

**A SYNTHESIS OF RECENTLY COMPLETED, ONGOING, AND PLANNED RESEARCH
RELATED TO EASTERN WILD TURKEYS BY SOUTHEASTERN ASSOCIATION OF FISH
AND WILDLIFE AGENCIES MEMBER STATES: 2008 - 2021**

Prepared by:

The Wild Turkey Working Group
of the
Southeastern Association of Fish and Wildlife Agencies

December 7, 2021

EXECUTIVE SUMMARY

While long heralded as one of North American conservation's greatest successes, the Eastern wild turkey (*Meleagris gallopavo silvestris*) and its management appears to be at a turning point. Most states encompassing the Southeast Association of Fish and Wildlife Agencies (SEAFWA) have documented recent declines in turkey population productivity and harvest. To address concerns associated with the trends, nearly five dozen different research projects have been undertaken throughout the SEAFWA geography in the past decade to increase understanding of wild turkey ecology and management. Twenty-six unique projects are investigating, or have investigated, various aspects of hunting and regulations, from documentation of basic harvest and survival rates, to associations between gobbling chronology and season timing, to hunter behaviors and impacts on wild turkey behavior. Nearly every SEAFWA member state has conducted, or has plans to conduct, research to describe key vital rates and better understand the factors affecting population dynamics in their state. Eighteen studies have addressed, or are attempting to address, concerns related to wild turkey habitat, their response to forest management, or the controversial application of prescribed fire during the nesting season. Five ongoing or recently completed projects have dealt with wild turkey predators, either directly or indirectly. Issues relating to diseases of wild turkeys are increasingly gaining more attention. A half-dozen studies have concluded or are ongoing which have looked at aspects of wild turkey disease ecology. Although wild turkeys continue to be one of the most studied game species in North America, there are still considerable knowledge gaps which will continue to hinder effective management of the species.

	3
EXECUTIVE SUMMARY	2
INTRODUCTION	5
SYNTHESIS OF PROJECT RESULTS	7
Hunting and Regulations	7
Major Findings	8
Survival, Mortality, and Harvest Rates	8
Gobbling Chronology and Season Timing	9
Hunter Behavior	10
Structured Decision Making	11
Population/Reproductive Ecology	12
Major Findings	13
Reproductive Vital Rates	13
Estimation of Size/Density/Occupancy	14
Habitat	16
Major Findings	17
Use and Selection	17
Impacts of Prescribed Fire	19
Impacts of forest management	20
Turkey Movements	21
Predators	22
Major Findings	22
Disease	23
Major Findings	23
Environmental Toxins	23
Bacterial and Viral Pathogens	23
Knowledge Gaps	26
Highest Priority	26
Medium Priority	26
Lower Priority	26

APPENDIX I: STATE LISTING OF PROJECTS	27
Alabama	27
Arkansas	31
Florida	33
Georgia	36
Kentucky	40
Louisiana	41
Mississippi	47
Missouri	53
North Carolina	56
Oklahoma	59
South Carolina	59
Tennessee	63
Texas	66
APPENDIX II: GROWING SEASON FIRE RESOLUTION	69

INTRODUCTION

The Eastern wild turkey (*Meleagris gallopavo silvestris*; hereafter, turkey) is a highly pursued game species in the southeastern United States, with nearly 1 million people annually hunting turkeys during spring seasons across the 15 states encompassing the Southeastern Association of Fish and Wildlife Agencies¹ (SEAFWA). Turkeys were nearly extirpated throughout this range during the early decades of the twentieth century due to the compounding effects of habitat loss and overhunting. Increased legal protections, reforestation, and trap and transfer programs coordinated by state wildlife agencies and their partners led to a dramatic resurgence in turkey populations over the past 60 years. While this restoration is widely lauded as one of North American conservation's greatest successes, turkeys appear to be at a crossroads in the early 21st century. Most SEAFWA states have recently documented declining turkey population productivity, with some states concurrently reporting simultaneous declines in total harvest². The combination of these two trends has created growing anxiety amongst hunters and wildlife managers about the current and future status of the species.

