Home Range Size and Resource Use of Male Eastern Wild Turkeys in West Virginia

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Abstract: Age-related differences in habitat use are commonly observed among eastern wild turkeys (*Meleagris gallopavo silvestris*). We investigated home range size and within home range habitat (third-order) selection of 55 radio-tracked adult and juvenile male wild turkeys across five ecological regions of West Virginia from September 2004 to August 2007. Mean core (50% fixed-kernel density estimates [KDE]; adult = 363.2 ha; juvenile = 447.6 ha) and peripheral (95% KDE; adult = 1635.4 ha; juvenile = 2105.8 ha) home range size estimates were large, but comparable to both historical and contemporary published estimates, particularly from forest-dominated areas. Resource use differed between age classes, particularly in relation to forest fragmentation metrics. Both adults and juveniles preferentially selected for deciduous forests, while avoiding developed land and open water. However, adults selected for forest edges and avoided non-forest areas and non-core forest patches. In contrast, juveniles utilized most fragmentation classes in proportion to their availability but avoided large core (>200 ha) forest areas. To benefit eastern wild turkey populations in West Virginia, management efforts should prioritize the creation and maintenance of forest edges in deciduous stands <200 ha, particularly in regions with minimal anthropogenic influence.

Key words: forest fragmentation, habitat selection, *Meleagris gallopavo silvestris*, radiotelemetry

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Eastern wild turkeys (*Meleagris gallopavo silvestris*) are an ecologically, economically, and culturally important game species in North America. In West Virginia, wild turkeys were nearly extirpated by the early 20th century, but populations rebounded between 1950 and 1990 due to a successful restocking initiative (West Virginia Department of Natural Resources [WVDNR] 2015). Despite past successes, population and harvest declines occurred in the southeastern, midwestern, and northeastern U.S. between 2004 and 2019 (Byrne et al. 2015, Casalena et al. 2015, Eriksen et al. 2015, Parent et al. 2015, Chamberlain et al. 2022). However, recent harvest figures from West Virginia suggest wild turkey populations in the state are increasing (WVDNR 2024). Despite positive local trends, habitat loss from urbanization and agriculture, climate change, predation, and disease have been proposed drivers of population declines, which suggests alterations to hunting regulations alone may not reverse current trends (Chamberlain et al. 2022, MacDonald et al. 2022, Boone et al. 2023). These persistent declines in wild turkey populations, driven by a complex interplay of several factors, highlights the need for additional research. Specifically, a more comprehensive understanding of home range size requirements and habitat use will better equip wildlife managers with the information necessary to support eastern wild turkey populations.

Despite extensive research related to female wild turkeys and broods, a comprehensive understanding of male ecology is essential for effective species management (Miller et al. 1997, Healy and Powell 2000). Early studies suggested wide variation in male eastern wild turkey home range size across states. For example, male home ranges in Mississippi ranged between approximately 1700 ha to >2000 ha (Kelley et al. 1988, Godwin et al. 1995). In comparison, research from both Alabama and Louisiana reported adult home ranges to be somewhat smaller at 1661 ha and 1473 ha, respectively (Everett et al. 1979, Smith et al. 1989). Contemporary research from the Midwest and Southeast has helped to advance our understanding of home range size and habitat requirements of the eastern wild turkey. This work has benefited from advancements in GPS technology and home range estimation techniques, moving beyond simple minimum convex polygons (MCP) to kernel density estimates (KDE) and movement-based models such as the auto-correlated KDE and Brownian bridge (Walter et al. 2011). Using these methods, research has documented substantial regional variation in home range size estimates. For instance, male

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wild turkey home ranges in Louisiana and Texas averaged 383 ha and 270 ha, respectively (Gross et al. 2015). Conversely, median male home ranges from the Atlantic Coastal plain of South Carolina were 1172 ha (Lott et al. 2024), and maximum 99% utilization distributions in Georgia were 1310 ha (Wakefield et al. 2020).

Home range size estimates are not the only aspect of male wild turkey ecology that varies regionally and has benefitted from technological and statistical advancements. Early ideas of eastern wild turkey habitat suitability emphasized the importance of large tracts of contiguous forest (Mosby and Handley 1943, Kozicky and Metz 1948, Latham 1956). However, radio telemetry studies conducted from the 1970s to 1990s demonstrated wild turkey persistence in areas with <15% forest cover (Porter 1977, Hecklau 1982, Kurzejeski and Lewis 1985, Kurzejeski and Lewis 1990). Historically, wild turkey habitat in Appalachia was also recognized as remote, large tracts of mast-producing hardwood forests with low road densities (Bailey and Rinell 1968, Wunz and Pack 1992). However, in Pennsylvania, wild turkeys persisted in areas of low (26%) forest cover, specifically in highly fragmented (<100 ha) stands with rich understories (Wunz 1971, 1985). Using telemetry-based locational data, Martin et al. (2012) found that male wild turkeys selected for frequently burned pine savannahs in Georgia. In contrast, Lott et al. (2024) found that males selected for forest edges during both mating and non-mating seasons in South Carolina. These findings highlight regional variation in habitat use and the potential influence of methodological differences on results.

