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SPECIAL SECTION

Measuring congruence between available and selected vegetation at wild turkey nest sites

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Abstract

Processes underlying nest-site selection are often considered drivers influencing wild turkey (*Meleagris gallopavo* ssp.) nest success. Thus, decisions by females to identify nest sites should govern all other components of reproductive habitat selection as female wild turkeys will be tied to nest locations for the duration of the reproductive period. Our objective was to determine if differential selection for vegetation characteristics was occurring on the first day of egg laying. We evaluated vegetation conditions at nest sites and travel paths used by 131 female wild turkeys, monitored across Arizona, Georgia, Louisiana, and Texas, USA, on the first day of egg laying. We used 164 nesting attempts and measured vegetation at 37,976 locations along 492 movement paths. Average vegetation height at the nest site was met or exceeded at 61–71% of random points along travel paths, whereas visual obstruction was met or exceeded at 22–25% of random points along travel paths. We found no effect of visual obstruction on nest success ($\beta = -0.004$, $SE = 0.004$, $P = 0.349$). Our results indicate that vegetation conditions selected by wild turkeys at nest sites were generally available on the landscape transversed by female wild turkeys during nest-site selection. Our results illustrate that adequate nesting conditions, as conventionally measured, may not be as limited across the landscape as previously assumed. We suggest that given the plasticity wild turkeys have in selection of nest sites, future research activities should reduce focus on nest-site vegetation sampling and increase focus on how nest success may be affected by nesting female behavioral activities.

KEYWORDS

ground-nesting, *Meleagris gallopavo*, nest site characteristics, vegetation structure, wild turkey

The process of resource selection influences species demography at multiple spatial scales. Selection differs from use or association, as selection implies informed choice and is commonly measured relative to availability or as use versus non-use (Mayor et al. 2009, Cunningham and Johnson 2012). Selectivity is assumed to be adaptive in that selected resource characteristics should yield higher fitness (Jones 2001). Thus, variation in selectivity should favor individuals that choose conditions that lead to greater reproductive success and survival (Martin 2004).

It is widely recognized that resource selection is an inherently scale-sensitive process (Mayor et al. 2009) ranging from organizational (Hutto 1985, Morris 1987), environmental or geographic (Kotler and Brown 1988, Danell et al. 1991), behavioral (Johnson et al. 2002, Revilla et al. 2004), to spatial (Holland et al. 2004) and temporal selection (Fortin et al. 2002). Thus, reproductive success and individual fitness may be influenced by the scale at which individuals select resources (Schmutz et al. 1989, Mayor et al. 2009). As such, selection is regularly presented as a hierarchical process where an individual first selects a location to live (i.e., home range) and then searches and selects locations within the range specific to demographic needs over time (Orians and Wittenberger 1991). For birds, selection is typically measured as where the individual is located compared to what is available within some restricted spatial area and selection is assumed to be driven by some type of search behavior wherein individuals can distinguish resource quality (Orians and Wittenberger 1991, Jones 2001).

Wild turkeys (*Meleagris gallopavo* ssp.) are a ground-nesting uniparental galliform that exhibit substantial plasticity in habitat selection (Porter 1992). Wild turkeys experience relatively low nest success compared to other species with similar reproductive strategies (Holloran et al. 2005) but can exhibit significant temporal variation in nest success (Seiss et al. 1990, Collier et al. 2009, Yeldell et al. 2017, Wood et al. 2018). Annual productivity, through nest success, is a primary driver of wild turkey population trajectories (McGhee et al. 2008, Pollentier et al. 2014). Therefore, identifying nest sites affording greater reproductive success and reduced predation risk should govern all other components of habitat selection for reproductively active females. Contemporary research has noted that the likelihood of a wild turkey evaluating a nest site before selection occurs was low across all subspecies (Conley et al. 2015, 2016; Collier et al. 2019). Therefore, female wild turkeys likely have a narrow temporal window within which to evaluate vegetation conditions surrounding potential nest sites, so selection may be driven by conditions available immediately before the first egg is laid.

Literature on vegetation characteristics at nest sites of wild turkeys has routinely identified a positive relationship between vegetation height and screening cover relative to nest success (Lutz and Crawford 1987, Schmutz et al. 1989, Badyaev 1995, Randel et al. 2005, Keever et al. 2022). However, throughout the published literature, there are numerous contradictory conclusions relative to what vegetation metrics influence nest success, with some authors noting no such influences (Lehman et al. 2003, Yeldell et al. 2017, Wood et al. 2018, Lohr et al. 2020), and others reporting positive influence (Badyaev 1995, Fuller et al. 2013). Thus, our objective was to evaluate vegetation characteristics in areas used by females immediately before egg laying began to determine if those characteristics differed from available. We evaluated the vegetation characteristics at nest sites and along known travel (laying) paths used by female wild turkeys immediately before nest initiation (Argabright et al. 2024). We evaluated if 1) availability of vegetation characteristics was limited along the travel path used by females immediately prior to laying the first egg, and 2) there were consequences of these characteristics on nest success.