Given its popularity amongst hunters and subsequent importance to state wildlife agencies, turkeys have been intensively studied in the past. Field research undertaken from the 1970s through the late 1990s largely sought to understand habitat use, basic ecology, and demographic drivers of population abundance. Most reported annual survival estimates which were relatively high as compared to other game birds, with annual losses typically accounting for 30 to 50% of adults^{3,4}. Conversely, reproductive output was typically low and highly variable. Nest success has ranged from 10-50%⁵. Most studies also reported extremely high losses (60-90%) of the young^{6,7,8}. As a result, turkey populations are primarily driven by the outcome of the annual reproductive cycle, which often results in large annual fluctuations in abundance⁹.

Due to the recent concerns surrounding populations, there has been a resurgence in turkey research over the past decade. Many of these recent studies have aimed to update knowledge about demographic rates under contemporary conditions in which populations are no longer exponentially growing. Considerable focus has been given to the role of hunting frameworks, gobbling chronology, and how these may coincide and interact with reproductive activities. Other specific issues, such as the impact of prescribed burning during the nesting season, have been thoroughly investigated at multiple study sites across the southeast.

Increased collaboration between states has been a hallmark of more recent turkey research. For example, brood survey data from across all SEAFWA states was recently examined to determine causal factors behind declining trends in turkey reproduction. Poult per hen ratios from summer surveys were compared to harvest trends and demographic rates from published literature. Findings from this work concluded that productivity of turkey populations is limited in a density dependent manner, i.e., as turkey populations expand, the per capita rate of reproduction declines. This phenomenon was suggested to be the result of limitations in the availability of quality nesting and brood rearing cover; as turkey populations grow, the availability of high-quality nesting and brooding cover becomes increasingly limited, thereby forcing a progressively higher percentage of the hen population to nest in poorer quality habitat, reducing per capita reproductive success². As a result of this study, the SEAFWA Wild Turkey Working Group adopted a standardized protocol for the conduct of brood surveys to allow for an even greater comparison of brood data between states in the future¹⁰.

The following synthesis document was initiated at the request of the SEAFWA Wildlife Resources Committee to review and summarize findings from ongoing and recently completed turkey studies conducted around the southeastern United States. In the past decade, 59 studies have been initiated or completed across the 15 SEAFWA states which addressed aspects of turkey ecology and management. These works have collectively produced at least 66 peer-reviewed manuscripts, 30 theses or dissertations, 20 final reports, with 7-12 additional manuscripts currently in stages of preparation. These studies have varied in their approach, scope, and detail, yet each provided important information needed to successfully ensure the sustainability of this premier game bird. Within this document, studies are summarized based on their relationship to the following aspects of the turkey life cycle: population/reproductive ecology, habitat, predators, and disease. Additionally, current knowledge gaps which may limit management of the species are identified. Research summaries are broken down both by topic and state.

¹Eriksen, R.E., T.W. Hughes, T.A. Brown, M.D. Akridge, K.B. Scott, and C.S. Penner. 2015. Status and distribution of wild turkeys in the United States: 2014 status. *Proceedings of the National Wild Turkey Symposium 11*: 7-18.

²Byrne, M.E., M.J. Chamberlain, and B.A. Collier. 2015. Potential density dependence in wild turkey productivity in the southeastern United States. *Proceedings of the National Wild Turkey Symposium 11*: 329-351.

³Byrne, M.E. and M.J. Chamberlain. 2018. Survival and cause-specific mortality of adult female eastern wild turkeys in a bottomland hardwood forest. *Southeastern Naturalist 17*: 345-356.

⁴Miller, D.A., L.W. Burger, B.D. Leopold, and G.A. Hurst. 1998. Survival and cause-specific mortality of wild turkey hens in central Mississippi. *Journal of Wildlife Management 62*: 306-313.

⁵Crawford, J.C., W.F. Porter, M.J. Chamberlain, and B.A. Collier. 2021. Wild turkey nest success in pine-dominated forests of the southeastern United States. *Journal of Wildlife Management 85*: 498-507.

