarding ESH to engage a broad spectrum of stakeholders.	RGS/AUD	Strategy 1.7, 3.4
107.	Inform other hunting groups/other species enthusiasts of importance of ESH.	1	Strategy 3.4
108.	Quantify economic benefits of implementing the plan.	1	
109.	PGC should create a documentary to highlight the environmental advantages of logging and run it on Pennsylvania Public Television.	1	Strategy 3.3
110.	Need for information/outreach to specific land-owners: Owners adjacent to public lands (NNIS info). Farmers –mgmt. of idle areas/cost share programs. Absentee landowners – cost share programs.	1	Strategy 3.2
111.	Need to educate hunters on gunning morals and common sense taking of grouse in certain areas.	1	
112.	Need to encourage trapping.	1	

113.	PGC should not reveal prime grouse areas to be advertised by big retailers.	1	
IMPLEMENTATION		**58**	
114.	Allocate adequate resources (funding and personnel) necessary to implement Plan.	5	Strategy 2.1
115.	Expedite implementation.	4	
116.	Implementation unlikely given PGC fiscal situation.	1	Strategy 2.1
117.	Identify source of funding.	1	Strategy 2.1
118.	Support for a grouse/woodcock/upland bird stamp to pay for research and management.	5	Strategy 2.1
119.	There aren't enough grouse hunters to rely solely on a grouse stamp.	1	
120.	Sell wildlife stamp to non-hunters to support habitat management.	1	
121.	See if non-consumptive user organizations are willing to support these efforts.	1	
122.	Partner with organizations with similar interests: Bird conservation organizations. Local and national conservation organizations. Foundations. Industry. Educational institutions.	2	Strategy 3.5, 3.9
123	Work with Ruffed Grouse Society to implement.	3 + RGS	Strategy 3.5
124.	Work with partners to track ESH creation: RGS, USFS Forestry Sciences Laboratory, Universities, USFWS, USFS, WMI, Audubon, Private forest industry.	RGS	Strategies 2.2, 3.5, 3.9
125.	Particular partnership opportunities identified: Absentee landowners. Farmers. Hunting clubs. Natural gas companies (leases). ANF and adjoining SGLs. Private lands adjoining SGLs.	5	Strategy 3.5
126.	Develop a partnership with the Pennsylvania Farm Bureau, and develop informational articles for farm related magazines.	1	Strategy 2.8
127.	Do not get involved with climate change organizations.	1	
128.	PGC should focus implementation on SGLs.	1	Strategy 2.6
129.	PGC should identify annual timber harvest projections necessary to accomplish work on SGLs.	RGS	Strategy 2.6
130.	Use ESH areas on SGLs as wildlife viewing areas to highlight importance to public.	RGS	Strategy 1.7, 2.9
131.	DCNR BOF willing to help identify sites on State Forests to focus grouse management efforts.	BOF	Strategy 2.9
132.	Create technical assistance and landowner incentives to create ESH on private lands.	RGS/AUD	Strategy 2.8
133.	Provide technical assistance to landowners re: invasive species. Audubon may be able to assist.	AUD	Strategy 2.3

134.	PGC private lands programs lack capacity to achieve goals for private lands.	AUD	Strategy 2.8
135.	Expand capacity of PGC PLAP program and develop funding for landowners to implement recommended management activities.	AUD	Strategy 2.8
136.	Make seedlings (alder, aspen, dogwood, and spruce) available to landowners.	1	Strategy 2.8
137.	Research county tax records to locate absentee landowners and send information on ESH and cost share programs.	1	Strategy 2.8
138.	Promote the use of woody biomass as a carbon neutral fuel source in energy production.	RGS	
139.	Assist in development of a market for low quality wood products.	RGS	
140.	Develop a process to measure success: Acreage improved. Grouse population response.	2 + RGS	Strategy 1.6, 3.9
141.	Form technical committee to assess success/failure of plan.	RGS	Strategy 3.9
142.	Keep the public abreast of the progress of the plan and allow for further comment in the process.	1	Strategy 3.9
143.	Institute a web-based game survey questionnaire for all recreational users to report species & numbers encountered afield.	1	
144.	Make maps of habitat improvement areas accessible to the public.	1	Strategy 2.9
145.	Develop self-guided tours or web-based programs on importance of ESH.	RGS	Strategy 1.7, 2.9
146.	Fully-integrate implementation of grouse, woodcock, quail, and golden-winged warbler plans.	1 + AUD	Strategy 1.7
147.	Guarantee this program for at least 12-15 years so it can make a difference.	1	Strategy 3.9
148.	Be willing to change and adapt the program as needed.	1	Strategy 3.9
OTHER / NONRELATED		**10**	
149.	Opposed to oil and gas development on public lands.	2	
150.	Opposed to Sunday hunting.	1	
151.	Opposed to gating SGL access roads.	1	
152.	Support for woodcock season extension.	1	
153.	Support for both the wild and stocked pheasant program.	1	
154.	Support for the ‘three points on top’ antler restriction in western units.	1	
155.	Support for PGC land acquisition program.	1	
156.	Support for PGC law enforcement officers.	1	
157.	Support for co-op efforts.	1	

APPENDIX 3: FULL RECORD OF PUBLIC COMMENTS RECEIVED
(Note: all personal information has been removed from these comments)

[1]
Please do not “overkill” our State Bird. In other states they are threatened. Could Pennsylvania Game Commission please treasure our wildlife for their value other than how much money is made hunting them down. Thank you.

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[2]
I can't believe the game commission is going to do more cutting. This is overdue. Manage for gamelands for game, not for hippies that don't like clearcuts! The ruffed grouse deserves our support.

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[3]
Dear Game Commissions

First I would like to applaud your efforts in improving the habitat for Upland Birds.

I sent comments on the Bobwhite Program through your Express Email and I received error messages so I assume the email did not go through. I will revoice my comments on the Bobwhite plan here, as well as my comments on the Grouse Plan.

In regards to the Bobwhite plan, I feel that your efforts and the State's monies would be much better served in building the Grouse program, than trying to re-establish a sustainable Quail population. Although quail may have been native to PA in the past it is my feeling that only southern PA is on the fringes of the range and Northern PA is generally much to harsh to support a sustainable population. Much like the PA pheasant program, I would feel the Bobwhite plan could possibly become another put and take program, which is not your goal. I remember native Ringnecks and southern PA as a youth, but unfortunately those days are gone and re-building those now gone habitats and populations of ringnecks or bobwhite would be lenghtly, costly, and quite possibily a failure.

Whereas PA is fortunate to have a strong, established and proven grouse population. It is assumed that the slowly maturing forests are the most likely reason for the slowly declining population, so the solution to harvest and create young growth seems to me to be a plan with a much better chance of success than starting from essentially ground zero with the bobwhite plan. There is no need to reinvent the wheel here when you already have a strong foundation with the Ruffed Grouse.

I personally feel the PA Pheasant program is a waste of Game Commission dollars and feel the Bobwhite program could become somewhat similar. Put and take is great for Trout fishing, but does not really has a place in the spirit of hunting.

Needless to say the Grouse Habitat program will also serve to strengthen Woodcock habitat, so the program will serve as a double benefit to upland hunters.

I wish you the best of luck with your programs.

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[4]

Anything to improve the habitat and increase the number of Grouse would be great. We hunt them a lot from our camp and although I don't want more competition at my favorite hunting spots but the young hunters need to be able to hunt something where they can get a reasonable amount of action. I grew up hunting Pheasants but I do not believe that hunting will ever return to the point that it will keep a young persons interest. If you can't keep them excited and looking forward to going out and seeing game they will stay at home and I think the numbers are proving just that. I belong to several conservation organizations one of which is Waterfowl USA and our chapter has done many projects with the Game Comm. And we look forward to doing more. Land and habitat is where it's at and I support your efforts in these areas.

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[5]

I've been hunting grouse for about 12 years now and would agree that bringing back early succession forest is the key to healthy grouse populations. I would like to note three minor observations I have made about habitat that may be of some value. Back in 2009 up in central Cameron County I observed healthy grouse population in a mixed deciduous forest where there was a large stands of aspen, barberry, and grape (As has been described in your report) However this area was logged probably about five years back but several healthy cherry and oak trees were allowed to stand. That year those trees had a very successive mass yield. I went out one day and managed to bag two grouse (a red phase and a gray) and upon investigating the crop discovered that cherry pits were among the diet. I feel based off this observation that occasionally leaving a few mature mass producing trees amongst these early successive stands management areas may be additionally beneficial.

It was an interesting note to add about Marcellus drillings impacts potential bringing more suitable grouse habitat. However, I didn't see any mention of the success of the reclamation of coal strip-mines. Because of the natural disturbance manner of these sites aspen and blueberry grows extremely well in these areas. I have flushed grouse out of mine lands both in Clarion County and in southern Columbia County. Is there any way to potentially increase the value of this situation. Would establishing safety zones within these areas and stocking grouse over a couple years possibly be plausible such as being attempted with pheasant? Has stocking of grouse been done in this state and if so to what success if any has there been?

The mentioning of agricultural lands seems to have gone unnoted in this report. True I would agree grouse are generally a bird of the forest. But one of the birds I've bagged over the years was in Buckhorn, Columbia County along the edge of a cornfield. The area is a mixture of agricultural land with scrub hedgerows and forested hollows and hillsides. Based off this success as well as grouse sightings during other times of the year it does seem farmland can support at least a low number of grouse. However it seems more and more common such land is being either developed as residential lots or that the brush thickets are just being cleared. Has any study been done to see if a certain ratio of scrub/forested habitat intermixed with agricultural fields appeal to grouse?

As to hunting policy. As a hunter I would not at all disagree with a decision of reducing the bag limit to one a day. I would be disappointed but willing if the PGC would like to close hunting of grouse to certain areas or a trial round for a year or two across the entire state.

The discussion in the report about reducing or eliminating the late season certainly does make sense. But I will admit I personally prefer to hunt winter season.

Finally I noted that the atlas breeding bird count and the Christmas bird count were used to help determine population trends. Has Cornell University's ebird program been used at all since it allows entries to be made any time during the year? I think for this species it has minimal use for population trends but may be useful in IDing grouse "hotspots". This may allow an even better insight on what habitat these birds truly prefer.

Thanks for your time

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[6]

I am a participator in the grouse cooperator survey and I spend anywhere from 15 to 20 days hunting grouse in the NW area of Pa-I found your draft plan well done for the most part but I have a few observations-1) little was discussed regarding predator impact on the birds-clearly avian predation is very high but with the introduction of new predators-ie fishers I believe these ground/nest predators –including furbearers whose harvest has been declining recently because of poor prices is and will become a bigger factor;2)I would like to have seen more comment /info on renesting issues and weather impact on chick mortality; 3) clearly the winter season COULD be disasterous for local populations but inclement weather normally keeps hunter activity low; 4) the elimination of dog training season has to negatively impact both grouse and woodcock-I have 3 times had dogs point nesting woodcock as early as March 30th – the closure during nesting season should be reinstated

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[7]

The grouse management plan is a great idea!!! I've been a Pennsylvania hunter since 1957 and would love to show my grandson grouse populations like I saw when I hunted with my dad

years ago.
Thank you for doing a great job with all your wildlife management work.

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[8]
This appears to be an excellent plan. Theres no reason PA cannot boast excellent grouse populations comparable to to Maine, Minnesota, Michigan, and so on. They have nothing that PA does not, aside from grouse habitat. This is not a bird we are trying to reintroduce. It exists here, and has stood the test of time in PA. lets not watch it go the way of the wild pheasant and bobwhite quail. We have the birds, and the birds are willing and capable of growing in numbers. Lets do something substantial for the habitat and watch the effort pay dividends over time.

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[9]
I have read and agree with the Grouse Management Plan as proposed by the Ruffed Grouse Society; except for the implementation time table.

I am 61 y.o. and my new English Setter (Champion Grouse Dog) of which I have over $4,000.00 invested in purchase and training, is 2 y.o.. By the time the proposed plan is implemented and hopefully the Grouse population increases; I will be either unable to hunt or dead, as will my dog.

We need to do LESS study and planning and have MORE action and implementation ON A SOONER AND FASTER TIMETABLE. JUST DO IT ! !

If changes or adjustment need to be done it can be done midstream.

The only research I would deem appropriate is to find a way to raise grouse as we do pheasants to supplement the natural population. Otherwise, increasing habitat is the best alternative and long range solution, however this needs to be done, yesterday.

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[10]
Cut some trees!

In my opinion It is that simple . I am an avid grouse hunter. So much so that I've stopped hunting any and all other species while the Grouse season is open. While pursuing this magnificent bird I have found self sustaining populations of them in areas that most other hunter say, Your Hunting What? I haven't seen one of them in years around here. I tell them all the same thing. You got to get into the thick stuff. Early successional growth is what I'm talking about.

I realize we can't just flatten the forest that would be cutting without sound management practices at heart. when I get into areas that have young forests they are teaming with a variety of life not just Grouse. Young forests provide what all woodland creatures need Food and Cover.

As a general statement I think the PGC has done a good job managing grouse and have seen many positive recent improvements. The most simple improvement would be..... CUTTING MORE TREES! Provide more food and cover for our wooland creatures.

Along with the most passionate of Bird Hunters
Codi Mae and Missy Mae my four legged friends agree.
Cut more trees!