STUDY AREA

We conducted research at 7 study sites across the southern United States, including B. F. Grant Wildlife Management Area, Cedar Creek Wildlife Management Area, Kisatchie National Forest, Peason Ridge Wildlife Management Area, Angelina National Forest, private lands in south-central Texas, USA, and Coronado National Forest (Figure 1). The B. F. Grant Wildlife Management Area (BFG) was owned by the Warnell School of Forestry and Natural Resources at the University of Georgia and managed jointly by the Georgia Department of Natural Resources-Wildlife Resources Division (GADNR) and Warnell School. The BFG was dominated by loblolly pine (*Pinus taeda*), agricultural lands, mixed hardwood and pine forests, and hardwood lowlands containing mostly oaks (*Quercus* spp.), sweet gum (*Liquidambar styraciflua*), and hickory (*Carya* spp.). Agricultural lands were mostly grazed mixed fescue (*Festuca* sp.) fields and hay fields planted for rye grass (*Lolium* sp.). Cedar Creek Wildlife Management Area (CC) was owned by the U.S. Forest Service (USFS) and managed in partnership with GADNR. The CC was composed primarily of loblolly pine uplands, mixed hardwood and pine forests, and hardwood lowlands of similar species composition as BFG. Prescribed fire was applied on an approximately 3–5-year rotation.

Kisatchie National Forest (KNF) was located in western Louisiana, USA, and owned and managed by the USFS. Research was conducted on the Kisatchie Ranger District, Winn Ranger District, and Vernon Unit of the Calcasieu Range District located in Natchitoches, Winn, and Vernon parishes, respectively. Collectively, the Kisatchie Ranger District, Winn Ranger District, and Vernon Unit area were approximately 41,453 ha, 67,408 ha, and 61,202 ha, respectively (Yeldell et al. 2017). The KNF was composed of pine-dominated forests, hardwood riparian areas, and forested wetlands, with forest openings and forest roads distributed throughout. Overstory trees included loblolly pine, longleaf pine (*P. palustris*), shortleaf pine (*P. echinata*), slash pine (*P. elliottii*), sweetgum, oaks, and hickories (Yeldell et al. 2017).

Peason Ridge Wildlife Management Area (PR) consisted of 30,070 ha located in Sabine, Natchitoches, and Vernon parishes of west-central Louisiana. The PR was part of a noncontiguous U.S. Army training area located north of Fort Johnson and consisted of 13,360 ha of U.S. Army lands and 190 ha of USFS lands. The PR was approximately 80% pine plantation that consisted primarily of longleaf pine and loblolly pine.