Due to high interregional variability in wild turkey home range size estimates and identified habitat relationships, along with recent observed declines in abundance, a clearer understanding of these ecological factors is essential for the implementation of effective conservation and management strategies. Moreover, the multifaceted nature of habitat suitability, coupled with ongoing and widespread land-use changes, necessitates continued research to refine our understanding of wild turkey ecology both regionally and locally (Porter et al. 2011). Although recent research, often utilizing GPS-derived data, particularly in the Southeast and Midwest, has yielded extensive knowledge gains in wild turkey home range size and habitat selection, these relationships remain understudied for male turkeys in West Virginia. Additionally, ongoing GPS-based research on wild turkey movements by the WVDNR (Lawrence 2024) may benefit from comparison to these baseline data derived from traditional VHF-telemetry methods. Finally, because recent research has shown age-based shifts in resource selection (Nelson et al. 2023), evaluating home range size requirements and habitat selection for adult and juvenile male wild turkeys in West Virginia will provide useful information for effective species management. Therefore, our objectives were to use historical VHF-telemetry data to 1) estimate annual home range sizes of adult and juvenile male wild turkeys and 2) determine resource selection patterns at the core home range (Johnson 1980) spatial scale, focusing on cover types and forest fragmentation metrics. We predicted home range estimates would be large due to the forested nature of the state. We also predicted the use of cover and forest fragmentation classes would differ between adult and juvenile male wild turkeys, with juveniles selecting resources that provide greater access to foraging and escape cover.

Study Area

Our study area encompassed the six ecological regions of West Virginia: Central, Mountain, Panhandle, Southern, Southwestern, and Western (Figure 1). Much of the Central ecological region is a dissected plateau ranging in elevation from 200–400 m. This area receives up to 130 cm of precipitation annually in eastern portions and has an average annual temperature of 9–13 C. Forests within the Central ecological region often contain yellow poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), red oak (*Quercus rubrum*), and red maple (*Acer rubrum*). The Mountain ecological region is dominated by steep slopes and large elevational gradients, ranging from 300 m in valley floors to nearly 1500 m on some summits. This region is cooler (6–12 C) than the rest of the state and receives 84–173 cm of precipitation annually. Similar to the Central ecological region, forests in the Mountain region contain an oak-hickory-pine component, but at mid- and high elevations, are dominated by red spruce (*Picea rubra*), sugar maple (*A. saccharum*), eastern hemlock (*Tsuga canadensis*), black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*), and birch (*Betula* spp.; USDA NRCS 2022). The Panhandle ecological region, east of the Allegheny front, is the driest region of West Virginia, receiving only 79–115 cm of precipitation annually. Coupled with a lower elevational range (100–800 m) and warmer average annual temperature (7–14 C), forests here are often comprised of poor-form scarlet oak (*Q. coccinea*), chestnut oak (*Q. prinus*), pitch pine (*Pinus rigida*), and various hickory (*Carya* spp.; USDA NRCS 2022). The Southern ecological region is described as a highly dissected plateau characterized by both narrow valleys and ridgetops along with steep side slopes. Although similarly rugged as compared to the Mountain ecological region, elevations here range only from 200–1200 m. This region receives the most precipitation in the state at 115–190 cm annually and is generally much warmer (10–15 C). The Southern ecological region supports a species-rich mixed mesophytic forest, including yellow poplar, American beech, and American basswood (*Tilia americana*), among others. The Southwestern ecological region receives less precipitation annually than the Southern ecological region at approximately 100 cm and

averages 12 C annually. Elevations in the Southwestern ecological region are among the lowest in the state at 300 m on ridges to 150 m near the Ohio River and the forests are dominated by a mixed oak-hickory-yellow poplar assemblage with intermediate trees comprised of sassafras (*Sassafrass albidum*), black locust (*Robinia pseudoacacia*), and persimmon (*Diospyros virginiana*; USDA NRCS 2022). The Western ecological region ranges in elevation from 175 m near the Ohio River to >400 m on higher ridges. The Western region receives approximately 110 cm of precipitation each year and averages a moderate 11 C annually. Forests in the Western region are typically comprised of oak-hickory-pine, often including Virginia pine (*P. virginianus*) in the midstory (USDA NRCS 2022).