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[11]

As a 54 yr old veteran grouse hunter taking his first bird at age 14 I am invested in the Ruffed Grouse being around in Pennsylvania for a long time. I have been a participant in the PA Game Commission harvest report for many years and have a long standing interest in this magnificent bird. Unlike the pheasant, I believe we as a state can do something about keeping good numbers of the grouse here and healthy. Pheasants were encroached upon by development and clean farming. I saw it first hand when the area from Lancaster to the Cumberland Valley area got pounded with overdevelopment and clean farming. On the other hand the grouse, being a forest bird has a tremendous area to inhabit, we simply have to create and/or keep the correct balance of forestation. I think we should do all that we can as an agency and a state to grow the population of grouse, or at least keep it stable. As many studies in regard to hunting has shown I also do not believe that longer hunting seasons have much affect on grouse numbers. But it certainly gives us outdoorsman's something to do in the dead of winter. I will tell you that I believe there is more predation on grouse the past several years from Redtailed Hawks and other avian predators as well as an increasing number of fox killing both juvenile and mature grouse. I know of some farmers and landowners that have started killing Redtailed Hawks simply because they are seeing too many and know that they are taking the young from many species. Trapping is down statewide and it is causing the amount of fox to go way up. I am seeing too many fox and fox sign when out in the woods with my dog on hikes throughout the year. Again, I am convinced that we should everything that we can to keep the Ruffed Grouse plentiful and always around our state.

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[12]

I highly commend the work that was done on this extensive Plan. I hunt grouse and woodcock predominantly in NE Pa (Pike/Monroe) and had the pleasure of spending 2 days with Bill Palmer 3 years ago when he visited our club. We gained valuable insights from him in managing our club resources.

Our club is comprised of roughly 3700 acres and has always held a respectable population of grouse, but in recent years the lack of logging due to timber prices and some members misconception of clear cuts, has started taking a negative toll on our grouse population.
I began a limited (due to my available time) program of 2 x 1+ acre clear cuts on an annual basis and as advised by Bill have worked to keep them in close proximity to existing grouse populations. We are also working on improving (cutting) in existing locations to limit the canopy growth. Additionally we have also done limited worked on some stands where grouse populations used to be strong, but are rarely seen now due to lack of density and I presume available food.

About 4 years ago now, we entered into a period of heavy infestation of gypsy moths caterpillars and 3 years later due to combined abnormal freezes in mid spring, which stressed the trees even further, we have lost thousands of oaks. At the time I was the only member cheering the gypsy moths on, but since others have seen the silver lining. This year we have approximately an additional 3-400 acres of land where sunlight is reaching the ground for the first time in 2 decades or more and seedlings are literally exploding from the ground. The density of our forest is becoming impressive again in just 2 years . I also took the time to write the PGC and asked them to reconsider the gypsy moth spraying program that was being considered, noting what I expected would be a windfall gain in habitat (and a savings in PGC funds) To say the least, the gypsy moths have done more work than I could do in a lifetime. We now have extensive stands of dead white, red and chestnut oak and a good portion of the white and red is being harvested prior to rot taking place. While the club would most likely not have acted on harvesting before, due to a depressed timber market, we are able to gain some revenue from the sales. A portion of those funds are being put back into the property. The other noticeable gain is the reduction of the deer herd. While the club members were still able to take approx 16 deer from the property, there has been a beneficial decline in the herd and some seedlings are now surviving (and the browse line is dropping), including 4 healthy stands of aspen that I plan to continue fencing off until they are able to mature further.

The state of Pa at one time made seedlings available to landowners at considerably reduce prices, although the selection wasnt what I would consider overly beneficial species for grouse (and woodcock). I have sought out private nurseries for the purchase of alder, aspen, dogwood and spruce and we are actively planting some (albeit limited) new covers. I would stress that the availability of these seedlings to landowners would go a long way towards improving the mix of beneficial cover. I would also be interested in professional guidance on other beneficial species and perhaps some that are a bit more resistant to deer browse as the fencing projects can only go so far.

I would also welcome being included in any annual surveys or assisting the state in anyway possible in conjunction with this proposed plan.
I am impressed by the PGC initiative to say the least.

[13]
Hello,
I am pleased to learn of the new draft plan for management of ruffed grouse.
As a PA resident sportsman I am concerned with the state of the grouse populations, and their subsequent decline as of late.
The ruffed grouse is our state bird, and also a native species, and I feel it deserves ALOT more of our focus for management than it has been given lately.

I feel the most important management tool we need to focus on is cutting alot of our mature stands of forest to generate re-growth, and ultimately good grouse habitat, and as a side advantage, help other species as well (such as deer), We cannot expect mother nature to correct this problem with an occasional Tornado...We must manage these forest habitats ourselves, for the benefit of Grouse, and other wildlife.
We need more of a focus on our native species first, and less on foreign, non-native, and costly Pheasants.

LETS SEE MORE LOGGING AND LESS FERNS, and ultimately a more diverse wildlife mix. !!!!
I am excited to see this draft plan, and am in favor of it.
Please make it a top priority.

Thank You for your consideration,

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[14]
Yes , Please Help the Grouse-- I belong RGS. Our forests are getting older and needs to be harvested.
Thank You VERY MUCH

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[15]
PA Game Commission,

Your draft is some of the best research and information I have ever seen on Ruffed Grouse, thank you. I hope a lot of people read it and become better educated. If your plan is implemented, I think the PA Grouse future is bright.

I appreciate the PGC interest in the Grouse. In many other States, if it doesn't gobble or have antlers, the wildlife agencies don't care much about it. I especially liked your comments directed towards educating the public and working with resource extractors concerning Early Successional Forest Habitat (ESFH). In my opinion, a large percentage of the people have no idea of the importance of ESFH. Most think the mature forests with their poor habitat underneath are 'pretty'. And clear cuts conversely are 'ugly', and detrimental to the environment. Education is the only way to change this. Possibly the PGC can create a

documentary to highlight the environmental advantages of logging. Run it on Pennsylvania Public Television.

I live in Mercer County and there are very few Grouse here. As documented in your draft, in 1980, this area had a much higher Grouse population. At that time, a lot of abandoned, non productive farmland was still in the ESFH stage. Well, now most of the ESFH is grown into saw timber. Most of this area is private property, and I realize Government intervention concerning private property to establish ESFH is difficult. I really don't see how ESFH (and the Grouse) will ever come back to this area in a big way. However, I do see one small bright light on the horizon, and that is disturbances created by natural gas exploration. Obviously, cutting roads, and clearing land for the wells inadvertently will create some ESFH. As your draft indicates, working with the resource extractors and landowners might bear some fruit concerning ESFH. I wish you good luck with this.

For the most part, I think the PGC manages the State Game Lands (SGL) very well. It seems to me that there is a lot more early successional habitat on SGL vs. State and National Forests. However, there is one SGL management issues that concerns me in this area. The 10,000 acre SGL 39 in western Venango County. This track has great potential for good Grouse habitat. Also, this area is important in another way. It is in the reach of a large population center (Pittsburgh). There are large numbers of hunters in the Pittsburgh metro area that are eager for the opportunity to hunt Grouse.

For some reason (possibly moth infestations), there was large scale logging operations on 39 in the 1980's. This created fantastic Grouse habitat in the 90's, and the Grouse population exploded. Unfortunately, for some reason, the logging almost completely stopped since then, and most of 39 is now either mature forest or pole timber, and consequently, the Grouse numbers have plummeted. My hope is that the PGC will do a timber sale/ and or habitat work to establish new ESFH. Possibly you already have plans implemented, I hope so. In my opinion, some habitat improvement on this SGL would go a long way to help small game hunting in Western PA.

If there is any way I can help implement your plan, please do not hesitate to ask.

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[16]

The plan is great -- if it gets done. Is there a probability of this happening? Only addition we'd like to see is a consideration of disease, possibly occurring or emerging with changing/warmer weather patterns, particularly in the southern area of the state. Lastly, we'd like to see regs changed to say that you can only shoot a ruffie either
a) when it's flying (might hit licenses too hard?) or b) only with a shotgun, to prevent deer hunters from taking pot shots from treestands.
Thank you! We hunt PA often, from NJ. Pls ask any Qs.

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[17]
I have been hunting grouse for over 40 years and am encouraged to see the Game Commission addressing the grouse decline in PA. As a long- time member of the Ruffed Grouse Society we have always supported forest management and the harvesting of mature forests to produce early growth habitat ideal for grouse and song birds.

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[18]
I support cutting for habitat improvement concerning grouse hunting oppertunities.

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[19]
Dear PGC,

I am pleased to hear and read the plans the PGC has for re-establishing young transitional growth habitat in the state.
However, I frankly will be surprised if much of it actually gets accomplished. From past experience it seems that the PGC has lots of ideas that never get implimented.
Case in point. This is the 3rd spring that has come and gone since the WMI sent a representative to northwest Pa. to meet with the PGC, RGS and PenDOT to discuss the very same habitat management - for young transitional forest- in Crawford, Mercer and Venango counties. I spent a weekend with the WMI representative and folks from the other 3 organizations. We traveled to various sites and discussed plans of action - some of which were as simple as using a brush hog to open some of the fields that were becoming over grown. These areas used to be habitat to many woodcock, but no more.
As far as I have been able to observe, none of the planed work has been carried out. Now it will require more expensive machinery than just a tractor and brush hog. And there were no woodcock to be found this spring.

So, I hope that you soon will have the man power and money to execute your plans.
Regards,

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[20]
Gentlemen and ladies,
Clear cutting benefits all wildlife. It most continue to sustain the wildlife in PA. I am an avoid grouse hunter and seeing the lack of management of state lands makes one wonder why timber harvest isn't being done more often. Habitat is the key to grouse populations. Please consider more habitat management for this resource. Much of the forest in the northern tier is at the stage that cutting most be done now or the trees will lose any value. When I see areas that 20 years ago held grouse and now look like a picnic area it makes me wonder what the state is doing for grouse. Please consider habitat management for grouse.

Thank you

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[21]

Good day,
I evaluated a portion of the plan and have no issues other than a lot of the plan involves studies and evaluations. Since it is obvious that this majestic bird is losing the necessary habitat that would help stabilize and increase its numbers, we should act aggressively to increase habitat. Studies are fine, however that will not change the landscape.
Being an avid, and some might say fanatic, grouse hunter, I am for anything that will increase grouse population numbers. From my experience, most wildlife flourishes in grouse habitat, so why not create more of it!
I am in favor of extensive timber cutting programs on state, federal, and private lands that will allow for new growth forests. The Pa. State Game Commission could surely use the funds, and the end result would be beneficial for grouse, deer, and bear.
No doubt timber prices are down, but this is to manage the habitat and not secure the highest revenue by waiting for the market to increase. I for one advocate anything pro active which will help our grouse population.
As mentioned, I have a passion to hunt grouse. I am very careful not to over harvest the areas I hunt. Most of my hunting takes place in Venango, Forest, and Warren counties with the occasional trips to Cambria, Potter, Elk etc.
It is really difficult to find the necessary habitat, and because of this, areas are over hunted. I drive through the Allegheny National Forest and see these vast areas of Hemlocks which, in my opinion should be cut, since their wildlife value is minimal.(I also realize there is no commercial value, hence wildlife management)
For me, the only way to create more grouse habitat on a large scale is to cut timber to remove the canopy and allow for new growth.
Instead of the studies prior, lets cut the timber, and study the long term benefit for grouse and other species.
Feel free to contact me via e-mail. I would be more than happy to bore you with my thoughts. E-mail ****

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[22]

As an avid life long grouse hunter and bird dog lover (now 78 years of age), I heartly endorse the Management Plan for Ruffed Grouse in Pennsylvania as developed by the Pennsylvania Game Commission. This sort of public education, participation, and practice is vitally necessary to the future of our "beloved" upland hunting sport.

To this end, I have suported the Ruffed Grouse Society over 40 years, now as a Centurion Life Member. The ongoing educational and practical efforts of this Society seem to be a direct tie

in the the program which the Commission is proposing. It would be my hope that these two entities work in concert on this most worth while project.

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[23]
To whom it may concern,

I am writing to commend you on your plan for our state bird. They are probably my favorite bird to hunt. I am very excited by the fact that you have put a plan together that shows your dedication to improving their habitat and population numbers. It is good to know that the game commission isn't going to sit idly and let the ruffed grouse succumb to the fates of the bobwhite or ringneck. I also like the fact that the habitat improvement will not be a one sided venture. It is not an effort to help one particular species, but will benefit many of our animals that rely on early successional habitat for their daily or seasonal needs. I only see this plan being a benefit to the Pennsylvania woods as well as the people that enjoy them and their denizens. Kudos to all of you.

One question I have regards maps of the improvement sites. Will maps be easily attainable that show where the habitat improvements have taken place?

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[24]
a great idea ! WILLING TO PAY FOR A $5 OR $10 STAMP TO GET THIS DONE!

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[25]
I wanted to take this opportunity to thank all those involved in the development of the plan. I find it a refreshing and comprehensive statement on the history, current status, and future of our beloved state bird. As an avid grouse and woodcock hunter I applaud the PGC on such an undertaking.

The information provided in this document appears to plot a very positive future for all wildlife which benefits from early successional forest in our commonwealth. As we all have a stake in this undertaking, I hope the PGC continues to keep the public abreast of the progress of the plan and allows for further comment throughout the process. As hunters, I believe we are the cornerstone in conveying the benefits of this plan to the non hunting public. While a certain small percentage of individuals in the commonwealth may never agree with any wildlife management if it benefits consumptive use, the vast majority of the non hunting public is 'reachable'. It is this segment of the non hunting public that could greatly impact the ultimate success of this plan. Dissemination of information in a science based and logical manner may well sway any potential negative opinion.

While it is difficult to comment directly on individual topics within the plan due to the scope of

the document, I again applaud the PGC for taking the steps necessary in bringing this to fruition. One small area that seems intriguing is the idea of large acreage Grouse Management Areas in multiple regions of the state. This could provide benefits both educationally and recreationally, especially if located near population centers.

In closing, I want to thank you for providing an opportunity to comment. Please continue to involve the public, not only in providing information and comment, but also in the potential 'hands on' aspects of the plan.