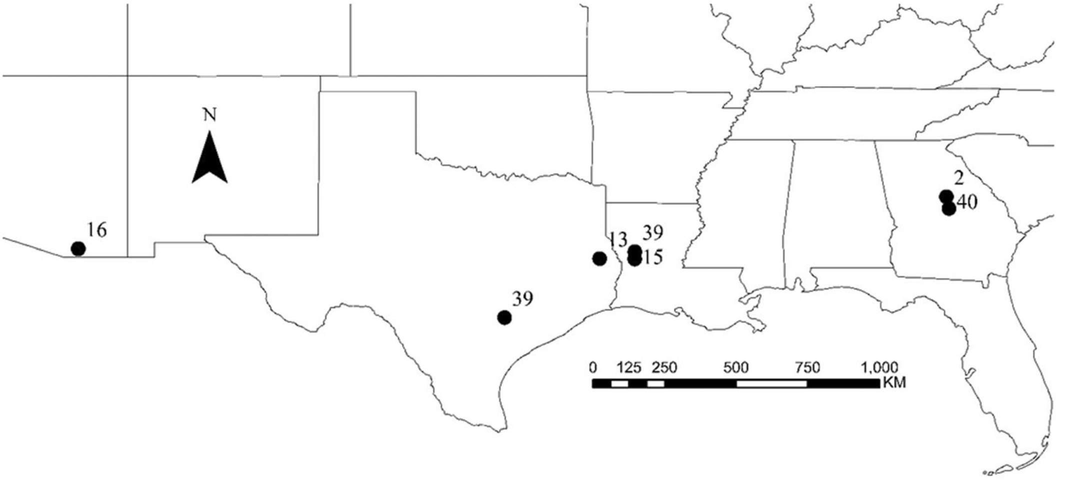

FIGURE 1 Distribution and number of unique nesting attempts by female wild turkeys (*Meleagris gallopavo* spp.) across the southern United States in 2017. Nesting data were collected using GPS-tagged individuals as part of a multi-state collaborative research effort investigating reproductive behavior and habitat selection. Black dots with associated numbers indicate the number of unique females monitored at each location. Subspecies included Gould's wild turkeys (*M. g. mexicana*) in Arizona (n = 16), Rio Grande wild turkeys (*M. g. intermedia*) in Texas (n = 39), and eastern wild turkeys (*M. g. silvestris*) in Texas (n = 13), Louisiana (n = 54), and Georgia (n = 42), for a total of 164 unique nest sites.

The Angelina National Forest (ANF) in southeastern Texas was owned and managed by the USFS. The ANF was comprised of 62,423 ha in San Augustine, Angelina, Jasper, and Nacogdoches counties. The area was pine dominated with hardwood riparian zones. Overstory stands in the ANF included loblolly pine, shortleaf pine, longleaf pine, sweetgum, post oak (*Q. stellata*), and white oak (*Q. alba*).

The south-central Texas (District 7) sites included a suite of (>200 ha) private lands widely distributed across multiple ecoregions within 6 counties, including Caldwell, DeWitt, Fayette, Gonzales, Jackson, and Lavaca. Ecoregions included the post-oak savannah, blackland prairie and South Texas plains. Dominant overstory of the post-oak savannah consisted of post oak and live oak (*Q. virginiana*). The blackland prairie consisted of grasslands and parks dominated by live oak, sugarberry (*Celtis laevigata*), mesquite (*Prosopis glandulosa*) and huisache (*Acacia farnesiana*). The South Texas plains consisted of mesquite, Texas persimmon (*Diospyros texana*), algerita (*Mahonia trifoliolata*), lotebush (*Ziziphus obtusifolia*), pricklypear (*Opuntia engelmannii*), and tasajillo (*Opuntia leptocaulis*).

The Arizona, USA, study sites were within the sky islands connecting the Sierra Madre Occidental to the Rocky Mountains, and included the Pinaleño, Chiricahua, Huachuca, and Patagonia Mountains located in Graham, Cochise, and Santa Cruz counties. The Coronado National Forest (CNF) in southeastern Arizona was owned and managed by the USFS and included an area of 720,340 ha. Landscapes included semidesert grasslands, madrean evergreen woodlands, petran montane conifer forests, and petran subalpine conifer forests. For a detailed description of site conditions in the CNF, see Collier et al. (2019) and Bakner et al. (2022).

METHODS

We captured female eastern wild turkeys (*M. g. silvestris*) using rocket nets, Gould's wild turkeys (*M. g. mexicana*) using walk-in traps, and Rio Grande wild turkeys (*M. g. intermedia*) using walk-in traps and drop nets baited with cracked corn, peanuts, or milo during January–March 2017. Additionally, during 2016 and 2017, 101 eastern wild turkeys (23 males, 78 females) from Iowa, West Virginia, and Missouri, USA, were translocated to ANF and re-introduced as part of a Texas Parks and Wildlife restocking project (Sullivan et al. 2022). We classified individuals as juvenile or adult based on the presence of barring on the ninth and tenth primary feathers (Pelham and Dickson 1992). Eastern and Rio Grande wild turkeys were fitted with a numbered, riveted aluminum tarsal band, whereas Gould's were given an alphanumeric color-coded patagial tag. All individuals were fitted with a backpack-style GPS transmitter weighing approximately 88 g equipped with a very-high-frequency (VHF) signal (Lotek Minitrack Backpack L, Lotek Pinpoint Backpack; Lotek Wireless, Newmarket, Ontario, Canada; Guthrie et al. 2011). We programmed transmitters to collect data at 1-hour intervals from 0500 to 2000 daily with one location at 2358:58 to identify roost site locations (Cohen et al. 2018). We released all birds at the capture site immediately after processing.

Individuals were monitored >4 times per week and downloaded GPS information ≥1 time per week via a VHF/UHF handheld command unit receiver (Biotrack Ltd., Wareham, Dorset, UK) during the nesting period (March–July) to monitor nesting activity. We determined first date of egg laying and nest site locations from VHF tracking and spatio-temporal GPS locational data (Collier and Chamberlain 2011, Yeldell et al. 2017, Bakner et al. 2024). Nesting females were not disturbed or flushed from nest sites during monitoring, but instead were live-dead checked daily via VHF from >20 m (Yeldell et al. 2017).