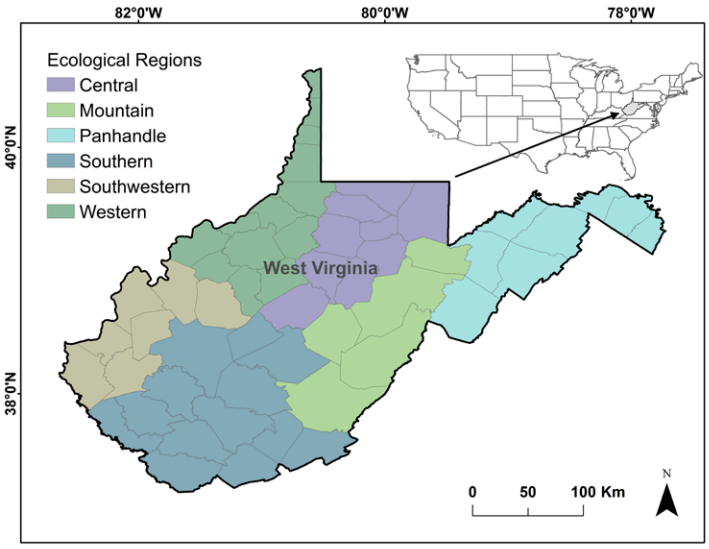

Figure 1. Ecological regions associated with adult and juvenile male eastern wild turkey (*Meleagris gallopavo silvestris*) home range study sites in West Virginia from 2004–2007.

Methods

Trapping and Radio Telemetry

We used rocket nets or boxes to capture male wild turkeys at 29 baited sites (i.e., cracked or whole corn) across the six ecological regions of West Virginia (Figure 1) from September to November and January to March during 2004–2007 (Kurzejeski and Vangilder 1992). We aged (i.e., juvenile or adult) and sexed captured individuals based on feather coloration and pattern (Pelham and Dickson 1992). We fit turkeys with an 80 g backpack VHF transmitter (Advanced Telemetry Systems Inc., Isanti, Minnesota) attached using a 4.8 mm nylon shock cord (Norman et al. 1997). We located turkeys at least once per week (range: 1–5 locations per week) via radio bi- and triangulation (Cochran and Lord 1963, Wallingford and Lancia 1991, Zielinski et al. 2004). We used the program LOCATE III (Pacer Computing, Truro, Nova Scotia, Canada) to generate UTM coordinates for each location. For a more detailed description of capture and tracking, see Rauch et al. (2010).

Landscape-scale Variables

We examined proportional use of land cover classes by adult and juvenile wild turkeys using the 2006 National Land Cover Dataset raster dataset (USGS 2011). Specifically, based on a reclassification of NLCD data, we examined use of six cover classes: open water, developed/barren, deciduous forest, mixed/evergreen forest, shrub, and herbaceous/crop. Developed/barren areas were dominated by anthropogenic development or barren land. Deciduous forests were comprised of areas dominated by deciduous trees >5 m tall. Mixed and evergreen forests were dominated by a mix of deciduous and evergreen trees >5 m tall. Shrub was comprised of areas dominated by woody vegetation <5 m tall. Herbaceous/crop areas were dominated by herbaceous cover, grasses, and/or crops.

To explore the influence of landscape structure, we examined use of forest fragmentation classes by male wild turkeys. Specifically, based on a forest vs. non-forest reclassification of NLCD cover classes, we used the Landscape Fragmentation Tool (version 2.0; Vogt et al. 2007) of ArcMap (version 10.6; ESRI, Inc. Redlands, California) to classify NLCD data into six categories including patch, edge, perforated, small and large core, and non-forest. The patch category was comprised of forest stands completely degraded by edge effects. Edge and perforated included exterior and interior forest areas, respectively, that were degraded by edge effects. We classified core forest areas as small (≤200 ha) or large (>200 ha). Areas classified as non-forest were those with no trees.

Statistical Analysis

We pooled point location data by age class for each male wild turkey across years and seasons and constructed home ranges for individuals with ≥30 locations and ≥9 mo of tracking (Seaman et al. 1999). This included individuals initially classified as juveniles that were later reclassified as adults. Consequently, some individuals were used in both juvenile and adult analyses if they met the location and time period criteria for both age classes. We constructed core and peripheral home ranges using 50% and 95% KDEs with reference bandwidth, respectively (Worton 1989). We created home ranges using the *kernelUD* function of the adehabitatHR (Calenge 2024) package of R (R Core Team 2023).