---

[26]

I applaud your effort to increase the amount of early successional habitat across the state. I am one of the 500 avid grouse hunters that participate in the cooperator survey, and hunted 32 days during the 2010-2011 season. The main concern I have with the study is in the following statement *" Should a majority of hunters favor more conservative seasons than currently offered, such adjustments could be made prior to availability of research results on effects of harvests."*

If research shows that our existing seasons and bag limits results in additive mortality, I would fully support a change to shorter season or a reduced daily bag limit for a portion of the season. However to make a change to either more liberal *or* more conservative seasons based solely on a hunter survey would be unreasonable.

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[27]

What are we waiting for? Grouse in every county, just like the Turkey program.

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[28]

Thanks for the opportunity to comment on this program. I am 87 yrs. old and have been hunting grouse for many yrs. I presently belong to the **** Club. We made the wrong decision in not spraying for gypsy moth This resulted in the loss of 3500 acres of forest. our undergrowth has been massive and we have early of grouse pop., A close followup of this could be an indication of a success of a young forest.

The only thing that matters is the number of healthy grouse pairs in the spring. I feel that the second season with harsh weather, predators,and lack of cover is very detramental to the number of pairs remaining in the spring.

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[29]

I would like to see more clear cutting be done in parts of Bald Eagle and Tiadaghton State forests, particularly where the butt up together around the Mile Run exit on Interstate 80 and the Gap Roads. The closest public Grouse cover near Williamsport PA is in Potter County,

followed by the Barrens near Scotia. It would be great to have some effort focused here. My setters would appreciate it! On a side note, it's been great to see the ongoing improvements made at SGL 252 for Woodcock habitat.

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[30]
I sincerely hope all your efforts are productive!

My only serious issue is that I would urge the PGC not to have anything to do with any group or organization that supports or promotes the concept of global warming (the new term being climate change) since no substantive data exists to support the global warming panic.

As a retired forester and park manager in PA I regularly saw just how the lack of clear data tends to draw alarmists to almost any charge. We as humans simply do not have enough background understanding of this planet to have any real basis to charge Global warming! We have no real ability to confirm or deny such claims. I use a common issue of saving old growth forests in making my point. My last duty was at Cook Forest as Manager and the “shock” that went through the community when I began to explain signs of the inevitable passing of the “big trees!” Evident to anyone with the training to see the signs are: die back and the measured age of the annual rings lead to the realization that the old growth is in the last stages of its’ normal life span .

The climate change folks attempted to make even this natural succession event somehow connected with our human devastation of our own planet. Something had to be the cause and efforts needed to begin to prevent the loss of old growth forests. No one can say with any certainty that the Cook Forest Area or anywhere else for that matter has not been at this point in the succession of a forest before or how many times before! Try as we might humans may not be as big a deal to nature as many might like to think (perhaps that is a great thing!)

All the above might seem to have no connection to the PGC but if funding is accepted from the Climate Change/Global warming group I fear that that partnership might end up being one you will regret! Do not seek that help, please!

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[31]
The creation of young forest benefits many wildlife species. The habitat improvement effort ought to be an easy sell to concerned sportsmen.

The idea is not perhaps such an easy sell to private landowners. Concerns over sustainability, to give but one example, may trump habitat improvement for many.

Although much of the 'private lands' mentioned in paragraph 2.8, pg vii may be held by hunting clubs or individuals interested in creating habitat, the ratio of the target acreage compared to that planned for State Game Lands seems way out of wack to me.

I believe the PGC should focus the bulk of their habitat improvement efforts on State Game

Lands.

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[32]
I've read your Ruffed Grouse Management plan and it all sounds good on paper. It's very gratifying to see this kind of interest by the PGC in the ruffed grouse population and more importantly habitat. I'm a 55 year old avid grouse hunter. I hunt along with my friends an average of 12 days during the early grouse season. We hunt full days not just a few hours a day. We hunt with flushing dogs in the Allegheny National Forest in all 4 counties (Forest, McKean, Warren & Elk)within the ANF. During a typical season we will hunt in about 40 different regenerating clearcuts. If one thing could be changed in the forest management on the ANF I wish the PGC could convince the ANF managers to stop their "crop tree release" program. Crop tree release is essentially the ANF going into 10 year old regenerating clearcuts and removing everything except high dollar hardwood saplings. The most prominent species of trees growing in these clearcuts are black birch saplings. We dissect every grouse we harvest everyday and record crop & gizzard contents. By mid-November the most prominent food found in grouse crops is bud ends from the black birch saplings. Black birch bud ends are the most important food source for ruffed grouse all winter long on the ANF. When the original CTR was announced about 6 years ago the ANF asked for public comment on the CTR program. I wrote a letter to then Marienville Ranger district ranger **** with concerns that CTR would ruin ruffed grouse habitat by too much cutting of black birch and beech saplings. He assured me "that as a fellow upland bird hunter they would not destroy all black birch saplings". He lied. When the ANF now conducts CTR they kill every black birch sapling in every clearcut. It's almost a joke to look at some of these clearcuts after a CTR. There are more trees cut down than are left standing. Unfortunetly the ANF no longer asks for public comment on CTR, they just do it.

About ten years ago or so a misinformed greenie group called the Allegheny Defense Project filed a lawsuit against the ANF to halt all tree cutting on the ANF.
They succeeded in halting cutting for about 5 years. Five long years for future grouse habitat. It now seems that the ANF has changed it's way of cutting as there are rarely if any clearcuts done anymore unless it's for well drilling sites. Most cutting done is selective cutting. Whether the lawsuit made the ANF change their cutting policy or not I do not know. But I can tell you that the former clearcutting was a great idea and did not only work for the ruffed grouse but was perfect habitat for tropical songbird nesting, turkey nesting and deer habitat. The ANF needs to with a prod from the PGC to really go back and take a closer look at clearcuts performed 30 years ago and see just what tree species did make it and this was at a time when we had record numbers of deer supposedly eating all the good market hardwood. In my mind, crop tree release is totally unnecessary and a waste of time and money.

I've never met the man, but PGC Land Manager John Dzeyeman is doing one hell of job creating grouse habitat on SGL 28. Some of the other PGC land mangers could use a lesson from John.

I applaud your efforts on the ruffed grouse management plan and wish you the best of luck.

Anything you can do to improve grouse habitat anywhere in our state is a very good thing.

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[33]

I am excited and encouraged to hear the PGC has a plan and continued interest in grouse management. I feel we are on the right track to better and more expanded habitat. I have access to alot of hunting areas in the northern part of the state but it always seems too little of it is suitable grouse cover. Clear cutting mature forest is the answer. Keep up the good work.

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[34]

Bravo.

I support all efforts to bring back grouse in PA. Our woodlands are way overdue for some thinning out.

Thanks from another PA Grouse Hunter.

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[35]

The plan sounds great. It will take allot of work and time, but you got to start sometime. I am a grouse hunter. Been sending in my yearly report for 30 years now. On my 4th dog now and have over 6000 flushes. Needless to say I have seen coverts come and go. Mostly go. Almost all my grouse hunting is in Bradford Co. Here is some of my observations. Autumn olive was good at one time. It now shades so much that native plants in places are non existent. I would hate to see all Hemlocks lost, but it sure would open up allot of forests. The chain saw is a grouse best friend. The game lands I hunt are being well run 12,36,219,250, 172, They do a great job for the few man hours there is. It makes me wonder how this is all going to take place when the state is not hiring new land personal and won't raise license fees. From what I understand they haven't had enough help in years. I hunt by myself and the dog and I don't think I have ran into 10 grouse hunters in the last 40 years. We are a different breed and it will be a challenge to get the public involved. We should tell the deer hunters how managing forests for grouse will bring back thousands of deer, Just like it use to be!!! Might get all kinds of help. There is allot of mature forests out there that have no grouse. The fields that farmers stopped using are now 20-30 year old forests. Allot of these new gas pipelines I believe will help out the grouse. More food and edges to let in sun light. It will never be like it was , but its not that bad. There is no such thing as a ten year cycle for grouse around here where I hunt. and I have a 35 year journal to prove it. I keep buying shrubs and trees from the Howard nursery for my 80 acres.and always cutting openings, its paid off.I think its great that the game commission is going to put forth an effort. Let me know when you reach Bradford CO.

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[36]
Check to see how the wind turbines affect grouse mortality. What impact on grouse habitat and noise affecting grouse habitat. What are the rules for hunting grouse around wind turbines on state game lands.

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[37]
I noticed that most of your article was about grouse habitat. I was just wondering, has anyone thought about grouse predators, such as red tails and coyotes? I know I am seeing a significant amount more of both of those species. Coyotes being a huge impact I'm sure, certainly multiplied in my area. I am getting several pictures a year of several different coyotes on trail cameras throughout my property. I also see many more red tails along highways and while hunting they provide me with much entertainment as they assault squirrels. I was just wondering what your take on this issue might be, well I know that habitat is a major part of grouse survival, I also have noticed a great increase in there enemies over last few years.

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[38]
I would like to make a comment about the grouse.
In the last 5 years we saw alot of grouse with there young all summer. But in the last 2 years they have been fewer and fewer and I believe it is due to the forestry doing all the spraying and killing all the under growth .Even when we are out hunting we would kick out 5 or 6 at a time all season. Even the coyotes have moved out there is no food there they are killing everything off. that is where you need to start. When they cut all the beech down just to get rid of it.
I had asked one forester why and i quote he told me that they did not want Beech , Oak ,Maple and a couple other he said that they were junk trees and they don't want them. They only want cherry they alocate 30 million board feet a year from our forest.
I had told him that they were feed for the animals. his comment was they don't care about them . he made me sick I did not get his name but if i ever saw him i would know and will get his name and will do something about it a pitcher says a thousand words. And these are the people that are running our forest. How sick is that. I do under stand that they all are not that way but even just one is a bad apple .

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[39]
It is very encouraging to see this extensive & comprehensive plan.

Just a few short comments:

1. I believe that "if" the PAGC web site instituted a game survey questionnaire, many recreational users of the outdoors would participate in reporting the species & numbers encountered during their day afield. Most young citizens, & a growing number of older have embraced IT, and we should take advantage of the opportunity to collect useful

data. Heck, one can now access such sites from the field via cell phone.

2. It was mentioned on pg.# 47, briefly, but I see a significant need to more aggressively address the problem of non-native invasive plants in the SE/SC. In Southern Berks Co., including SGL #52 the once thriving grouse population & habitat has been assaulted by the Mile-A-Minute Weed & Asian Honeysuckle. Education & outreach might also include informational pamphlet distribution to property owners adjacent to public lands regarding the problem & suggested actions to halt the spread or eradicate the plants. Many do not realize the problem & actually encourage their growth!

3. Perhaps I missed it, but I saw no mention of predation as a result of the spread & increase in the Coyote population. I have no scientific data to support, but my observations & the decline in grouse populations also seem to coincide w/ their arrival.

4. I believe it may be valuable to incorporate habitat enhancement for grouse in concert w/ existing & planned Wild Turkey habitat projects. Would this not facilitate a more economical approach to sustaining the various stages of habitat beneficial to the wide array of species & bring together resources.

As a boy, I was 1st introduced to Squirrel hunting. After the 1st Grouse flush, & attempted harvest, I was hooked. I have pursued grouse in all 4 corners of PA for many years. I, along w/ many companions, are disappointed if we spend time in the woods in pursuit of any species & don't at least flush a grouse or hear the drumming. Grouse are a barometer as to the health of a diverse & biodynamic ecosystem.

I commend you for your efforts & hope for your success!

If I can be of any assistance, please do not hesitate to contact me.

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[40]
Many non-hunters, including those that would never venture out of a city or get out of their cars and set foot in the woods, like the idea of supporting wildlife. Let them buy a non-hunting stamp to show their support for the wild grouse population. It will make them feel good when they see a grouse (someone will have to tell them what one looks like) on a "nature video."

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[41]
We need to focus on increasing public and private forest harvesting through clear cutting. This type of harvesting maximizes the production of early successional habitat which is the key to increasing the grouse population. Some of the harvest techniques which have been adopted in recent years are not producing early successional habitant to the extent that clear cutting does. This simple change would support key goals, objectives and strategies of this plan.

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[42]
THANKS FOR OPPORTUNITY TO COMMENT.
PLEASE CONSULT AND WORK IN CONJUNCTION WITH THE RUFFED GROUSE SOCIETY.

I LIKE WHAT IS PROPOSED BUT I'M WORRIED THST IT WILL BE TO LITTLE TO LATE. I'M 55 YRS OLD AND NEED YOU TO ACCELERATE EVERYTHING SO THAT ME AND MY 4 ENGLISH SETTERS GET A CHANCE TO UTILIZE IT!!!!!

SPEED IT UP !!!!!!!!!!

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[43]
It is nice to see that the state bird is finally receiving some much needed attention before it is too late to bring the ruffed grouse back to healthy populations. Up until now; it seems all of the game management programs are directed towards deer and turkey.

Beginning as a young kid; I started hunting grouse with my father, **** of Chambersburg, PA. and our friend ****, a well known fly fisherman of Carlisle, PA. Along with our bird dogs in the South Mountain area of Cumberland County, located near Shippensburg, PA. We hunted the area in the 1960's and 1970's; in places such as Watery Hollow, Tobacco Patch Mountain, Dead Woman's Hollow, Strohm's Hollow, and the old CC Dam. Until about 1990; we always experienced decent flush rates and good dog work. The good times of grouse hunting the area came to an end: virtually no birds.

This past season; I hunted mostly the areas of my home, in Fulton County, and some in Bedford County. On New Year's Day, after hunting for approximately three hours near Mckee's Gap, my German Shorthaired Pointer locked-up on point on the edge of a clear cut. As I approached at an angle to my dog, a grouse flushed and I made a quick snap shot and knocked the bird down. After a nice retrieve by my dog, I took her picture and decided after another disappointing season of a very low flush rate, and as much as I hated to do so, it was time to call it a season. After all, I may have just shot the only surviving grouse for miles. I'm not sure what the problem is in my area. In approximately forty (40) hours hunted, we managed only twenty (20) flushes. My hunting was in very suitable, prime, grouse habitat (5 to 15 year old clear cuts, grape vine areas, green briar, edge areas) in Southern Fulton County. Which I might add became my permanent residence a year ago with the hope and dream of having grouse hunting right out my back door.