Following Yeldell et al. (2017), we considered incubation to have started when a female did not significantly deviate from a central location for several days. Once it was determined a female was laying or incubating a nest, nest fate was monitored using VHF telemetry and GPS locations until nest termination (Bakner et al. 2019, Lohr et al. 2020). After nest termination, nests were visually inspected to estimate clutch size, determine hatching rate of eggs, and collect measurements of vegetation characteristics at nest sites. Following Melton et al. (2011), we classified nest fate as successful if ≥1 egg hatched and unsuccessful if the nest was depredated (nest or eggs showed signs of disturbance) or abandoned (female left nest area and eggs remained unhatched).

To determine date of nest initiation (i.e., initiation of egg-laying period) and date of incubation, we mapped the spatial-temporal data using ArcGIS 10.3.1 (Environment Systems Research Institute, Redlands, CA, USA). We evaluated locations hourly until incubation start date was determined (Yeldell et al. 2017, Bakner et al. 2019). Once the incubation start date was determined, we evaluated GPS locations for the previous 20 days and determined when a female initially visited the nest site (defined as a location being within a 20-m radius; Conley et al. 2016, Bakner et al. 2024). We then placed a buffer of 20 m around the nest site and considered the first GPS location within the 20-m buffer as the time of first nest visit, and used this date as the beginning of the egg-laying period (Conley et al. 2016, Bakner et al. 2019). We connected each consecutive GPS location to create a general movement path for the 3-hour period before the first nest visit. We generated 2 random points along each hourly movement path, which resulted in a maximum of 6 randomly assigned points along the 3-hour path (Figure 2). At each random point, we established a 10-m transect on each side of the estimated movement path, perpendicular to the path (Figure 3). We uniquely identified transects with 1 being farthest from the nest site and 6 being closest. We measured visual obstruction (dm) using a Robel pole following Yeldell et al. (2017) at a distance of 15 m from the transect every 1 m along each 10-m transect (Figure 3; Robel et al. 1970). We conducted readings in 2 directions perpendicular to the transect line. We defined visual obstruction as the lowest point on the Robel pole at which we could see the pole when viewing from 1 m above the ground at a distance of 15 m away and estimated average height of understory vegetation at line of sight between the transect and each respective 1-m location along the transect. We recorded 40 measurements (20 on each side of movement path segment) along each perpendicular transect. At each nest location, we collected the same measurements in each cardinal direction (Yeldell et al. 2017, Wood et al. 2018). We averaged Robel pole readings from the

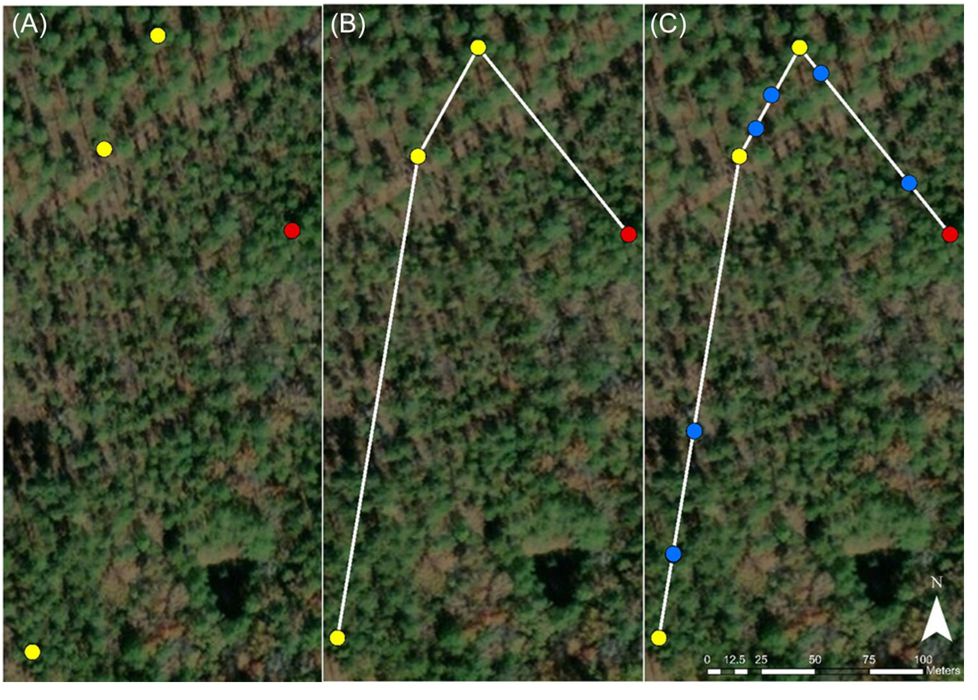

FIGURE 2 Example of an individual-specific movement path used to identify laying routes for vegetation transect sampling. Data were derived from GPS fixes (yellow points) collected 3 hours prior to nest initiation (red point). (A) GPS locations preceding nest initiation, (B) inferred laying path between GPS locations, and (C) randomly assigned vegetation sampling points (blue points) along the path to quantify cover. Data shown are from a female wild turkey monitored during the 2017 breeding season in the southern United States. Individuals included eastern (*Meleagris gallopavo silvestris*), Gould's (*M. g. mexicana*), and Rio Grande (*M. g. intermedia*) wild turkey subspecies.