For habitat selection, we followed the framework developed by Johnson (1980) and Aebischer et al. (1993), whereby animals make decisions about resource selection at several hierarchical spatial scales. Specifically, we evaluated selection by comparing the proportional availability of resources within peripheral home ranges to the proportional availability of resources within core home

ranges (i.e., third-order selection; Johnson 1980). We quantified the percent composition of each land cover and forest fragmentation class within peripheral and core home ranges using the *global* function of the terra package (Hijmans 2024) in R. To assess habitat use, we employed the *phuassess* function from the R package phuassess (Fattorini et al. 2017). This method utilizes a nonparametric permutation-based approach (n = 100,000 in this study) to combine sign tests, thereby relaxing the statistical assumptions associated with compositional analyses (i.e., a multivariate normal distribution; Aebischer et al. 1993). We assessed proportional use across all cover classes using an overall P-value. At the individual cover class level, we used partial P-values to determine whether specific classes were preferentially selected, used in proportion to their availability, or avoided. Specifically, tests returning a significant P-value (<0.05) in combination with proportions >0.50 indicated selection of that cover type, while proportions <0.50 indicated cover type avoidance. Insignificant P-values (>0.05) signified proportional use. Finally, this approach provided a ranking of cover classes based on use preference. We present these rankings in a matrix format, where +, -, and NS indicate significantly positive, significantly negative, and non-significant differences in use between cover classes, respectively. Due to insufficient sample size, we excluded the Western region from all analyses.

Results

We captured and equipped 197 male wild turkeys with radio transmitters throughout the six ecological regions of West Virginia (Figure 1). Based on tracking effort (≥30 locations and ≥9 mo of tracking), we used a subset of 55 individuals for analysis of home range size and habitat selection. Among this subset, 29 were classified as juveniles (11 of which were later included in the adult category) and 37 were adults. We obtained an average of 76.4 (SD = 46.0) and 52.0 (16.3) telemetry points per adult and juvenile turkey, respectively. Across ecological regions, the mean number of telemetry points ranged from 47.2 to 72.1 per turkey (Table 1). Core home ranges averaged 363.2 ha (SE = 49.8 ha) for adults and 477.6 ha (74.2) for juveniles (Figure 2). Peripheral home ranges were larger,

Table 1. Mean (SD) number of telemetry locations, mean (SE) core (50% kernel density estimates [KDE]) and mean (SE) peripheral (95% KDE) home range estimates for male eastern wild turkeys (*Meleagris gallopavo silvestris*) in the Central, Mountain, Panhandle, Southern, and Southwestern ecological regions of West Virginia from 2004–2007.

Region	Telemetry Locations	Core (ha)	Peripheral (ha)
Central (n = 28)	72.1 (42.0)	494.0 (67.2)	2202.7 (296.0)
Mountain (n = 13)	66.0 (39.8)	292.0 (36.8)	1311.0 (176.5)
Panhandle (n = 3)	49.3 (19.1)	497.9 (55.8)	2204.2 (360.8)
Southern (n = 6)	54.2 (21.5)	365.2 (231.6)	1670.8 (942.7)
Southwestern (n = 5)	47.2 (9.4)	273.7 (39.9)	1145.2 (125.3)