Well that is my two cents worth. I'd like to add; that I would be in favor

of an grouse/woodcock stamp, as well as a reduction in the late season, to give the birds a break until they can hopefully make a comeback.

I wish you success and good luck with the Ruffed Grouse Management Plan.

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[44]

As a forester for over 30 years, I cannot help but make a few comments. I have purchased a few tracts of timber in my career and I currently am the General Manager of **** Lumber Co. Inc. We buy over 8 Million BF of timber per year.

I have been a strong advocate of regeneration of forests through harvesting, i.e. clearcutting for quite sometime, because it works on shade intolerant species like Cherry, Red Oak, etc. It also is highly effective to create habitat for numerous species of wildlife. BUT and this is huge, most people do not like it. I cannot tell you how many folks I have purchased timber from over the years and they almost unanimously hate harvesting of any kind but most especially the kind that creates Early Successional Habitat. Indeed, the most common silvicultural prescription that I hear from landowners is "cut the big ones, so the little ones will grow" or "I want all the money I can get, but I want something green when you are finished". These are recipes for deteriorization of the forest through "high grading" and do little to help wildlife. All of the plans of the Game Commission and others are going to have very limited success, when the vast majority of the 17 million acres of forest land is owned by over 500,000 landowners, the vast majority of whom HATE exactly the kind of forest management activity that is needed to create the habitat we desire.

I applaud the PGC and The RGS for working on and developing a Ruffed Grouse Management plan and I feel confident that the PGC will develop more ESH, but until we can educate the public and more importantly LANDOWNERS that this type of management is NOT evil, or bad, or deforestation, or hideous, or rape, or pillage or plunder, it will have limited results. Please understand that I am a member of RGS and a forester and I am in favor of the creation of more ESH, but I have worked with private landowners for my entire career and I know their sentiments.

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[45]

I would like to thank the Pennsylvania Game Commission for the opportunity to comment on the Ruffed Grouse Management Plan. And in PGC's recognition of the need for an increase in the percentage of early successional habitat (ESH) within the Pennsylvania landscape to benefit the ruffed grouse, American woodcock and multiple wildlife populations dependent upon young forest habitat.

As a resident of the Commonwealth of Pennsylvania I cannot emphasize enough the importance of grouse and the grouse hunting experience is to me and my family. The

participation in this sport benefits not only us personally, but the citizens of the state as well as the country.

Ruffed grouse hunting in Pennsylvania is a source of both social and economic significance in this state. Hunting contributes to approximately $79 million of direct spending each year to the Pennsylvania economy. Much of this is directed towards small businesses. Continual decline in optimal habitat will adversely affect these businesses, and the social and cultural tradition of the grouse hunting heritage of both the Pennsylvania residents and those traveling to PA for the hunting experience.

Pennsylvania is one of the few states to develop such an individualized plan to implement the National Plan of 2008. This is a highly commendable point. How is the PGC going to determine if the Plan is being successfully implemented on the ground? What role in the acreage of ESH to be created each year will the PGC be responsible in creating? How much of the total acreage to be created each year will be dependent on federal, private, and private forest industry timber/land management?

There is a need is for PGC to establish a scientific based method to determine ruffed grouse population status in Pennsylvania rather than relying on Breeding Bird Surveys (BBS), Christmas Bird Counts (CBC) and other 'trend' analysis data. Fault in using the current hunter flush rates is hunters go to the best covers and overestimation of population becomes a problem in attaining accurate representation population goal success progress. PGC field crew summer sight surveys are strictly observational and chance happenings limited in usefulness in determining population estimations. The PGC recognizes the limitations of these surveys and utilizes these encounters as opportunities to formulate a fall hunting prediction sought by hunters.

Currently there are programs in place that offer incentives to private landowners whom manage their forest stands for timber and native grasslands but NOT in a scrub-shrub or young forest mosaic within their property ownership scale. What about developing incentives for maintaining their lands in ESH state in a rotation incentive program? This would depend on the total acreage of forestland vs. scrub-shrub land. Even-aged management on no less than 7 acres of timber land every 10-15 years incentive programs and maintaining the low clumped woody shrub habitat in native species which will also benefit American woodcock among other wildlife species like white-tail deer. In association with this point, much of the private forestland in PA is not of a high quality timber of the past. As such, developing a market for the lower quality, wood fiber, industry, or promoting use of woody biomass as a carbon neutral energy source would be of economic benefit to the landowner and logging industry.

There are potential impacts of continual decline in percentage in ESH in the Pennsylvania landscape. Possible Federal and State listing of hunted and non-hunted species of birds and mammals could restrict the use and access of both private and public lands. This illustrates the need for the creation of ESH through responsible silviculture (timber management) methods available. Recognizing there are differences in habitat characteristics between the naturally

occurring scrub-shrub ESH and those of the young regenerating forest created by timber management but realizing many species of wildlife will utilize both types of ESH.

Benefits of ESH to other wildlife species during all seasons and multiple phases of their life stages will occur. Benefit to other small and large hunted species important to license sales and the social aspect of the hunting tradition in Pennsylvania. This type of habitat provides not only cover but increased multiple food resources for other species, for example Eastern cottontail, red fox, grey fox, Eastern coyote, black bear, bobcat, white-tail deer, and wild turkey. Forest interior bird (those which nest in big timber) fledglings follow their parents into ESH shortly after leaving the nest due to the high number of insects, mast, and cover available in this type of habitat. Fall migratory songbirds utilize these habitats for the same reasons as stopover areas to refuel or find cover during their journey south.

ESH provides wildlife viewing areas for both the hunter and non-hunter users of Pennsylvania rural areas. Pennsylvania is known for its wildlife, and reviving the balance of ESH within the landscape affords PA the opportunity to showcase one of its greatest resources and increase tourism within the rural areas.

Again thank you for the opportunity to voice my feelings on the Ruffed Grouse Management Plan.

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[46]

I would like to voice my support for a more scientific and robust plan for promoting the Grouse population in PA. I stopped hunting grouse a few years back because of the too few flushes. I would like to start hunting again as I'm a Grandpa now and want to teach my grandson to hunt grouse.

I'm a landowner with 30 acres of timber. I would like some help managing this timber for better habitat for small game. It is my understanding that PA is one of the few states that has an individual plan for promoting ESH and commend your efforts in developing and promoting ESH. I am currently trying to eliminate Autumn Olive from my property. It chokes out all secondary growth and is impossible to walk or hunt through. Is there any help from PA or PCG to help develop this timberland for better small game management? My property of 70 acres is open to the public for hunting. Thank you all for your efforts in preserving hunting traditions in PA. It is appreciated.

I'm not really interested in seeing PGC stripping gas and coal and timber off our lands just to fund a bunch of bureaucrats pensions and healthcare, all the while closing all the access roads to our land to vehicles except for a few weeks a year. These roads shoud be open year round and not gated. I would like to travel these roads in summer and it's not safe to walk everywhere due to rattlesnakes. Thank you for reading my comments.

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[47]

- How is the PGC going to determine if the Plan is being successfully implemented on the ground?
- What role in the acreage of Early Successional Habitat to be created each year will the PGC be responsible in creating?
- How much of the total acreage to be created each year will be dependent on federal, private, and private forest industry timber/land management?
- PGC needs to establish a scientific based method to determine ruffed grouse population status in Pennsylvania rather than relying on Breeding Bird Surveys (BBS), Christmas Bird Counts (CBC) and other 'trend' analysis data.

Thanks for the opportunity to comment on the plan.

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[48]

Dear Sirs,

I am pleased that this plan is underway to provide more early successional habitat. I only have one concern. I hope that the cutting you are proposing is not done in the same manner that was used on Game Lands 314 in Erie County. Cutting the timber and leaving it in such a haphazard manner does not create a huntable situation. It is virtually impossible to hunt these areas. I am not looking for a golf course but I won't subject my dog or myself to hunting in those conditions. The timber that is cut needs to be removed or at least done in such a way as to provide access. I am sure my dog could point a bird there but I would find it extremely difficult if not dangerous to get to him.

I hope this undertaking is successful and I thank you for putting forth the effort.

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[49]

This is indeed wonderful news -- a fine example for other states as well, given its understanding of grouse ecology, the birds' desperate need for habitat.

It ought to attract visiting hunters from states like Illinois in a few years as the good news begins to spread.

I do hope the issue of the wild turkey population feeding on grouse nests will be addressed, that these two bird populations can be kept separate to some extent, or much of your work will be wasted.

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[50]

Private landowners make up the largest segment of property owners in the State. Specific

attention should be paid to two specific groups within property owners segments: farmers and absentee owners.

Farmers own large tracts of property usually with a large percentage of forest land. However, most farmers spend their time and resources on improving their agricultural production, and have little knowledge of forest management practices. In addition, the organizations they are associated with are agricultural based instead of forestry based. I suspect that only a few active farmers have stewardship plans or are involved with landowner associations. To more actively engage this segment of property owns, the Pennsylvania Game Commission should develop a partnership with the Pennsylvania Farm Bureau, and develop informational articles for farm related magazines. I believe more farmers would be more interested in actively managing their forest land if they were aware of the financial assistance available for management activities, and the economic opportunities that forest management could provide.

Absentee owners may have an interest in actively managing their forest, but may only get to the property a few times a year. This may preclude them from thinking about joining an association, or contacting PGC. The best way to reach this segment is probably through research of county tax records to locate absentee landowners, and sending them informational brochure on programs and contacts to improve forest management.

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[51]
Dear Sir, I applaude your vision and leadership to make this a reality. I am a member of the Ruff Gouse Society and I support this program one hundred percent. I hope future generations will appreciate the hard work and the importance it will play in their lives.

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[52]
Dear Game Commission,

The Ruffed Grouse Society has encouraged these comments and thank you for your acceptence.

First of all let me state that my support of the PGC is at an all time high as of this year with enthusiasum never better. With the treaking of the deer management to what I feel is near perfect now really helped the overall outdoor picture. Previously I felt much over harvesting in sections was being done but now I've turned to your favor in a very supportive way. Onto the grouse:

I hunted Ruffed Grouse in PA 30 days last fall/winter to find the grouse population very very good! I had over 2.5 flushes per hour over the coarse and bagged 1.5 birds per outing with my English Setter. I hunted mostly Unit 2G and Units in Clearfield county. The habitat was superb do to outstanding timber management thanks to you and affiliates. Please continue this outstanding trend!! Ground cover was ideal thanks to lower but stable deer numbers as well I

believe. My Son and I purchased a camp in Potter County last year and could not believe the forest conditions on the upper First Fork and East Fork drainages in the fall and spring of this year. I feel it's the most beutiful forest management I've seen. Over the last year I now know why there's a need for the DMAP program. It's beneficial to the forest and all forms of forest wildlife including the beloved grouse.

In closing we support you one hundred percent. In our opinion you're number one in the nation. Thank you for:

1. Grouse and forest mangement

2. Extending grouse season to end of January

3. The pheasent program both wild and stocked

4. Three point on top antler restriction in western units

5. Land aquistions (absolutely outstanding!)

6. Co op efforts

7. Great Law enforcement officers

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[53]
To the Pennsylvania Game Commission,

Regarding the proposed Ruffed Grouse Management Plan, I would first like to commend the PA Game Commission on their ability and willingness to develop and propose such a comprehensive and thoughtful management plan. Adopting a science-based approach seems only logical, but history has shown me that logic and science are often trumped by emotion and politics. I have been involved with the equivalent agencies in states of Michigan and Indiana, and was and very closely involved in the unfortunate repeal of the initial 10-year management plan for the Hoosier National Forest in the 1980's. Those of us, from within and outside the Indiana Department of Natural Resources, arguing for an increase in early successional forest were drowned out by "preservationists" seeking the virtual elimination of anything resembling responsible forest management. The results, of course, have been disastrous.

Simply put, I am both appreciative and respectful to the professionals of the PA Game Commission for putting habitat management at the forefront. This was the best single decision that could have been taken. Thank you for your professionalism.

I did note some goals and objectives regarding the effects of hunting. With PA hunters

experiencing better flush rates than any surrounding state, despite a 50% decline in early successional habitat, and a 75% decline in grouse hunter numbers, I don't see how hunting can be of much concern? Research on the effects of hunting is unlikely to provide much insight - unless it is a large (spatially, temporally, and fiscally) project. I would prefer that our dwindling resources be focused on habitat management. In any case, does anyone seriously doubt that habitat is the overwhelming limiting factor in determining grouse populations?

Thank you for developing a terrific management plan! You enjoy my continued and vocal support.

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[54]
Dear PGC,

We live on a small 75 acre gentlemen's farm in Huntingdon County.
Twenty years ago we always had ruffed grouse on our property. We even had one fly through a window. It was unhurt and we released it. Since then as the years passed we have not seen ruffed grouse on our property. We have streams, pastures, hard woods, pines, and hay fields.

We have riding horses now and we do see ruffed grouse just about every time we ride through a neighbor's property about 1/2 mile away. We ride a trail that goes to Leading Ridge Road. We usually see them in the same area. Several weeks ago we flushed out a mother and this years chicks.

I feel the ruffed grouse will be fine on their own, if the hard woods and pine woods are left alone and the streams are kept unpolluted. It is a waste of money to have someone count ruffed grouse in an area.
All you need to do is keep the habitat and they will be fine. They seem to fly faster than the hawks can fly and have the ability to hide and then scatter if need be from other preditors. I believe they will only survive in the state forest grounds. If we lose the hemlocks to insects and more imported insects come into the country and effect other trees it may be different.

Thank you for listening.