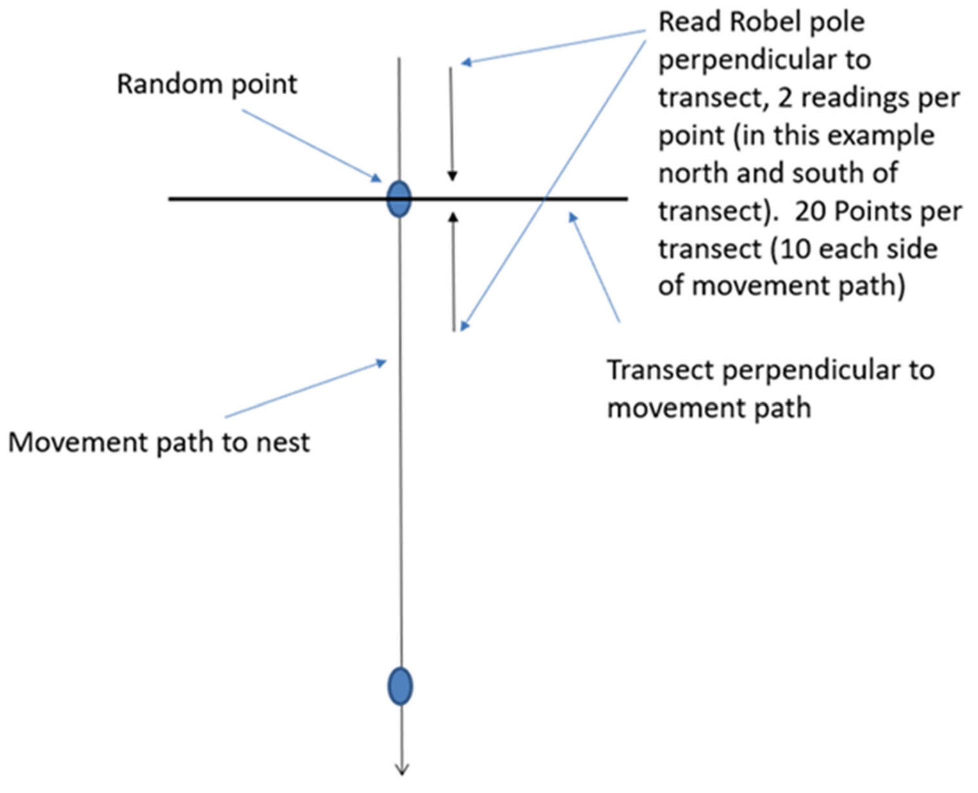

FIGURE 3 Schematic representation of vegetation transect sampling design used to quantify visual obstruction along laying paths. Random points were generated between known GPS fixes taken 3 hours prior to nest initiation and sampled using standardized vegetation transects extending in cardinal directions. This method was applied across multiple sites in the southern United States in 2017 to assess pre-nesting vegetation cover for wild turkeys, including eastern (*Meleagris gallopavo silvestris*), Gould's (*M. g. mexicana*), and Rio Grande (*M. g. intermedia*) subspecies.

4 nest-site measurements to estimate mean visual obstruction at the nest site. We conducted all vegetation sampling within 7 days of nest failure or hatching.

For each nest site, we compared estimated visual obstruction and average vegetation height to the same metrics collected along movement paths that the female used before selecting a nest site. For analysis, we assigned each cross-transect measurement a 1 if vegetation conditions met or exceeded the same measurement collected at the nest site, and a 0 if measurements failed to meet the conditions, as the literature regularly identifies a positive relationship between nest-site vegetation measurements and nest success. We then calculated the proportion of vegetation measurements that met or exceeded what was selected by the female at the nest site across all females, by site, age, and relative to nest success or failure. We used a generalized linear model with a logit link function to evaluate nest fate relative to visual obstruction measurements at the nest site of eastern wild turkey in Program R version 4.4.2 (R Core Team 2025). Nest fate was modeled as a binary response variable, with successful nests coded as 1 and failed nests coded as 0.