⁶Thogmartin, W.E. and J.E. Johnson. 1999. Reproduction in a declining population of wild turkeys in Arkansas. *Journal of Wildlife Management 63*: 1281-1290.

⁷Spears, B.L., M.C. Wallace, W.B. Ballard, R.S. Phillips, D.P. Holdstock, J.H. Brunjes, R. Applegate, M.S. Miller, and P.S. Gibson. 2007. Habitat use and survival of preflight wild turkey broods. *Journal of Wildlife Management 71*: 69-81.

⁸Chamberlain, M.J., B.S. Cohen, N.W. Bakner, and B.A. Collier. 2020. Behavior and movement of wild turkey broods. *Journal of Wildlife Management 84*: 1139-1152.

⁹Healy, W.M. and S.M. Powell. 1999. Wild turkey harvest management: biology, strategies, and techniques. US Fish and Wildlife Service, Biological Technical Publication BTP-R5001-1999.

¹⁰Byrne, M.E., M.J. Chamberlain, and B.A. Collier. 2014. Southeast regional wild turkey reproductive decline study: report on use of brood surveys to monitor productivity. A report to the Southeast Association of Fish and Wildlife Agencies Wild Turkey Working Group.

SYNTHESIS OF PROJECT RESULTS

Hunting and Regulations

Of the various factors influencing wild turkey populations, the only one that state wildlife management agencies have direct control over is establishment of hunting seasons and regulations. Therefore, understanding the direct and indirect impacts of hunting on population dynamics is critical for proper management. Consequently, these topics have been a focus of research among SEAFWA member states. Twenty-seven unique projects across 11 states are investigating, or have investigated, various aspects of hunting and regulations, from documentation of basic harvest and survival rates, to associations between gobbling chronology and season timing, to hunter behaviors and impacts on wild turkey behavior. Results and preliminary findings from these studies confirm that harvest during the spring hunting season is the greatest source of adult male mortality (particularly for 2-year-old males) and outside of this period, survival of male turkeys is quite high. Observed harvest rates vary temporally and spatially, with reported rates from across the southeast ranging from 12% to >40%. The upper extent of this range may exceed thresholds which maintain favorable demographic structure and ensure sustainable hunting quality. While regulations designed to protect jakes from harvest can lead to high juvenile male survival (90%), harvest mortality for this cohort is generally low (from 0-6% in one study), and jake protections may not necessarily translate into increased harvest rates for hunters.

Gobbling activity of male turkeys is highly variable temporally and spatially, although some states report relatively little variation in gobbling activity across ecoregions. Some research suggests that gobbling activity is, in part, a function of turkey abundance and/or density. Seasonal patterns of gobbling activity are complex with multiple high-intensity “peaks” and are influenced by multiple factors. Atmospheric conditions (wind, precipitation, low temperature, high relative humidity), for instance, have been found to depress gobbling activity. The proportion of females engaged in laying or incubating behaviors positively influences daily gobbling activity. Conversely, hunting and removal of males has a negative effect on daily gobbling activity, and gobbling activity on hunted sites generally peaks earlier and at a lower level than unhunted sites. This effect of hunting and removal of males may be disproportionately greater than the positive effect of female reproductive behaviors such that gobbling activity often declines dramatically with the onset of hunting regardless of when hunting begins and how many breeding hens are available. Periods of peak gobbling activity generally coincide with peak nest initiation (i.e., average start of egg-laying), and most of the gobbling activity occurs within the framework of state hunting seasons. Nevertheless, in some cases, a shift in hunting season timing may correlate more closely with peak nesting, as has been advocated by the SEAFWA Wild Turkey Working Group¹¹.

Harvest per unit effort (HPUE) is a common measure of hunting success and is generally tied to gobbler abundance. However, hunter efficiency appears to be amplified at lower turkey abundances, i.e., declines in associated measures of turkey abundance do not translate into equitable declines in HPUE. Managers should use caution, therefore, when relying on HPUE as an index of turkey populations as HPUE appears to be sensitive to hunter variables which are subject to temporal change and may not be linearly and proportionally related to turkey abundance. Regulations also impact HPUE and regulations limiting the harvest of jakes or expanding hunting seasons by moving the opening day earlier and lengthening the spring season can result in decreased hunter HPUE.