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[55]
I do in fact try and hunt grouse at least
one day per week. We primarily hunt in Venango, Forest, and Warren
counties. We have a highly skilled Setter locate our birds.
I would be pleased to belong as a Grouse Hunter Cooperator.

I read the flush surveys and harvest rates per/hr. hunting. We typically have much
higher averages. I attribute our success due to the fact that we specialize in

the hunting of Grouse. While guys are archery or bear hunting, we are grouse hunting. We spend the off season training the dog and scouting for areas that have been timbered 12 to 18 yrs. ago. I cannot imagine what we spend for one lb. of grouse meat.

In closing thank you for your reply. Should you know the location of any accessible 12 to 18 yr. old timber cuts in any central to western Pa. county, we would be pleased to add these to our list for the Grouse Survey.

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[56]
I just checked out the Grouse Management Plan and feel you guys are on the right track. Increasing the amount of young trees will do wonders for the grouse population. We all know -- if you find brush, you find game. This applies to all game, not just grouse. I am in favor of more clear-cuts. It will take a few years for mother nature to make these areas grouse havens, but that is the process. As a member of the Ruffed Grouse Society and a dedicated grouse hunter, I commend your efforts. These early succession habitat areas will be magnets for all game. Please continue with this plan, especially in Wayne County -- (that is my selfish side coming out). If you keep up with clear cuts and "checkerboards", the grouse and woodcock, will take care of the rest.

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[57]
Please move forward with this project as I remember having more grouse around 30 years ago. Presently there are very few in the Snyder County area where I live.

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[58]
Thank you for the comprehensive work on the Grouse management plan for PA.
I would be happy to distribute educational promos on early successional habitat for grouse and other declining species, in my ecology and environmental classes at Shippensburg University, and encourage colleagues to do the same across the state system of higher ed and other colleges and universities in PA. This offer also stands for the quail recovery plan, which I may not comment on due to comparatively lower field knowledge. If management for either grouse or quail is implemented close-by, I may also be able to involve ecology classes in active management, or at least field observation.

My other comments follow:

Based on poor nest success and presumably high predation in more southern habitats where hawks actively migrate, perhaps a shortened season/single bird limit could be considered as an experiment in the Michaux and perhaps ridges to the west (perhaps to Rt. 70, bounded on the north by the turnpike?), of course with concommittent cutting to increase stem density. Flush

rates pick up substantially to the west and north of this area. If I understand the mortality rates reported correctly, nesting hens in the southern oak/hickory association produces 1.24 chicks per nest attempt (1 nest x 0.63 success x 9.4 eggs/nest x 0.21 survival), and then there is substantial mortality of survivors from avian predators. These dynamics severely limit genetic diversity to survive the tougher conditions in southern PA (west Nile, masting cycles., higher human population densities). Grouse in the Michaux in particular are isolated, and may need extra protection to maximize genetic diversity as they recover with improved habitat, if not trap and transfer from elsewhere. I know that grouse seasons have been over-restricted in the past when populations were low, and that habitat is key, but with modern development, habitat fragmentation, and disease, recolonization may not happen in this area as it did in the past.

Also related to the Oak-Hickory habitat on the eastern side of the Ridge and Valleys and Michaux, the covers need more, larger cuts so that dispersing males can set up a breeding territory. This will take coordination with DCNR as most wildland in the area is state forest. Many cut areas are greater than one mile apart, or are clustered together so that predators (and hunters) converge on them. Another potential issue in this region is the nearly continuous presence in the woods of deer hunters for the special seasons that overlap most of the bird season. Birds are chronically disturbed, and it is difficult to find clear cuts not already occupied by deer hunters during typical grouse hunting hours. One muzzleloader additionally boasted how he had taken grouse off the road when the deer hunting was slow. Perhaps after cutting increases, there will be more space for everyone and the bow, muzzleloaders, and flintlockers will balance browsing effects by deer.

My final comments I offer with all due respect to the PGA habitat partnerships with RGS. I am against the RGS pay-to-hunt and other pay-to-hunt programs for grouse, even in our prime range where populations are strong. This is a small area compared with the upper mid-west, Maine, or Canada where guided grouse hunts are common, and is the same area undergoing increased and uncertain impacts from the natural gas industry. Grouse are native and wild, and belong to state residents. Whereas I see why the non-profit RGS would consider payed "Huntsmen" etc. for fundraising, I see no redeeming feature of the PGA revealing prime grouse areas to be advertised by big retailers. It seems this could easily lead to for profit pay-to-hunt and decreased access in our best areas. Google Earth and on-line magazines offer more than enough information already!

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[59]

I am an avid grouse/woodcock hunter with a setter who loves to be in the woods. My Dad & son also hunt with me. I am 54 now. I really do not have too much specific feedback on the Plan other than to say I believe you are totally correct in addressing the lack of secondary growth habitat. If you can find the cover that has saplings, aspens, and is difficult to walk through, you can generally find grouse and we have no doubt lost lots of that type of cover over time. In the 70s we would flush 20-30 grouse a day on a good day. Now a very good day is 10. One concern I have is I have been to some locations that have been cut, but all of the

wood was just left on the ground and you cannot even try to walk through it & believe me I go into thick stuff. The Northcentral region (2G) has lost of overgrown woods that needs some management.

Thanks for your efforts in attempting to bring grouse & woodcock back. What wonderful wild birds.

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[60]
I am an avid grouse hunter in western Pa.(north and south) I am also a Google earth fan who locates small (1 to 5) acre cuts on game lands and hunts them with regularity. I have been very surprised at the return of flush counts on these tracts and am encouraged that this type of management will continue or increase. I must also note that in finding the producing covers I also noticed a lack of wild turkey sign (not on the entire game lands but in and around the favorable covers) Keep up the good work , we cannot lose this valuable resource.

---

[61]
I'll do this by asking brief questions:
1.How will you measure success for the money spent?
2.Why don't we do drumming counts in the areas where we have habitat?
3.What we be the source of funding?
4.Will climate instability be factored in? Grouse are disappearing from the Southern Appalachins.
It goes without saying ESH habitat is beneficial to many species other than grouse as a consequence the more we can create the better for everybody but the quality of habitat will be the results of funding.

The idea of a voluntary grouse stamp costing $5 or less could be put forward. As there aren't a huge number of grouse hunters other approaches need to be considered
Bird conservation organizations might be a source of both funding and project expertise that could be utilized as they are aware of the need for this type of habitat creation to sustain and increase some declining bird populations.The PGC has worked with many conservation organizations regarding land purchases and acquistions to enlarge Gameland's holdings.We should see if the organizations representing passives users of Gamelands are willing to support these efforts.

I've lived and hunted here all 65 years of my life and the changes I've witnessed have been great. I experienced great small game hunting as a youth and watched it vanish by the time I was a young adult. In it's place came a deer explosion we're still grappling with, an increased bear population, along with the implementation of a sucessful turkey program. On the whole what was lost outweighed what we gained in my view but then I like hunting with dogs.

Thank you for the opportunity to question and comment.

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[62]

Thank you for reading my comments,
I've hunted grouse over bird dogs all my life and have seen populations decline precipitously along the southern tier. Gerald Almy, who began writing for Sports Afield in 1975 asked me and my setter, Puddles, to take him into the Michaux . He wrote about our days hunt. Although I didn't count flushes and he couldn't hit birds he wrote in a piece for Sports Afield that we flushed an average of five bird per hour in the woods.

I believe that we should be cutting more contiguous acres and allow cut over areas to connect with corridors. Most of the cuts I see are small, concentrate birds and spaced more than a mile apart.

Regarding the late season I believe it should be shortened to perhaps the Saturday after New Years. Grouse hunters might appreciate the long season but with all the deer hunting seasons allowed in our State the grouse are constantly being pushed out of prime habitat at a time, when predators find them easy pickings.

I do not believe we should allow the Ruffed Grouse Society to commercially sell or auction hunts for wild birds. Maybe in the Northern states where birds and habitat fit better and flush rates are high along with grouse populations it might be acceptable but not in such a high density state like Pennsylvania.

I like most hunters who think beyond a compound bow and a tree stand know that high stem densities and food rich environments (grapes, aspen, etc) equal more grouse.
The exception is the Michaux which is an island. Rattle snakes and ruffed grouse need additional help. Perhaps a trap and transfer program such-as the ones use when we traded with Missouri might help. It re-established the wild turkeys after they were released from the Hawbaker flock off Hog's Head road.

Finally I read a PHD study by two women several years ago. They were Penn State candidates and were writing about oven birds. They found where limestone grit was available oven birds increased exponentially. In our southern mountains I think the grouse population would benefit from a requirement that when timbered, the logger must top dress the replanted roads with Limestone for better egg production.

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[63]

As a side note, we kick butt on the average flushes per hour survey every year but we honestly do hunt about 7 clearcuts everyday and at least 12 days a season. We flush so few woodcock that we will not shoot them. I didn't want to sound so negative on my original comments. Don't get me wrong, grouse do thrive on the ANF but the crop tree release deal if halted would

produce way more grouse. I'm so thoroughly disgusted with what's happening to wildlife habitat on the ANF between the ATV trails and the obscene amount of oil & gas drilling. It just seems that wildlife always takes a back seat to everything else on the ANF. The ANF Marienville district ranger is **** and a Penn State graduate. If he's not one of your contacts with the ANF you should make sure he gets my comments. Part of the problem on the ANF as I see it is that the district rangers move around so much to different National forest posts that there is never any consistent approach to wildlife habitat. I really meant what I said about Land Manager John Dzeyeman's grouse habitat work on SGL 28 but failed to mention that one of his Land & Cover guys Jim Olszak is a very avid grouse hunter and I'll bet both of them know more about grouse habitat than anybody in the PGC. Don't take their opinions lightly on grouse habitat and if they haven't offered any opinions, I'd sure be searching them out.

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[64]
I've recently become more of a wing shooter than any other type of hunting. I am thrilled to read of the grouse habitat management plan. I am in full support of any hunter participation, whether it be taking surveys or volunteering man power.

From what I read and understand, the plan is solid and will benefit a large amount of wildlife. I'm excited for the future of the sport.

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[65]
Asking for public comment is seemingly a good way to utilize the experience of those who spend time utilizing the resource that the plan wants to increase. Unfortunately our governmental systems have become extremely overloaded with the bureaucracy of government , politics, and money. Although some may hesitate to admit the truth the reality of past practice tells us that regardless of input those who have the title of biologist will make the recommendations based on scientific data collected and validated over years of research; by the way costing tons of money with no need to pound the grouse coverts to see what is actually happening. The actual decisions will be made by individuals subject to political popularity to ensure their future to continue their positions. For those of us who have hunted grouse for the past 50 + years what could we really know regarding the science of a project such as this.

Oh well regardless I will give some insights from thousands of hrs. and thousands of miles in the grouse woods of Pa. 1) The grouse habitat in my part of the State (SW) has increased or at least remained stable. The only problem is more posted ground, but I can find as much good grouse cover now as ever, unfortunately the birds are not there. Why are the birds not there? There are some simple answers for this but then we would not need all of the research that we are going to do, it cannot be simple common sense, it must be complicated and scientific. Reason one, too much extended season hunting when grouse are yarded up and most vulnerable to hunting pressure. Reason two, predators were killed on sight when grouse

populations were good , now we introduce more predators (Fishers) and protect the ones we had before; by the way they all eat - every day. Reason three, and this is the one that the game commission really does not want to hear, the increase in Turkey populations is a detriment to ground nesting birds such as grouse. No farmer would ever let a turkey round a hen house. They destroy nest and will cannibalize chicks. As Turkey populations have increased grouse populations have fallen, there is more to it than coincidence. Honestly this is not "Rocket Science" but some people try to make it seem such. Unfortunately I don't see much of a solution because for some reason I don't see the Commission bringing back bounties on fox and the great horned. The Turkey is a bigger cash cow than grouse, and for some reason we must extend all seasons to the limit so that we maximize everyone's opportunity. The people who made decisions to institute bounties years ago and the length of seasons were just using common sense, no science, Oh by the way we had good grouse numbers back then. Palmer and Krist did grouse research for years, I sent in countless envelopes with feathers, with what result? Did we not just finish a long grouse research study at Scotia with what result? Lots of studies but no improvement, perhaps its time to use more common sense and less science. I respect science and those who are involved, but at the same time am frustrated at "not seeing the forest for the trees" approach that is being taken. I am **** with no Biological background, only grouse hunting experience since 1960' and still going strong. Perhaps my light game bag in recent years is better for my health and I save money on shotgun shells, and my setters get more exercise, although they tell me they would like to find more birds.

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[66]

I have been hunting upland birds for over 30 years primarily in south western Pennsylvania. Yes, I will attest to the decline in the grouse population. I read the paragraph explaining predation both avian and mammalian, but no apparent plans to control predators. From purely a subjective point of view, coyotes and raptors seem to have devastating effects on the grouse population, at least in the area I primarily hunt (SGL 95). During the deer season of 2008 a few inches of snow had fallen overnight. We had started into the woods an hour before sunrise. To my astonishment was the amount of coyote tracks laid down in the fresh snow. It was like a coyote grand central station. I actually came upon tracks of a coyote pursuing a cotton tail ending at the base of a pine tree and a pile of rabbit fur. Raptors too, appear up in numbers. Thirty years ago you never saw a bald eagle or the number of hawks that you see now and coyotes were unheard of.

As far as a remedy, well the raptors are federally protected. The coyote? Why isn't there a plan or even mention of ways to eliminate the coyote in your draft? We are attempting to eliminate feral and wild hogs in PA and other states, why not institute some programs to at least drastically reduce the coyote population? Again, being subjective, I think decreasing the population of coyotes would increase grouse, deer and cottontail populations.