RESULTS

We used 164 nesting attempts during 2017 by 131 individuals (118 adults, 13 juveniles) for analysis (Table 1). We sampled vegetation at 37,976 locations along 492 unique movement paths. We found no evidence that available vegetation characteristics changed as one approached (from cross transect 1 to 6) nest sites (Table 2). Across all

TABLE 1 Number of wild turkey (*Meleagris gallopavo* ssp.) nesting attempts by site and subspecies used to sample vegetation along 492 pre-nest initiation sampling paths during 2017. Sites include Angelina National Forest (ANF; Texas), B.F. Grant Wildlife Management Area (BFG; Georgia), Cedar Creek Wildlife Management Area (CC; Georgia), Coronado National Forest (CNF; Arizona), South Central Texas (District 7; Texas), Kisatchie National Forest (KNF; Louisiana), and Peason Ridge Wildlife Management Area (PR; Louisiana), USA.

			Nest attempt		
Site	***n***	**Subspecies**	**1**	**2**	**3**
ANF	13	Eastern	11	2	0
BFG	2	Eastern	1	0	1
CC	40	Eastern	27	10	3
CNF	16	Gould's	14	2	0
District 7	39	Rio Grande	33	6	0
KNF	39	Eastern	26	12	1
PR	15	Eastern	15	0	0

subspecies and nesting attempts, the proportion of vegetation characteristics that met or exceeded that at the nest site declined as nest attempts increased (Figure 4).

Average vegetation height and visual obstruction at the nest site was met or exceeded at 61–71% and 22–25% of random points, respectively (Table 2). Average vegetation height and visual obstruction met or exceeded measurements at nest sites 66% and 24% of the time for unsuccessful nests, and 67% and 17% of the time for successful nests, respectively. The proportion of average vegetation height at random locations that met or exceeded values at the nest site was 72% and 66% for juvenile and adult females, respectively. The proportion of sites where visual obstruction at random sites that met or exceeded nest sites was 18% and 23% for juveniles and adults, respectively.

Eastern wild turkeys had the greatest proportion of random points where average vegetation height met or exceeded measurements at the nest site (75%) followed by Gould's (59%) and Rio Grande wild turkeys (46%). We note a similar pattern for visual obstruction (27, 17, and 15%, for eastern, Gould's, and Rio Grande wild turkeys, respectively). Across our eastern wild turkey study sites, locations in the western region (Texas, PR, KNF) had greater (80%, 86% and 87%, respectively) probability of average visual obstruction meeting or exceeding that at nests, whereas locations in the eastern region (CC, BFG) were lower (57 and 58%, respectively). The same trend held for visual obstruction, where locations in the western region had greater (40%, 49% and 34% in Texas, PR, and KNF, respectively) probability of visual obstruction meeting or exceeding that at nests, whereas locations in the eastern region (CC, BFG) had lower (4% and 1%, respectively). We found no evidence that visual obstruction affected nest success ($\beta = -0.004$, SE = 0.004, $P = 0.35$; Figure 5), but we note that successful nests occurred in a fairly narrow window (~50–110 cm) of visual obstruction (Figure 5).

DISCUSSION

Establishment of quality nesting habitat is regularly identified as a manageable action for wild turkey population sustainability (Bailey and Rinell 1967, Dickson et al. 1978, Healy and Nenno 1983, Moore et al. 2010) under the assumption that vegetation characteristics conducive to nest success are limited on the landscape (Badyaev 1995, Thogmartin 1999, Streich et al. 2015, Isabelle et al. 2016). Our results indicate that vegetation characteristics at

TABLE 2 Predicted probability, by cross transect, that vegetation characteristics—average vegetation height and visual obstruction—measured at random locations met or exceeded those recorded at nest sites for 492 laying paths sampled in 2017. Cross transects are labeled 1–6, with transect 6 located closest to the nest site and transect 1 farthest from the nest. Vegetation measurements were collected using standardized transect protocols to evaluate the concealment available along the pre-nesting laying path. Standard deviation (SD) was calculated and included for both average vegetation height and visual obstruction estimates. Data were collected across the southern United States from female wild turkeys of 3 subspecies: eastern (*Meleagris gallopavo silvestris*) in Texas, Louisiana, and Georgia; Gould's (*M. g. mexicana*) in Arizona; and Rio Grande (*M. g. intermedia*) in Texas, USA.