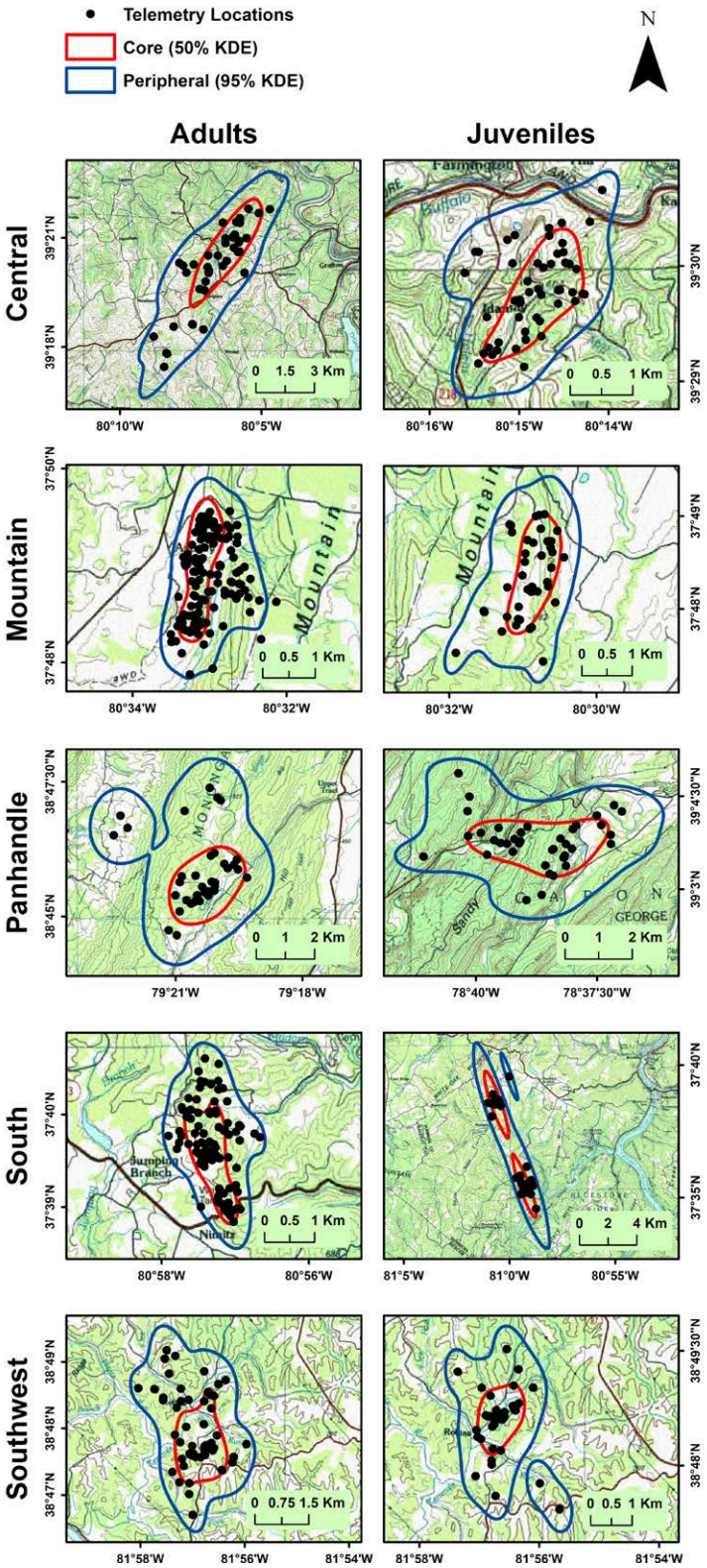

Figure 2. Examples of adult and juvenile male eastern wild turkey (*Meleagris gallopavo silvestris*) core (50% kernel density estimates [KDE]) and peripheral (95% KDE) home ranges in five ecological regions of West Virginia from 2004–2007.

averaging 1635.4 ha (SE = 222.7) for adults and 2105.8 ha (318.8) for juveniles (Figure 2). Pooling age classes across regions, average core home ranges ranged from 273.7 to 497.9 ha and peripheral home ranges ranged from 1145.2 to 2204.2 ha (Table 1, Figure 2).

Adult male wild turkeys displayed significant selection of land cover classes (overall $P < 0.01$; Table 2, Figure 3). Specifically, adults preferentially selected deciduous forests ($P = 0.02$), used areas of shrub, herbaceous/crop, and mixed/evergreen forests in proportion to availability, and avoided areas of open water ($P = 0.01$) and anthropogenic development ($P < 0.01$). Adults also demonstrated selection of forest fragmentation classes (overall $P = 0.02$; Table 3, Figure 4), preferentially selecting forest edges ($P = 0.01$), used small core forests, forest perforations, and large core forests in proportion to availability, and avoided non-forest areas ($P = 0.01$) and non-core forest patches ($P < 0.01$). Juvenile male wild turkeys also displayed selection of land cover classes (overall $P < 0.01$; Table 2, Figure 3). Specifically, juveniles selected for deciduous forests ($P = 0.02$), used areas of shrub, herbaceous/crop, and mixed/evergreen forests in proportion to availability, and avoided areas of development ($P = 0.02$) and open water ($P < 0.01$; Table 2, Figure 3). Unlike adults, juvenile male wild turkeys did not select for any forest fragmentation cover class but did avoid areas of large core forests ($P < 0.01$), while using forest edges, small core forests, forest perforations, non-forest areas, and non-core forest patches in proportion to availability (overall $P = 0.02$; Table 3, Figure 4).