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[67]
I have hunted grouse and woodcock in Pennsylvania for nearly 23 years. I am very happy to hear that the PAGC is considering a management plan targeted specifically for early succession growth forests (ESGF). Those who hunt grouse know these are the areas that support and sustain healthy grouse and woodcock populations. I have spent thousands of hours in the grouse woods and have come to realize ESGF support many other species of wildlife such as whitetail deer, black bear and many other non game species. Finding good grouse habitat in Pennsylvania has been like finding a needle in a haystack. There just is not that much of it on public land. I am aware of some of the programs that the PAGC has adopted over the years to create ESGF. I have seen the "Deer Fences" that have been erected around clear cuts or burning areas. These will definitely help in allowing the young growth to prosper and get beyond the reach of browsing deer. The problem that I see is that the areas are severely undersized in supporting grouse populations. I do understand that as the area gets larger the cost and manpower required to erect the fence is greater.

I have spent many years hunting grouse/woodcock in states other than Pennsylvania. I have hunted in northern Wisconsin, both the Lower Peninsula and the Upper Peninsula of Michigan. I have been travelling to these areas for the last ten years. Finding good grouse/woodcock habitat in these states is a matter of driving down any secondary road. The ratio of ESGF to mature woods is significantly higher in these states. Accordingly the grouse and woodcock populations are significantly higher. I am aware that there are other factors that can effect bird populations. However without ESGF the birds do not stand a chance to prosper. I have held the opinion for years that Pennsylvania needs to increase the size and number of clear cut areas to overwhelm the deer in any given area. Create so much ESGF that the deer could not possibly over browse the young growth.

It is in this vain that I strongly support and applaud your recognition that a targeted approach needs to be taken to create healthy forest habitat for grouse and woodcock. We have seen flush counts decrease over the past 20 years. I do believe that with more habitat the grouse and woodcock populations will rise once again.

Thank you for your consideration.

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[68]
I would like to pass along a few comments concerning the grouse hunting (or rather lack of) in Pa. It seems all of the emphasis these days by the PGC is on stocking "pheasants" and appeasing deer hunters. Perhaps the PGC should consider working closer with the Ruff Grouse Soc. and begin to address the lack of habitat we are currently experiencing in this state..

I too have been hunting grouse & woodcock in Pa. since 1960...Fortunately back then we did not have to travel to the "Lake States" to find birds in any numbers. Myself, along with dozens of other Pa. bird hunters now travel to Mich, Wisc. and Minn. to find suitable habitat..And along with all of us "non-resident hunters" goes a lot of revenue that would otherwise stay in

our state.

Is there anything we hundreds of grouse hunters can do to get you folks motivated to try and at least begin to turn this problem around ??

Do you think the lack of action by the PGC to address these kinds of problems has anything to do with the continuation of the decline of Pa. resident hunting license sales ??

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[69]
First, I would like to thank the PGC for taking this important step in improving the habitat for Grouse and to a degree, Woodcock and other wildlife that thrive in early successional habitat (ESH). Ruffed Grouse depend on young forests and their numbers have been in steady decline since the PGC abandoned controlled burns, timbering and other habitat projects that maintained the forested lands in a balanced system back in the late 70's or early 80's. Our present forests are well aged.

As a life long hunter in PA dating back to the mid-1960's, I have witnessed a decline in the numbers of several game species and habitat loss, both by urban sprawl and aging of woodlots, plays the most significant roll. Hopefully, this plan presented by the PGC will lead to an overall improvement in ESH and game numbers, especially Grouse, Woodcock and deer, for all to enjoy.

I do suggest the PGC develop and more accurate method of determining the population of Grouse, and Woodcock, rather than depend on just the surveys of the coop hunters. New Hampshire has a program whereby all hunters can participate as do some other states where Ruffed Grouse are pursued in earnest. I believe, and would support, a Grouse and Woodcock Stamp, providing the revenues are mandated to be solely for ESH improvement. This should be done by statute so the monies cannot be derailed for other purposes. This would be similar to the "State Duck Stamp" or better, an "Upland Bird Stamp" and this would be required for any upland bird hunting like the Migratory Bird Stamp necessary for doves and woodcock. This would provide additional funding for the PGC to use towards ESH projects.

Again, thank you for taking this first important step and I will also urge my state senator and representative to support your plan once finalized by the PGC.

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[70]
Thanks to all involved to protect and increase our grouse population. Since the decline of our pheasant population, I have enjoyed the challenge of grouse hunting and the pleasure it brings my dogs. Keeping journals and notes through the years of personal experiences, I agree with the information in the Grouse Management Plan. In addition, I have noticed a dramatic increase in the turkey, coyote, and bear populations in areas that once supported good

numbers of grouse. These areas still provide excellent cover and food sources, but it seems to me that the turkey is consuming some of the same food supply required to support the young grouse and the coyotes are consuming grouse, or at the very least, chasing away both young and old grouse from the food sources they need to survive. I appreciate and respect those people involved in trying to maintain a balance of game for all hunters. I have three sons. All three hunted when they were younger. There reason for not hunting now is lack of game. I can no longer persuade my son's to hunt with me. They get their exercise from other activities. As mentioned above, I still hunt grouse and occasionally deer. Like most true grouse hunters I know, we do it for the outdoor experience, challenge, and great pleasure it gives our dogs. With that said, it is extremely rewarding and encouraging to have a close flush even if you do not bag the bird. It was this type of excitement and experience that kept my son's interest in hunting alive. Unfortunately for me, too many 5 hour walks with the dog with few or no flushes, my son's quit hunting. Being introduced to bird hunting by my father during the height of the pheasant population was an experience I thought would last forever. I would hate to see the grouse end the same way. Thanks again for your efforts.

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[71]
I would love to see more focus on the ruffled grouse. It is a native bird that we should make sure it thrives in Pa. I'm new to learning about grouse but I do support any efforts made by the game commission.

[72 – Repeat of comment #67, submitted by a separate individual]
I have hunted grouse and woodcock in Pennsylvania for nearly 23 years. I am very happy to hear that the PAGC is considering a management plan targeted specifically for early succession growth forests (ESGF). Those who hunt grouse know these are the areas that support and sustain healthy grouse and woodcock populations. I have spent thousands of hours in the grouse woods and have come to realize ESGF support many other species of wildlife such as whitetail deer, black bear and many other non game species. Finding good grouse habitat in Pennsylvania has been like finding a needle in a haystack. There just is not that much of it on public land. I am aware of some of the programs that the PAGC has adopted over the years to create ESGF. I have seen the "Deer Fences" that have been erected around clear cuts or burning areas. These will definitely help in allowing the young growth to prosper and get beyond the reach of browsing deer. The problem that I see is that the areas are severely undersized in supporting grouse populations. I do understand that as the area gets larger the cost and manpower required to erect the fence is greater.

I have spent many years hunting grouse/woodcock in states other than Pennsylvania. I have hunted in northern Wisconsin, both the Lower Peninsula and the Upper Peninsula of Michigan. I have been travelling to these areas for the last ten years. Finding good grouse/woodcock habitat in these states is a matter of driving down any secondary road. The ratio of ESGF to mature woods is significantly higher in these states. Accordingly the grouse and woodcock

populations are significantly higher. I am aware that there are other factors that can effect bird populations. However without ESGF the birds do not stand a chance to prosper. I have held the opinion for years that Pennsylvania needs to increase the size and number of clear cut areas to overwhelm the deer in any given area. Create so much ESGF that the deer could not possibly over browse the young growth.

It is in this vain that I strongly support and applaud your recognition that a targeted approach needs to be taken to create healthy forest habitat for grouse and woodcock. We have seen flush counts decrease over the past 20 years. I do believe that with more habitat the grouse and woodcock populations will rise once again.

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[73]
What I like about the plan

1. researching the size and type of cutting that will be done to manage for grouse
2. realizing the need to go back in and cut, even if timber is not at a marketable stage yet
3. The goals of acres to be timbered on GL's, although I question if that goal can be reached without more foresters to mark timber
4. Using fire to help generate habitat

Concerns about the plan
1. The small size of habitat cuts being recommended. I know everyone likes the habitat at the "Barrens", but my experience, is bigger cuts results in more and better grouse hunting. Plus smaller cuts requires crews to go back in sooner to regenerate the younger forest grouse need
2. I don't see anything about working with the Allegheny National Forest to enhance grouse habitat in that large are with the existing game lands
3. I'm concerned with checking with hunters and their ideas for season lengths. I would hate to see seasons shortened for those that don't spend a lot of time hunting grouse, with their hopes that a shortened season might increase their flush rates the few times they go out.

Overall, a well thought out plan. As a dedicated grouse hunter, I'm hoping 75% of this can be fully implemented. If so, grouse hunting will be fantastic for generations to come.

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[74]
The ruffed grouse is a beautiful bird and is our State bird. Developing a State wide management plan for the ruffed is a great endeavor. I wish you well. Ruffed grouse management is cost effective. Even aged management works. A treatment can create habitat as well as make money. Quality (seeded) roads are an important part of grouse habitat and forest management. Private forest landowners can understand this. Investing $10,000 in grouse management goes a long way to help the ruffed grouse. Paying $10,000 for stocked

ringnecks is money down the drain. This could be the Pennsylvania Game Commissions best effort. Again, I wish you well.

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[75]
It should be against the law to shoot a Ruffed Grouse In Area 2A. I live in Western Greene County, 30 years ago this was the best Grouse hunting in the state. I havent seen a Grouse while hunting in 3 years and I spend around 100 days a year in the woods

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[76]
I would like to start by saying how pleased I am that the PA Game Commission has finally decided to start a grouse management plan, and thank you for the opportunity to allow me to give me thoughts on it. Overall I am very pleased with the management plan I only have a few concerns; 1) The importance and accuracy of collecting the statistical data on how well the program is working, i.e. are grouse numbers actually increasing, if not, then why? certain areas more than other? and the program and its leader be fluid enough to change and adapt as the program needs 2) I believe the late grouse season (from Christmas on) may need to be eliminated for a few years, at least in the south tier of PA as this is my home hunting range and I am most familiar with this area. After hunting this area for more than 15 years I have seen a steady decline in grouse populations. This is the most crucial time for grouse because of the generally harsh winters we have it is hard enough for them to survive, without having to deal with human predators as well. I believe closing the late season for a few years will allow the population to increase and then we can re-visit the idea of having a late season, maybe a shortened one. My concern is if the grouse populations get to low, as they are in some of my areas, we can do all the habitat work we want to but there will be no grouse left to move into these new habitat areas. 3) I would also like to see something put in place that will guarantee this programs for at least 12-15 years so this program actually has a chance to make a difference. To many times with changes in leadership and government something gets started, goes for a few years and then due to budget cuts, changes in leadership and so on, the programs are done. 4) I would like to see a change in the woodcock seasons as well, being that it would start 1 week later in October and then run 1 week later into November, as our greatest number of birds generally aren't getting here until the last few days of our current season. I appreciate your time to consider my comments and again want to say how pleased I am to see some money and programs going towards grouse hunting, as I feel grouse hunters are a small percentage of hunters and all previous programs were directed solely towards deer and turkeys. Even non grouse hunters should appreciate this program, after all it is our state bird and he needs help!

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[77]
I think reaching 1980 young forest percentage throughout the state is a good start. However, I believe as a dedicated grouse hunter and conservationist that the goal should be 25% of our

forests less than 25 years old. This would provide a 100 year harvest schedule, which if properly managed would provide a very diverse habitat in our woodlands. Right now Pennswoods are becoming very monolithic with little habitat for wildlife. As most conservationists know, a monolithic forest does not provide the habitat need to sustain healthy wildlife populations

Thank you for putting together the plan. I wish you the best in its implementation

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[78]
I think your program of flush rates per unit is an excellent gauge of grouse populations year to year. Personally I feel spring drumming counts statewide would be a waste of time and resources for the PGC. This opinion is based on experience hunting midwestern states where the surveys are taken.
I've found drumming counts are inconsistant due to spring weather and at best may only gauge winter survival. In my opinion they have no way of predicting fall grouse populations, only in speculation or a guess. I add these comments on account of reading that the RGS would like to see a better or more accurate program added to PA grouse management. While they are a super wildlife group I disagree and believe you can do no better than you already do. I've found your biologists and staff to be better at forcasting fall hunting than any other state I've been to. I write this with 40 yrs experience. Forestry management is excellent on game lands and anywhere else the PGC is involved. Please keep up the great work as it's paying off. I've found PA grouse hunting to better than ever the last five years and I'm glad to say it's even better or at least even with the best areas in the upper midwest.

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[79]
I agree on the Draft Ruffed Grouse Plan. I do however disagree with your figures stating that 100,000 hunters harvest 75,000 to 100,000 birds each year. I think both figures are much less. If you are getting this info from the "grouse hunting fraternity", I believe they are telling you "un-truths" !

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[80]
I feel that the daily bag limit should increase to 4 from 2. This would enable hunters to enjoy longer days in the field and spark the interest of younger hunters

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[81]
I participated in the grouse study being done my Mr Palmer some years ago (for about 10 yrs.). I basically quit recording my hunts because of the lack of birds. I (and a number of my friends) now hunt in Mich., Minn., and Wisc. Only a few outings in Pa.
(for old time sake)...

I will however start keeping records again in Pa. based on our correspondence.

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[82]
I live in Cambria County and would appreciate a contact person to assist me in habitat development for small game. Thanks again.

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[83]
Thanks you for your response to my comments concerning the Ruffed Grouse Management Program. My father participated in The Cooperator survey for years and I would be interested in participating. Also, I'd like to correct myself in recommending a woodcock stamp - I since realized that is federal jurisdiction but do think a state grouse stamp to help with the management plan would have the support of serious grouse hunters and weed out the others.