Cross Transect	Average vegetation height (SD)	Visual obstruction (SD)
1	0.62 (0.006)	0.22 (0.005)
2	0.67 (0.006)	0.22 (0.005)
3	0.67 (0.006)	0.23 (0.005)
4	0.63 (0.006)	0.22 (0.005)
5	0.68 (0.006)	0.25 (0.005)
6	0.71 (0.005)	0.23 (0.005)

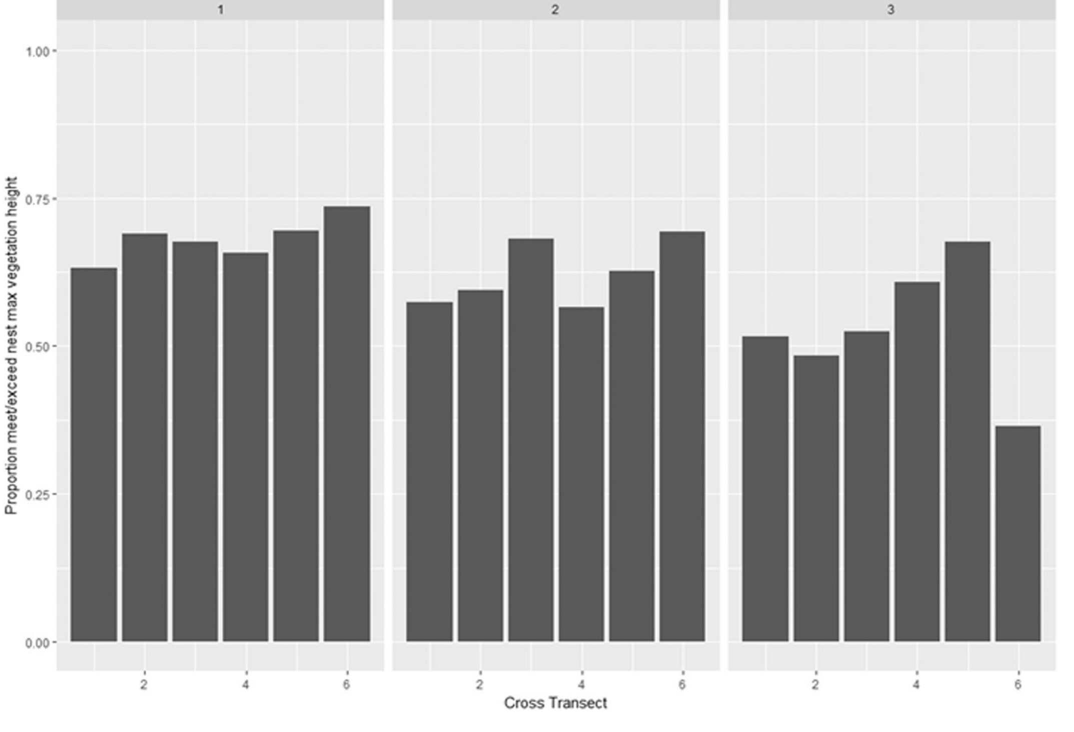

FIGURE 4 Proportion of vegetation height measurements at random laying path points that met or exceeded the visual obstruction measured at the nest site. Data were collected in 2017 from GPS-tagged female wild turkeys of 3 subspecies: eastern (*Meleagris gallopavo silvestris*), Gould's (*M. g. mexicana*), and Rio Grande (*M. g. intermedia*), across study sites in the southern United States.