Hunter characteristics (attitudes, behaviors, etc.) are important determinants of hunting success and considerations in establishment of regulatory frameworks. In one study, hunter age, even more than hunting experience, exerted the strongest influence (positive) on the likelihood of harvesting at least one gobbler. Age also had a significant (negative) effect on the tendency to miss a turkey. Decoy use, weapon choice, and maximum shot distance did not strongly influence HPUE or the likelihood of missing. Despite many previous attitudinal surveys correlating hunter satisfaction to naïve measures of turkey abundance (e.g., seeing and hearing birds), Alabama turkey stakeholders place twice as much value on management outcomes with higher harvest than higher gobbler density. Structured decision making (SDM) approaches can help decision-makers balance stakeholder interests with resource needs. For example, SDM work was used to predict that the statewide wild turkey population in Alabama will continue to decline under a status quo Alabama harvest management framework, and any harvest management alternatives that did not impact productivity (i.e., reduce bag only and current/status quo) resulted in continued population declines. Decision Support Tools can be developed to help evaluate tradeoffs in predicted demographic outcomes across multiple harvest management alternatives.

¹¹Isabelle, J.L., A.B. Butler, C. Ruth, D.K. Lowrey. 2018. Considerations for timing of spring wild turkey hunting seasons in the southeastern United States. *Journal of the Southeastern Association of Fish and Wildlife Agencies* 5: 106-113.

Major Findings

Survival, Mortality, and Harvest Rates

- Ambient temperature at time of capture appears to be the factor that had the greatest influence on capture-related mortality. (AL - 2)
- Data suggested that increased relative humidity at the time of capture had an adverse effect on post-capture survival. (AL - 2)
- The relationship between handling time and post capture survival was also important. (AL - 2)
- Survival odds increased linearly post-capture and increasing ambient temperature at the time of capture had an adverse effect on survival. (AL - 2)
- Survival rates varied with age, sex, and season:
 - Fall survival of adult males was slightly greater than winter survival, and spring and summer survival were the lowest.
 - Winter survival of adult females was greater than in any other season, followed closely by fall.
 - Winter survival of subadult males was greater than any other season.
 - Subadult female survival was greater in winter when compared to fall, and fall survival was greater than spring and summer survival. (AL - 2)
- Harvest of adult males during the spring hunting season, and predation or illegal harvest of subadult males during the fall was the greatest source of male mortality. (AL - 2)
- The greatest source of mortality for both adult and subadult females was predation in the spring and summer during nesting and brood rearing. (AL - 2)
- Management focused on reducing the vulnerability of turkeys to predation and harvest would have the greatest influence on survival rates. (AL - 2)
- Juvenile male survival (under a no-jake regulation) was high, near 90%. (AR - 2)