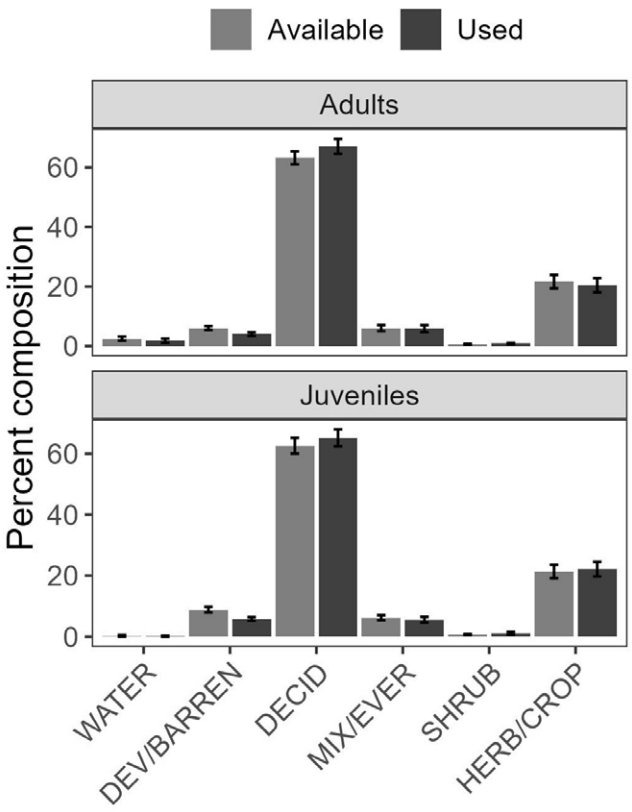

Figure 3. Comparisons of the land cover class (open water [WATER], developed/barren [DEV/BARREN], deciduous forest [DECID], mixed/evergreen forest [MIX/EVER], shrub [SHRUB], and herbaceous/crop [HERB/CROP]) percentages available (95% kernel density estimates [KDE] ± 1 SE; light grey bars) and used (50% KDE ± 1 SE; dark grey bars) by adult and juvenile eastern male wild turkey (*Meleagris gallopavo silvestris*) in West Virginia from 2004–2007.

Table 2. Rankings of National Land Cover Database (NLCD) land cover class selection by adult and juvenile male eastern wild turkeys (*Meleagris gallopavo silvestris*) within core (50% kernel density estimates) home ranges based on a permutation-based proportional habitat use assessment in West Virginia from 2004–2007. Significant ($P < 0.05$) positive, negative, and non-significant between class differences in use are denoted by a +, -, and NS, respectively.

Cover class	F[1]	Deciduous	Shrub	Herb/Crop[2]	Mix/Ever[3]	Open water	Dev/Barren[4]	Selection[5]
Adults								
Deciduous	0.70		+	+	+	+	+	SELECT
Shrub	0.51	–		NS	NS	+	+	PROP
Herb/Crop	0.43	–	NS		NS	+	+	PROP
Mix/Ever	0.35	–	NS	NS		+	+	PROP
Open water	0.22	–	–	–	–		NS	AVOID
Dev/Barren	0.16	–	–	–	–	NS		AVOID
Cover class	**F[1]**	**Deciduous**	**Shrub**	**Herb/Crop[2]**	**Mix/Ever[3]**	**Dev/Barren[4]**	**Open water**	**Selection[5]**
Juveniles								
Deciduous	0.72		+	+	+	+	+	SELECT
Shrub	0.52	–		NS	NS	+	+	PROP
Herb/Crop	0.52	–	NS		NS	+	+	PROP
Mix/Ever	0.45	–	NS	NS		+	+	PROP
Dev/Barren	0.28	–	–	–	–		NS	AVOID
Open water	0.11	–	–	–	–	NS		AVOID

[1]F = proportion of animals using cover class more than available; [2]Herbaceous/Crop; [3]Mixed/Evergreen Forest; [4]Developed/Barren; [5] SELECT = selected cover type, PROP = proportional use, and AVOID = avoided cover type

Table 3. Rankings of forest fragmentation class selection by adult and juvenile male eastern wild turkeys (*Meleagris gallopavo silvestris*) within core (50% kernel density estimate) home ranges based on a permutation-based proportional habitat use assessment in West Virginia, 2004–2007. Significant ($P < 0.05$) positive, negative, and non-significant between class differences in use are denoted by a +, -, and NS, respectively.