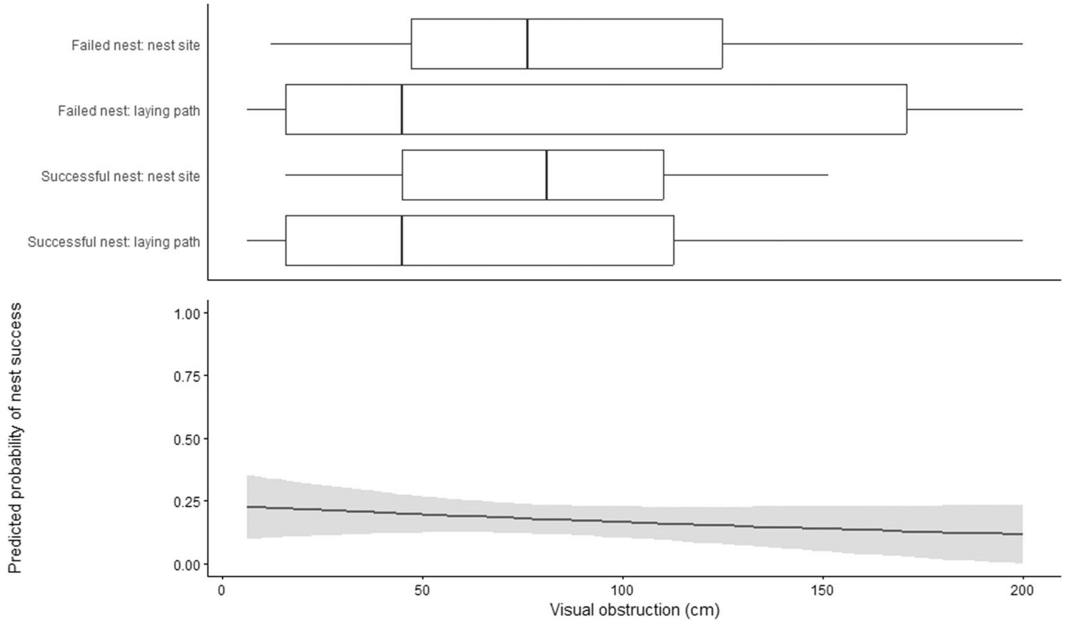

FIGURE 5 Predicted probability of nest success relative to visual obstruction (solid line) with 95% confidence intervals (gray shaded ribbon). Above the model prediction are 4 boxplots representing visual obstruction measured at: (1) failed nest sites (Failed nest: nest site), (2) laying paths 3 hours prior to incubation for failed nests (Failed nest: laying path), (3) successful nest sites (Successful nest: nest site), and (4) laying paths 3 hours prior to incubation for successful nests (Successful nest: laying path). Data were collected from eastern (*Meleagris gallopavo silvestris*), Gould's (*M. g. mexicana*), and Rio Grande (*M. g. intermedia*) wild turkeys during 2017 across the southern United States.

nest sites, as quantified using the standard metrics thought to underlie nest success, are widely available within areas that females use immediately before onset of laying (Argabright et al. 2024). Likewise, our findings indicate that vegetation characteristics historically measured had no effect on nest success as we found no relationship between visual obstruction at the nest site and nest success (Keever et al. 2022).

Our findings suggest that vegetation characteristics that occur at nest sites are not limited on the landscape. Previous works assessing vegetation characteristics at nest sites of wild turkeys have typically included measurements collected at the nest site and random points around the nest and results from this approach have failed to illustrate consistent conclusions as to characteristics that drive nest success (Schmutz et al. 1989, Badyaev 1995, Randel et al. 2005, Yeldell et al. 2017, Wood et al. 2018). Conley et al. (2016) and Collier et al. (2019) determined that the concept of habitat sampling proposed by earlier authors (Chamberlain and Leopold 2000) and detailed by Jones (2001) as an example of selection with fitness consequences, was not universally applicable as previously described. Our results suggest that the process of nest-site selection relative to vegetation characteristics may be better defined as stereotypy, or a persistent repetitive act with no obvious purpose or benefit (Martin 1993, Argabright et al. 2024). Rather, we speculate that females may be selecting vegetation characteristics that satisfy some general threshold for cover that provides a location where they can hide during incubation, as selection along the laying paths seems to show no difference between females (Argabright et al. 2024). If so, female wild turkeys may indeed be selecting nest sites with a threshold of cover the day the first egg is laid, with no apparent consideration of the fitness consequences of the vegetation selected (Collier et al. 2019, Keever et al. 2022).

Selection of vegetation conditions and the relative difference between what is used and available has provided the foundation for evaluating fitness consequences of habitat selectivity (Jones 2001). In order to be adaptive, habitat selection is required to have positive benefits to species demography. Absent any consistent links to fitness, we suggest that vegetation characteristics, as quantified using common techniques replete in extant literature, may be irrelevant to actual nest success in the wild turkey. Moreover, we posit that vegetation measurements and other similar metrics commonly used and reported by researchers may be unrelated to the process of nest loss via predation (Yeldell et al. 2017, Wood et al. 2018, Collier et al. 2019, Ulrey et al. 2022). Techniques regularly used for assessing vegetation characteristics at nest sites such as vegetation obstruction (Robel et al. 1970), vegetation structure or density (Nudds 1977), or canopy cover (Lemmon 1956) have not changed in use since their inception. As such, we offer that perhaps researchers studying wild turkeys have fallen into a scientific paradigm, where most people follow a common set of rules (Morrison et al. 2012), in this case the rule being that nest vegetation is limited on the landscape and hence should be an area of focus and thus measured. However, when paradigms are perpetuated without challenge, resource management may suffer. Therefore, we question the continued collection and reporting of standard vegetative characteristics used to evaluate how such characteristics may be influencing fitness in wild turkey studies.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

The Institutional Animal Care and Use Committee at Louisiana State University (Protocol #A2015-07) and the University of Georgia (Protocol #A2014 06-008-Y1-A0) approved capture and handling protocols.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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