- Annual and season survival estimates were similar, with 2 year old males achieving significantly reduced annual survival (33%), while known age 3 year old gobblers and unknown age adult gobblers had higher survival (>50%). (AR - 2)
- Harvest rates in the study area (Cedar Creek and B.F. Grant WMAs) exceed levels that are believed to be necessary to ensure a sustainable population, for example, a harvest rate of above 40% of all marked birds was observed in 2020. (GA - 1)
- Direct recovery rates vary year to year. (LA - 7)
- To-date, combined years' direct recovery rates have ranged from 12%-32% across all Ranger Districts. (LA - 7)
- Annual survival rates of VHF radio-tagged adult males, subadult males, and hens ranged from 27-46%, 69-83%, and 53-71%, respectively. (MO - 2)
- The percentage of adult males harvested during the spring season ranged from 15-31% (23% on average), while the percentage of subadult males harvested during the spring season ranged from 0-6% (4% on average). (MO - 2)
- Fall harvest rates of radio-tagged male turkeys ranged from 0-3% (1% on average), while fall harvest rates of radio-tagged hens ranged from 0-3% (1% on average). With banding data included, the fall harvest rate of hens during the project was about 1%. (MO - 2)
- Based on the top model, the harvest rate for female Rio Grande turkeys was 0.031 (SE 0.008). (TX - 4)
- Top supported model for females based on the Barker model parameters:
 - S(aged) p(tel) r(spring fall) R (telemetry) R'(Fixed @0) F and F' (Fixed @ 1)
 - Survival (S) differed by age (Adult = 0.68 ± 0.02 and Juveniles = 0.98 ± 0.01)
 - This is because not many juveniles were shot during the year of capture.
 - Recapture probability (p) for band only females was 0.006 ± 0.001
 - Recovery rate (r) for spring (0.013 ± 0.003) and fall (0.17 ± 0.004). Combined = 0.031. (TX - 4)
- Based on the top model, the harvest rate for male Rio Grande turkeys was 0.131 (SE 0.014). (TX - 4)
- Top supported model for males based on the Brownie model parameters:
 - S(constant) f(aged)
 - Survival (S) constant across time (0.60 ± 0.04)
 - Recapture probability (f) for adults (0.095 ± 0.010) and juveniles (0.036 ± 0.009). Combined estimates = 0.131 (SE 0.014). (TX - 4)

Gobbling Chronology and Season Timing

- Greater than 75% of gobbling activity occurred from 30 minutes before sunrise to 30 minutes after sunrise. (FL - 4)
- In North Central Florida the current spring hunting season aligns with the egg laying period and in the panhandle of Florida the season begins a week earlier than the egg laying period. (FL - 4)
- A 3-week shift in hunting season correlated better to nesting and gobbling activity (~20% greater). (FL - 4)
- Prior to the season change, gobbling activity declined dramatically with the onset of hunting. By mid-April, gobbling had essentially ceased on the study area. After the season opener was delayed, the decline in gobbling activity continued to begin with the onset of hunting, regardless

of whether hunting started in March or April. The effects on reproduction are not yet known, but may be confounded by the numerous marked males captured on the study site that were harvested on surrounding private lands prior to the delayed season opener. (GA - 1)

- As the proportion of females engaged in laying or incubating behaviors increased, expected daily gobbling activity increased. Conversely, hunting and removal of males had a negative effect on daily gobbling activity, and this effect was disproportionately greater than the positive effect of female reproductive behaviors. Our findings suggest that hunting and removal of males are important determinants of gobbling activity, and that corresponding reductions in gobbling activity may have mediating effects on the mating system of wild turkeys. (GA - 1)
- Two SW GA sites experienced a single peak of gobbling activity annually, and 3 out of 4 times this coincided with peak nest initiation. Most (78%) of gobbling occurred within 2 hours of sunrise. Gobbling activity was greatest when mean daily temperature was 15 °C, when wind speed increased, and when barometric pressure decreased. No relationship between gobbling activity and hunting or peak nesting was detected, but 32-44% greater gobbling activity occurred on the Jones Center (unhunted site) versus Silver Lake WMA (hunted site) from when the general hunt opened on Silver Lake WMA through the end of the breeding seasons. (GA-2)
- Prior to the 2018 turkey season (when 1-week season shift was enacted), on average approximately 63% of turkey harvest occurred prior to the peak of nest initiation. [Note: Peak nest initiation occurs during the 2nd week in April (mean date = Apr 9) in Louisiana.] (LA - 8)
- There was an approximate two-week difference in gobbling peaks between northern and southern Mississippi. Gobbling activity peaked on 30 March in southern Mississippi, whereas the peak occurred on 13 April in northern Mississippi. Despite this discrepancy, nearly two-thirds of all gobbling activity, regardless of region, fell within Mississippi's current spring season format. (MS - 9)
- Atmospheric conditions influenced gobbling activity. Gobbling activity was more prevalent on days of regionally dry atmospheric conditions (i.e., less humidity), which most often occurred in the days behind passing cold fronts and were characterized by northerly to westerly winds. The odds of hearing a turkey gobble on days of high humidity and moisture were reduced by approximately 60% compared to dry atmospheric conditions. (MS - 9)
- Overall gobbling activity varied annually and could be accurately predicted by both jake observations in the preceding year or poult per hen ratios two years prior. (MS - 9)
- On non-hunted properties 25%, 60%, and 15% of gobbling activity occurs before, during, and after the time that North Carolina's hunting season occurs. (NC - 4)
- Relatively little variation in gobbling activity across regions. (NC - 4)
- High variation in gobbling activity across years. (NC - 4)
- Complicated patterns of gobbling activity with multiple peaks. (NC - 4)
- "Peak" gobbling activity generally coincided with peak nest initiation. [Note: Over a 4-year period, average nest initiation (start of egg laying) was April 9.] (SC - 2)
- Gobbling activity on hunted sites peaked earlier and at a lower level than unhunted sites. (SC - 2)