Fragmentation class	F[1]	Edge	Small[2]	Perforated	Large[3]	Non-Forest	Patch	Selection[3]
Adults								
Edge	0.73		+	+	+	+	+	SELECT
Small	0.56	–		NS	NS	+	+	PROP
Perforated	0.54	–	NS		NS	+	+	PROP
Large	0.42	–	NS	NS		+	+	PROP
Non-forest	0.27	–	–	–	–		NS	AVOID
Patch	0.25	–	–	–	–	NS		AVOID
Fragmentation class	**F[1]**	**Edge**	**Small[2]**	**Perforated**	**Non-forest**	**Patch**	**Large[3]**	**Selection[3]**
Juveniles								
Edge	0.66		NS	NS	NS	NS	+	PROP
Small	0.56	NS		NS	NS	NS	+	PROP
Perforated	0.55	NS	NS		NS	NS	+	PROP
Non-forest	0.41	NS	NS	NS		NS	+	PROP
Patch	0.31	NS	NS	NS	NS		+	PROP
Large	0.20	–	–	–	–	–		AVOID

[1]F = proportion of animals using fragmentation class more than available; [2]Small core; [3]Large core; [2]SELECT = selected fragmentation class, PROP = proportional use, and AVOID = avoided fragmentation class.

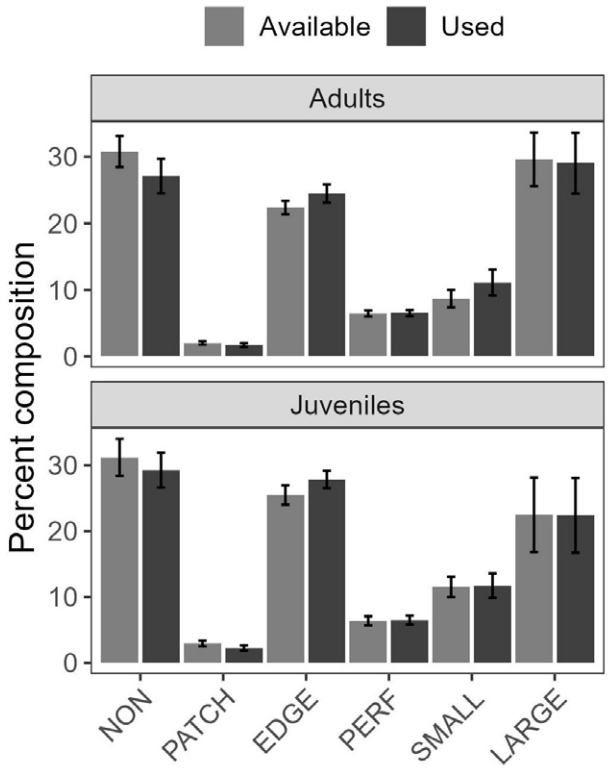

Figure 4. Comparisons of the forest fragmentation class (non-forest [NON], patch [PATCH], edge [EDGE], perforated [PERF], small core [SMALL; <200 ha], and large core [LARGE; >200 ha]) percentages available (95% kernel density estimates [KDE] ± 1 SE; light grey bars) and used (50% KDE ± 1 SE; dark grey bars) by adult and juvenile eastern male wild turkey (*Meleagris gallopavo silvestris*) in West Virginia from 2004–2007.

Discussion

Core and peripheral home ranges were large for both adult and juvenile turkeys but were comparable to both historical and recently published estimates from the Southeast (Everett et al. 1979, Smith et al. 1989, Wakefield et al. 2020, Lott et al. 2024). Moreover, habitat selection by adult and juvenile wild turkeys in West Virginia was not random and varied between age classes, particularly for forest fragmentation cover classes. Our results support the idea that wild turkey home range sizes are a function of habitat diversity and that large home ranges are often associated with homogeneous, mostly forested areas (Wigley et al. 1986, Exum et al. 1987, Kelley et al. 1988). Specifically, we found that both adult and juvenile male wild turkeys preferentially selected for deciduous forests, while selecting for mixed/evergreen forests in proportion to their availability. Our finding is consistent with research showing that wild turkeys preferentially forage on hard mast (Korschgen 1967). Moreover, mast abundance and distribution affect home range characteristics such as size and habitat composition (Burhans et al. 2000). Kelley et al. (1988) suggested that when mast is abundant, turkeys move shorter distances to find food and thus have smaller home ranges. Conversely, when mast is poor during the fall, wild turkeys may expand their range in search of supplemental foods (Kurzejeski and Lewis 1990, Healy 1992). However, such factors in one season may affect behavior in another, as recent research found that spring survival was negatively correlated with

fall hard mast production (Norman et al. 2022). Although, not directly quantified here, our observed selection of deciduous forests by male wild turkeys, along with large core and peripheral home ranges, likely reflects the selection of mast-producing forests, not only as roosting and escape cover, but as important foraging areas in West Virginia.