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[84]
I wish this plan would have been implemented ten years ago. 2010 was the worst grouse season I had in the south east region in 30 years. We need to educate hunters on gunning morals and common sense taking of grouse in certain areas , also bring back bounties or season limits on avian predators such as sharp shin, gos hawk,red tail etc.which in this day and age will be next to impossible, but absolutely necessary. We need to make it less expensive for trappers and somehow educate younger sportsman to get involved in trapping to decrease the number of land dwelling predators. I'm amazed there are as many birds upstate. Why don't we see as many predators there? If there is anything I can do as an avid grouse hunter to help the cause please contact me.

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[85]
The recent comments from the Ruffed Grouse Society that the cooperators flush counts might not be a good way to evaluate the overall grouse population may hold some merit. I've told you we hunt about 7 clearcuts on the ANF each day and about 40 different ones throughout the early season. While we never hunt any single clearcut more than 6 times in a season and usually only twice and we try to hunt 6 or more new ones (to us) each season, we generally know what type of grouse cover we're heading into before we start hunting. Keep in mind we hunt in thick regenerating sapling stands with flushing dogs. Grouse hunters on the ANF with pointing dogs can hunt more open cover and do quite well. The other side to this is that I've never seen the pointing dog hunters exploit the middle of the clearcuts that we hunt. I'm guessing that hunters who hunt over pointing dogs out number flushing dog hunters ten to one. I don't have a clue on how to improve grouse counts. I think you have a pretty good thing going now. It's way better than what Casselina is doing with turkeys. I've talked with WCO's on the ANF about turkey counts taken by driving roads the same day & time each year. They think

it's a joke. Weather and food sources could negate any type of accurate count from year to year. The bottom line is you need feet on the ground which is exactly what your current survey is doing. Not sure what all this means – just some food for thought.

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[86]
It's interesting that **** mentions the importance of birch and the utilization by grouse on the Allegheny Plateau. We sometimes think of birch as an "undesirable" weed tree and discriminate against it in our management techniques. This is another example that shows the importance of creating tree and shrub species diversity and variety in our habitat projects and how wildlife utilizes it at different times of the year.

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[87]
We do have them [grouse] at hawk mountain as a long-term nesting species though we are in a maturing ridgetop forest so I am curious to read the plan.

[88-93]
Individual requests to be added to the PGC Grouse Hunter Cooperator Survey.

Comments provided by Ruffed Grouse Society, Audubon Pennsylvania, and DCNR-Bureau of Forestry appended separately.

APPENDIX 4: FULL RECORD OF PARTNER COMMENTS RECEIVED

DCNR Bureau of Forestry

The Bureau of Forestry agrees that Ruffed Grouse (*Bonasa umbellus*) are of significant social and economic value to the state and State Forest land and their habitat is important for numerous other early successional species. Therefore, we look forward to working with the Pennsylvania Game Commission on accomplishing some of your management plan goals.

In response to your request for comments, we have reviewed the latest draft of the Ruffed Grouse Management in Pennsylvania. Our comments on this document follow:

The Bureau of Forestry agrees that understanding the population is necessary to identify the maximum level of hunting that will not result in overharvest of the resource. We are willing to assist, when possible, in conducting any surveys on State Forest lands of ruffed grouse presence. We also encourage the review of additional methods of estimating the ruffed grouse populations to ensure monitoring tools are as up-to-date and accurate as possible since this information is crucial to making harvest allocation decisions, and management strategies should be based on reliable data and sound science.

As mentioned in the plan, creating young forests has been shown to increase grouse populations. The Bureau of Forestry presently has a goal to create 60,000 acres of new early successional habitat each decade in support of producing the widest possible variety of plant and animal habitats upon the lands we manage. In 2009 the Bureau of Forestry created 7,913 acres of early successional habitat and in 2010 we created 6,450 acres. We are willing to assist when possible in surveys or studies regarding management producing good habitat. We would be interested in looking at the differences in habitat quality created by the different silvicultural practices conducted on State Forest land for ruffed grouse.

The Bureau is looking forward to working with PGC to identify the sites on State Forest land with the greatest potential for ruffed grouse and to develop management plans for those particular areas. Although we are already working together on several sites on State Forest land, we are looking forward to working with you on developing more landscape level plans where the best potential for ruffed grouse habitat may be.

Thank you for the opportunity to comment on this Plan. We are very willing and committed to working with the PGC on the future management of this important species.

Sincerely,

Emily Just

Wildlife Ecologist
Ecological Services Section
Pennsylvania Bureau of Forestry

From: Philip S. Wallis, Executive Director, Audubon Pennsylvania

To: Pennsylvania Game Commission

Date: August 30, 2011

Re: Draft Management Plan for Ruffed Grouse in Pennsylvania, 2011-2020

Audubon Pennsylvania, the state office of the National Audubon Society, has reviewed the Draft Management Plan for Ruffed Grouse in Pennsylvania, 2011-2020, and submits the following comments for your consideration.

Like the Game Commission, Audubon is concerned with the population declines experienced by Ruffed Grouse in recent decades. These declines are indicative of the loss of early-successional forest habitat in Pennsylvania that has impacted our state bird and a host of non-game species of conservation concern. Creating additional early-successional forest habitat in Pennsylvania is of utmost importance to conserving the Commonwealth's biodiversity.

With the recent creation of management plans for American Woodcock, Northern Bobwhite, and Ruffed Grouse – three game species dependent on early-successional habitats – Audubon urges the Game Commission to approach the management of these species and associated non-game species holistically. Each of these plans contains ambitious goals, but the connections among them are not clearly evident. Additionally, the Game Commission should ensure that all of its recommendations and strategies are tightly aligned with best management practices for non-game species of conservation concern, such as the recommendations of the Golden-winged Warbler Working Group.

The concept of studying the impact of hunting on grouse populations, as described in Strategy 1.3, is a worthy endeavor. Since this research will take several years to complete, we recommend erring on the side of caution with regards to the existing restrictions on grouse hunting. An annual review of the progress made in this study may allow for quicker changes to hunting regulations if research is beginning to suggest that a negative impact on populations exists.

The issue of invasive plant management in the establishment of early-successional habitat is critical, as described in Strategy 2.3. Providing technical assistance on this issue statewide would help the entire suite of early-successional habitat specialists. In many areas of the Commonwealth, landowners are apprehensive to perform timbering operations or let old fields grow because of the probability of serious invasive plant issues. The development of clear management guidelines and an extensive landowner education and outreach program will be critical to address this concern. Audubon and other conservation partners, such as land trusts, watershed associations, and environmental education centers, may be well suited to perform this work with support from the Game Commission.

In addition to better integrating the management plans for species dependent upon early-successional habitat, Audubon also recommends better defining within this and other plans how sites will be selected for early-successional habitat management. As early-successional habitats are part of a complex matrix of habitats across Pennsylvania, it is vital that by improving the status of early-successional habitats, we are not simultaneously damaging other critical landscapes for wildlife, such as interior forest habitat. Strategies 2.6, 2.7, and 2.8 should be expanded upon to ensure that areas targeted for early-successional habitat creation are selected strategically and with the health of all of Pennsylvania's flora and fauna in mind.

August 1, 2011

Pennsylvania Ruffed Grouse Management Plan Comments

Pennsylvania Game Commission
2001 Elmerton Ave
Harrisburg Pa, 17110-9797

Commenting Organization:

The following comments are on behalf of the Ruffed Grouse Society (RGS) in reference to the Pennsylvania Ruffed Grouse Management Plan public comment period June 03 – September 01, 2011. RGS supports the PGC efforts put forth thus far in the first stage of implementing the National Plan for the conservation of this species. Pennsylvania is one of the few states to have progressed forward with the National Plan recommendations and the PGC should be recognized as such.

NUMBER CLARIFICATIONS

The working assumption pending further clarification from the PGC will be the nonstocked classification in FIA database is being combined with the Early Successional Habitat (ESH) to total acreage, along with the expert addition to derive the amount of ESH data alluded to on page 17.

The National Plan recommends 1,992,100 acres to sustain ruffed grouse populations at or above 1980 level, and currently PA is at 1,835,000 - acres a deficit of 157,100 acres annually thus far. Continuing, the PA target for the National Plan in year 2025 is 3,272,000 acres indicating an increase of 1,437,000 acres from current estimates of occurrence, therefore current estimate of small diameter occurrence would be 1,835,000 (10.96% ESH PA timber land 2009 FIA data) acres not 1,836,000 acres as used later in your calculations for yearly timber harvesting. Your PA goal of 2,741,000 acres of harvest requires 906,000 acres of harvest rather than 905,000 new acres at the rate of 90,600 acres /year. Combining the amount needed to be harvested to maintain 1,835,000 acres of commercial forest presently in small diameter class with the newly added 906,000 the percentage of 16.37% for the duration of the PA plan (2,741,000/16,739,850) not 17.3%. Somewhere these numbers do not add up and it could be in the addition of the ESH from your expert opinion.

The timber harvesting of 0.57% of Pennsylvania total timberland a year (90,600 acres) should not be considered an arching goal when marketed correctly to the users of Pennsylvania's forests for a multiple

use regime. This Plan is targeted for ruffed grouse, but not only early successional species will benefit from this management. Many forest interior birds and fall migrants use ESH during portions of their life for increased cover or high nutritional value food source. This may occur during molt periods requiring high energy demands, post-fledging, or as a stopover site during migration flights. Big game species, once critical to Pennsylvania's local economies, would benefit from the return of a higher percentage of ESH habitat to the landscape for many of the same reasons, food and cover. Marketed in this light, the PA Plan demonstrates not only the hunted and hunter aspect, but the wildlife viewing aspect of the Ruffed Grouse Management Plan to the users of Pennsylvania's forests.

SILVICULTURE SYSTEMS

Northern hardwoods: Portions of this forest type have the highest flush rates for the state and the counties representing these flush rates also contain high percentages of black cherry (*Prunus serotina*). RGS would therefore recommend utilizing both Allegheny hardwood and northern hardwood as separate forest types in the Pennsylvania Ruffed Grouse Management Plan. Stocking guidelines for fully stocked stands with higher stem densities of black cherry will be different and in many instances a higher proportion of stands could be considered fully stocked due to the low browse preference of seedlings of this species from white-tail deer. Another advantage in the separation of the northern hardwood forest type is the frequency of occurrence of *Populus* sp. as an associated species in large enough numbers to possibly contribute to the fitness of ruffed grouse in areas within this type rather than the Allegheny hardwood forest type. It should be noted; the presence of *Populus* sp. may be a relict characteristic of past disturbance or stand position not to be considered a true characteristic of the northern hardwood forest type.

Even-aged management systems in the presence of high deer densities or an understory of rhizome based fern without the presence of adequate advanced regeneration is not recommended. Allelopathy is not the main problem. Shade inhibiting the new regeneration from the fern present, and browse of those initiated resulting from high deer densities is the main problem. Proactive management through herbicide treatment or use of exclosures are proven methods and neither of these are mentioned in the PA Grouse Plan as methods available for increasing woody stem density (advanced regeneration to the stem exclusion stage).

What are the PGC plans for the black cherry / red maple savannah stands that were the result of the attempts of even-aged management in the 1960's? Some of these stands are on State Game Lands (SGLs), but a majority is located within the Appalachian High Plateau? If a more stringent emphasis on regeneration of woody stems is not considered, as seems absent from this plan, the possibility of such savannahs throughout the landscape by 2020 seems likely within the Allegheny / northern hardwood forest type (lack of acknowledgement of deer density or the use of herbicide as treatment method). These stands represent possibilities for artificial regeneration (thermal cover or native shrub under planting, aspen conversion,) or conversion to brood areas with warm season grasses. Factors limiting success include presence of invasive herbaceous vegetation and browse pressure, expired seed bank and vigor of remaining seed source for natural regeneration and dispersal based on spacing of remaining dominant stems.

Mixed Mesophytic: Slope, position and aspect is critical in the amount of sunlight reaching the ground and thus affect the growth and species competition factors in the regeneration of the next stand. Rather than utilizing thinning, which promotes crown closure up to a certain age and does not promote understory development in most cases, RGS recommends you utilize even-aged management systems. Most of Pennsylvania forests are even-aged and thinning from above will not promote closure or much additive diameter growth for commercial value in mature stands of today's forests. Precommercial thinnings of stands have not been proven to be beneficial to ruffed grouse due to the lack of development of an herbaceous understory leading to woody regeneration in stands utilizing this silviculture treatment.

In even-aged management systems, providing no less than 50% sunlight to the forest floor provides the amount necessary to promote the desired herbaceous and woody stem regeneration response. Given the average stand age of PA forests the spacing of leave trees (10-15 per acre) crown closure should not be an issue in the mature stands following the established percentage of sunlight guideline. The residual trees should only be left if a seed source is needed for advanced regeneration or as a diversity component (snags, course woody debris) in the next stand. RGS understands certain agencies are mandated to leave a predetermined basal area within even-aged timber management areas.

In the riparian areas RGS would recommend group selection rather than thinnings within these areas to promote herbaceous cover in the gaps. These gaps attract invertebrates making them useful for increasing brood survival rates and are beneficial for other insectivorous and browse dependent species, as well as providing escape cover from predators.

Mixed Oak: The intermediate shade tolerant nature of *Quercus* sp. in Pennsylvania lends this species to the shelterwood even-age silviculture system. Dispersal within an oak dominant stand of regeneration is usually fairly uniform due to small mammal, bird and natural tree growth spacing. Maintaining the regeneration into the next stand at the desired stocking is where the use of prescribed fire and shelterwood combination can be a useful tool. The measure of the advanced oak regeneration root collar should be at least of a 0.25-0.50 inch size class or 4-5 foot in height to survive the fire, deer browse, and out- compete the more shade intolerant species (birch mostly and perhaps pin cherry) that will establish themselves and contribute the woody stem density also creating the desired ruffed grouse habitat. It is important though to encourage the survival of the oak in these stands as they mature to contribute to the landscape hard mast in the next generation of sawtimber sized stands and nesting sites. The shade intolerant species will regenerate and establish again, but the oak will be able to out-compete and hold its place in the next stand. The woody stem density will be nearing the desired 8,000 – 12,000 stems/acre at 5-7 yrs. prior to stem exclusion.