Despite preferential selection of deciduous forest cover, we found that adult male wild turkeys selected for forest edges and that juveniles avoided large core forest areas. Adults likely use edges of deciduous forests for both foraging and breeding display areas, whereas nearby forest interiors provide proximal escape cover and roosting habitat (Wunz and Pack 1992). This finding supports the recent work of Lott et al. (2024) that showed males spend significant time near forest edges during both mating and non-mating seasons. Additionally, we found that juvenile male wild turkeys used a wider variety of forest fragmentation classes in proportion to availability than did adults while also avoiding areas of large core forests. This may reflect that juvenile birds retain some brood-related behaviors, promoting growth and development by extensively foraging in diverse cover types rich in invertebrate prey (Hamrick and Davis 1971, Hurst 1978, Healy 1985). Numerous studies show that hens with young poults selected for diverse herbaceous cover that contained greater insect abundances and were adjacent to escape cover (Hurst 1981, Pack et al. 1988, Sisson et al. 1991, Bakner et al. 2022, Nelson et al. 2022, Nelson 2023). We also found that both age classes avoided areas of anthropogenic development and open water. These areas likely lack nearby foraging and roosting resources for turkeys, potentially promote increased natural predation and hunting pressure (Gerrits et al. 2020, Wightman et al. 2023, Roth et al. 2024), and may result in negative human interactions, such as vehicle collisions (Michael 1978).

We found that both juvenile and adult male wild turkeys used herbaceous and crop cover in proportion to availability. The lack of these resources in densely forested areas, combined with highly variable mast production, may have the potential to limit turkey density (Little et al. 1990, Porter et al. 1980, Vander Haegen et al. 1988). Given selection of deciduous forests by both age classes, selection of edges by adults, and avoidance of large core forests by juveniles, wild turkey management may benefit from the creation and maintenance of feathered forest edges to provide access to productive ecotones in West Virginia. Additionally, the proportional use of some non-forest cover classes may highlight some plasticity in wild turkey habitat selection in West Virginia (Healy 1985, Peoples et al. 1996).

Although both adult and juvenile male wild turkeys preferentially selected deciduous forests in West Virginia, adults selected for forest edges while juveniles avoided areas of large core forests. Changes in forest management practices (i.e., fire suppression and diameter-limited harvesting without regeneration considerations) and the introduction of invasive diseases (e.g., chestnut blight [*Cryphonectria parasitica*] and beech bark disease [*Cryptococcus fagisuga*]) are promoting a shift towards shade-tolerant species (e.g., maples) in eastern forests (Nowacki and Abrams 2008). This trend has resulted in closed canopies and potentially less food availability for wildlife due to reduced mast production (Nowacki and Abrams 2008, Porter et al. 2011). Such forest types contain fewer oaks and hickories and may leave turkeys without adequate nutrition for long periods (McShea et al. 2007). The loss of open and young forests in the East (Hanberry and Thompson 2019), which provide turkeys with critical resources in the form of herbaceous vegetation, seeds, soft mast, buds, and insects, has likely relegated populations to mid-successional, structurally homogeneous forest stands that offer temporally unreliable food sources (Porter et al. 2011). Selection of areas of higher forest fragmentation by male wild turkeys in West Virginia may be in response to higher food productivity and resource diversity (Backs and Bledsoe 2011). Such areas may serve as proxies for open forest conditions that would have been available to wild turkey populations through historic disturbance regimes (e.g., fire and ungulate grazing), and which are precluded from turkey habitat availability due to current successional and forestry trends that have led to potentially less productive forests (Porter et al. 2011).

Our research provides valuable insights into home range size estimates and the preferential selection, proportional use, and avoidance of cover and forest fragmentation classes by adult and juvenile male wild turkeys in West Virginia. Moreover, our analyses can serve as an initial assessment of home range size and habitat selection for comparison to ongoing GPS-based research into wild turkey ecological dynamics by the WVDNR (Lawrence 2024).

Management Implications

Despite West Virginia being nearly 80% contiguous forest, selected cover types in our study were often characterized as edges and small core stands of deciduous forests. Such areas likely provide much greater invertebrate abundances compared to large expanses of mature forest, and active management may be the key to maintaining their proper functionality (Backs and Bledsoe 2011). Multilayer early successional cover types with complex edges provide diverse food sources (e.g., seeds, insects, fruits), escape cover, travel corridors, and mating display areas for male wild turkeys (Speake et al. 1975, Holbrook et al. 1987, Wertz and Flake 1988). Through planting, cutting, mowing, or even passive management, forest edges and perforations, particularly in association with smaller core areas of deciduous forest cover, should be managed

to increase landcover diversity (Backs and Bledsoe 2011, McCord and Harper 2011).

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