Cerulean warbler: This long distance migrant is declining at 3.0% a year according to Breeding Bird Survey (BBS) data USFWS as shown in the 2005 analysis. It has been demonstrated that the use of the shelterwood systems in mixed oak stands is beneficial to increasing territorial density and nesting success of this species within its breeding range in Pennsylvania. Utilizing published information such as this is a critical aspect in your public opinion and education for countering the intrinsic value placed on

'big timber' vs. views of timber harvesting operations and its usefulness to forest birds and role in their conservation.

TABLE 5: CONSERVATION PRIORITY

Willow flycatcher, olive-sided flycatcher, and yellow-bellied flycatcher, during migration are found in high numbers in ESH that is not classified as breeding habitat. Ongoing research in the Allegheny National Forest conducted by the Northern Forestry Sciences Laboratory demonstrates the use of ESH created by silviculture systems for these three species (among others) that you have listed in your Conservation Priority Table. Expounding on this adds support for those who oppose your proposed additions of ESH on the landscape through timber management. This signifies the importance of ESH within the landscape for these birds as stopover during fall migrations that are classified as a Conservation Priority strategy.

RIGHTS OF WAYS (ROWs) AND DAYLIGHTING FOREST ROADS

These areas are indeed favorable to brooding and provide opportunities for habitat improvement. These areas should not be considered in the calculation of the total acreage of ESH due to the linear nature and little work has been done in Pennsylvania to evaluate their productivity other than a presence/absence of occurrence. They do however contribute to the viewing aspect of the multiple-use of Pennsylvania forests.

RESEARCH NEEDS AND IMPLEMENTATION

Prior to any adjustment in season and bag limits, which will alter determining the success of timber management methods in different forest types, the PGC needs to establish these standardized sampling protocols on dedicated research management units.

RGS would recommend, support, and assist the PGC in utilizing the resources available within the state to establish a scientifically sound design for determining the progress of the implementation of the PA Grouse Management Plan. Progress defined as what percentage each year of ESH is being established on private, federal or state land, the forest type it is established in, size and location. State and local Society of American Forester (SAF) Chapters could be a good source for this information as reports or simple surveys. Identifying potential outcomes of failure to establish the desired percentage of ESH within the landscape would assist in the cooperation of all agencies and private landowners in Plan implementation. The very real possibilities could be the state and federal listing of certain species of birds which are presently experiencing global declines in populations due to lack of suitable nesting habitat (ESH). If this occurs access to both public and private lands for multiple use activities could be governed by state and federal regulations. *What are the Game Commission plans for timber harvest projections each year on SGLs to achieve their part of the planned acreage goal?*

This call for research assistance should be an outreach to the agencies and organizations involved in the implementation portion of the plan, RGS, USFS Forestry Sciences Laboratory, Universities, USFWS, USFS, WMI, Audubon, Private forest industry, and others not listed here. The information from Pennsylvania

used in the development of this Plan is, at the admittance of the Editor's, trend analysis and although the trends are consistent, relying on trend data to determine success of the state wide plan and continuing through to the 2025 National Plan target might be difficult in the public eye. Establishing trends requires long-term data for acceptable confidence levels where as shorter-term results for public display within the scope of PA Plan are probably more desirable.

For example the continued use of BBS and Christmas Bird Count (CBC) data on the established areas has seen considerable habitat changes in routes and 'circles' due to sprawl and other developmental impacts in even the remotest areas of Pennsylvania (ruffed grouse highest flush rate areas). Will the increases in timber harvesting and impacting the population of ruffed grouse within the state amicably be reflected using these sampling methods?

Relying on hunter flush rates and PGC Summer sighting surveys incorporate high rates of observer bias and are a source of categorical and observational data, restricting analysis methods and increasing error. Hunters will utilize optimal covers increasing their success rate. If a decrease in rates is detected through these surveys the potential of a 'too late' reaction is a reality. The overestimation of populations is much more likely due to lack of standardization in areas being surveyed. Summer sighting by PGC crews is a chance happening encounter virtually paralyzing statistical analysis but as you use them now, somewhat useful for preseason hunting predictions. As stated above RGS personnel would be willing to assist the PGC and other agencies or cooperators in developing sampling and design protocols to decrease errors and biases in determining short-term success/failure of the PA Plan goals.

RGS would suggest forming a technical committee to assist in determining the projected goal of 215,000 male ruffed grouse by 2020 as your plan has no criteria for determining this success or failure. Input in this plan prior to release from participating organizations could have assisted in the evaluation of success of the goal for population recruitment and timber harvest method by forest type.

Most of this Plan has been stripped from the National Plan and the ability to adhere to the timber harvesting schedule and the actual arrangement within the landscape remains to be determined. The placement of and size of the management units are just as critical as the creation of the young forest habitat itself.

DEVELOPMENT OF PRIVATE LANDOWNER INCENTIVES

The condition of the standing timber in Pennsylvania is variable as you are well aware of regardless of ownership. Presently there are programs available (listed in the PA Plan) to private landowners for reimbursement enrolled these and utilizing these management plans written by the associated professionals. Many of the plans do not involve the creation or long-term management of ESH as the main directive. Many developers of these plans utilize timber stand improvement methodologies. In the many high-grade conditions of Pennsylvania forests this is proven to not be cost effective, beneficial to timber production, or conducive to increasing the quality of wildlife habitat. Therefore direct landowner incentives to the creation of ESH in the high-grade stands common in PA and assisting in developing a market for the lesser quality of timber products would be critical to the successful implementation of the PA Plan on private lands.

Promoting the use of woody biomass as a carbon neutral fuel source in energy production could provide a larger economic market for the lower quality large stems and small woody regen considered undesirable or interfering with the desirable woody regen. If the interfering woody regeneration could be harvested as a potential rotational schedule (7-10yrs) for use as a biomass fuel this would maintain the ESH condition within the landscape. As programs were developed the landowner could receive benefits through this participation and their contribution to energy production. This type of management would only be conducive on stands where cost to convert to commercial timber would be too high to offset stand entries and current incentive programs. This is ambitious and beyond the scope of the Plan but should be approached as future possibilities to maintaining and increasing the percentage of ESH in Pennsylvania and the participation of private landowners whose objectives are wildlife based and whose forestland is severely degraded.

ECONOMIC BENEFITS OF PA GROUSE PLAN IMPLEMENTATION (NON –TIMBER REVENUE)

The Pennsylvania Ruffed Grouse Management Plan indicates the hunting of this 'King of the Gamebirds' is responsible for $79 million dollar direct spending in the economy of the Commonwealth. The successful implementation of this plan to the extent of achieving the desired percentage of ESH within the landscape and the goal of increasing the number of male ruffed grouse to the desired levels in the population can only be additive to the economic impact from this single species. Identifying other economic potential from reestablishing the balance of ESH within the ecological mosaic of habitats in Pennsylvania for hunted and non-hunted species should be a key element in the successful acceptance of this Plan in the eye of the general public. One notable element includes emphasizing the creation of this type of habitat to generate a plethora of both browse and cover for one of the most sought after big game species in Pennsylvania, the white-tailed deer. In doing so will assist in increasing the health of the herd , hunter success rates, and the possible renewal of dwindling interests in pursuit of this species by both resident and non-resident license purchase increases. A second element of potential local economic benefit from increased ESH within the landscape is in the promotion of what Pennsylvania has to showcase, and that is its original diversity of native flora and fauna. Reviving the balance of ESH within the landscape through the implementation of the PA Grouse Plan will not only sustain the diversity, but provide optimal breeding and foraging habitat to assist in reversing the documented trends of decline in many of species using this ephemeral habitat. This economic benefit may be slow in developing and requires coordination / outreach with local and national conservation organizations, foundations, industry, and educational institutions. The ones which come to mind all have long standing representation in Pennsylvania and I will not list them here. RGS would offer our support and expertise coordinating these partnerships.

The PCG can capitalizing on this opportunity to showcase Pennsylvania's wildlife and native flora by maintaining a portion of these ephemeral habitats in the early successional condition on SGL as wildlife viewing areas to emphasize their importance. Initiating a public education campaign on the ecological significance of ESH and the role of timber management in their creation and the recreational opportunities they provide through time can only lessen the resistance received from some entities. To

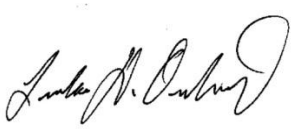
successfully achieve this, new partnerships need to be established (as suggested above) and more effective ones fostered with existing partners like RGS. RGS would offer to assist in developing programs such a self-guided tours or web-based programs to demonstrate the benefits of ESH not only for ruffed grouse and American woodcock but for all of Pennsylvania's native flora and fauna as well as spring and fall migratory birds. RGS personnel would be more than willing to discuss these and other promotion options with PGC personnel.

CONCLUSION

Thank you for providing the Ruffed Grouse Society the opportunity to comment on the Pennsylvania Ruffed Grouse Management Plan. The implementation of this Plan is of high interest to RGS members who enjoy the pursuit of our state bird and understand the ecological relevance of young forests in the landscape as conservationists and hunters. The ephemeral character of early successional stands makes this a challenging habitat in an ever changing landscape. That is the issue in Pennsylvania. The change is no longer evident due the lack of even-age timber management equating to the declining percentage of the early successional component within the mosaic required to maintain a stable grouse population. The projected goal is very progressive and forward thinking in management at the state level for conservation. The PGC should be commended for that. It is obvious from the previous comments that the main concerns of RGS lie in the implementation of the Plan and evaluation of success vs. failure.

The PGC has provided the initial ground work in the writing of the Pennsylvania Ruffed Grouse Management Plan, and RGS offers its support and assistance in the implementation of the PA Plan with consideration of the aforementioned comments in establishing the presence of ESH component to historic levels within the landscape for the benefit of ruffed grouse and all Pennsylvania wildlife. Please feel free to contact me if you have any questions.

Professionally



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From: Philip S. Wallis, Executive Director, Audubon Pennsylvania

To: Pennsylvania Game Commission

Date: August 30, 2011

Re: Draft Management Plan for Ruffed Grouse in Pennsylvania, 2011-2020

Audubon Pennsylvania, the state office of the National Audubon Society, has reviewed the Draft Management Plan for Ruffed Grouse in Pennsylvania, 2011-2020, and submits the following comments for your consideration.

Like the Game Commission, Audubon is concerned with the population declines experienced by Ruffed Grouse in recent decades. These declines are indicative of the loss of early-successional forest habitat in Pennsylvania that has impacted our state bird and a host of non-game species of conservation concern. Creating additional early-successional forest habitat in Pennsylvania is of utmost importance to conserving the Commonwealth's biodiversity.

With the recent creation of management plans for American Woodcock, Northern Bobwhite, and Ruffed Grouse – three game species dependent on early-successional habitats – Audubon urges the Game Commission to approach the management of these species and associated non-game species holistically. Each of these plans contains ambitious goals, but the connections among them are not clearly evident. Additionally, the Game Commission should ensure that all of its recommendations and strategies are tightly aligned with best management practices for non-game species of conservation concern, such as the recommendations of the Golden-winged Warbler Working Group.

The concept of studying the impact of hunting on grouse populations, as described in Strategy 1.3, is a worthy endeavor. Since this research will take several years to complete, we recommend erring on the side of caution with regards to the existing restrictions on grouse hunting. An annual review of the progress made in this study may allow for quicker changes to hunting regulations if research is beginning to suggest that a negative impact on populations exists.

The issue of invasive plant management in the establishment of early-successional habitat is critical, as described in Strategy 2.3. Providing technical assistance on this issue statewide would help the entire suite of early-successional habitat specialists. In many areas of the Commonwealth, landowners are apprehensive to perform timbering operations or let old fields grow because of the probability of serious invasive plant issues. The development of clear management guidelines and an extensive landowner education and outreach program will be critical to address this concern. Audubon and other conservation partners, such as land trusts, watershed associations, and environmental education centers, may be well suited to perform this work with support from the Game Commission.

In addition to better integrating the management plans for species dependent upon early-successional habitat, Audubon also recommends better defining within this and other plans how sites will be selected for early-successional habitat management. As early-successional habitats are part of a complex matrix of habitats across Pennsylvania, it is vital that by improving the status of early-successional habitats, we are not simultaneously damaging other critical landscapes for wildlife, such as interior forest habitat. Strategies 2.6, 2.7, and 2.8 should be expanded upon to ensure that areas targeted for early-successional habitat creation are selected strategically and with the health of all of Pennsylvania's flora and fauna in mind.

Clearly the largest implementation hurdle for this plan is the creation of additional early-successional habitat on private lands. Strategy 2.8 calls for the creation of 66,000 acres of such habitat on private lands annually, and yet it falls short on details of how this could be accomplished. Technical assistance for private landowners and funding for habitat establishment on private lands will be vital to the efforts to restore populations of Ruffed Grouse and associated species. The management plan should greatly expand on proposed methods that the Game Commission and partnering organizations will utilize to accomplish this goal, including methods for working with both large and small landowners. Existing resources for technical assistance on private lands, such as the Game Commission's Private Landowner Assistance Program, do not have sufficient capacity to reach the number of landowners that would be required to create 66,000 acres of habitat each year. Further, the topic of potential sources of funding to implement management recommendations on private lands requires substantially more detail.

Strategy 3 details many proposed methods of increasing knowledge and support of Ruffed Grouse habitat management. While this section includes many fine suggestions, more focus on the interests of non-consumptive stakeholders in grouse and other species that use similar habitat (such as birders and hikers) is likely warranted, especially in light of the significant declines observed in grouse hunting during recent decades. Engaging a broad spectrum of stakeholders in the issue of early-successional habitat management for Ruffed Grouse and other species is essential to the long-term health of Pennsylvania's biodiversity.