Hunter Behavior

- Mean harvest per unit effort (HPUE) increased over the years of study (2015 – 2018). (MS - 7)
- Hunter age exerted the strongest influence on the likelihood of harvesting at least one gobbler. Hunters were more likely to be successful as they aged. Hunter age was more important than

total years of turkey hunting experience in predicting hunting success. Age also had a significant negative effect on the tendency to miss a turkey. (MS - 7)

- Amongst successful hunters, variables which served as naïve measures of turkey abundance best predicted HPUE. Harvest per unit effort increased with turkey observations and the percentage of hunts in which a gobbler was heard. (MS - 7)
- Decoy use, weapon choice, and maximum shot distance did not strongly influence HPUE or the likelihood of missing. (MS - 7)
- Harvest per unit effort was highest on moderately hunted properties with 3-6 hunter outings per 500 acres per week. (MS - 7)
- Hunter efficiency appeared to be amplified at lower turkey abundances, i.e., declines in naïve measures of turkey abundance did not translate into equitable declines in HPUE. (MS - 7)
- Managers should use caution when relying on HPUE as an index of turkey populations as HPUE appears to be sensitive to hunter variables which are subject to temporal change and may not be linearly and proportionally related to turkey abundance. (MS - 7)
- Poults per hen ratios from brood surveys accurately predicted juvenile gobbler observations in the following year. (MS - 8)
- Harvest per unit effort could be predicted (with up to 86% regional accuracy) using a model which combined juvenile gobbler observations from the previous year with variables corresponding to two major spring season regulatory changes. (MS - 8)
- The initiation of a “no-jake” law in 1998 and a framework change in 2005 which moved the opening day earlier and lengthened the spring season by up to 12 days both significantly decreased hunter HPUE. (MS - 8)
- Hunters hunted an average of 6hrs each day and traveled an average of 5.9 km/day. (LA - 9)
- Hunters stayed within 0.3km of a road or access trail on average. (LA - 9)
- 50% of hunter locations occurred within 18m of roads or access trails. (LA - 9)

Structured Decision Making

- Results statewide wild turkey population will continue to decline under the current (status quo) Alabama harvest management framework (circa 2020 - AL Spring Turkey Hunting Season Framework). (AL - 3)
- Given the current state of the turkey populations in Alabama, the most optimal harvest management alternatives to increase the turkey population are a Closed season or a Restricted season. (AL - 3)
- Any harvest management alternatives that included a later opening date resulted in sustaining or stabilizing the turkey population over time. (AL - 3)
- Any harvest management alternatives that did not impact productivity (i.e. reduce bag only and current status quo) result in continued population declines. (AL - 3)
- Alabama turkey stakeholders placed twice as much value on management outcomes with higher harvest than higher gobbler density. (AL - 3)
- A Decision Support Tool (DST) was developed to evaluate tradeoffs in outcomes of turkey population growth, density of adult males in spring, and density of gobbler harvest across all harvest management alternatives. (AL - 3)
- DST outcomes indicated management alternatives that most frequently ranked as the best decision (long-run value over time) given Alabama stakeholder values were the management

alternatives of reducing “bag-open season later-shorten season”, “restricted season”, and the “open season later” alternative. (AL - 3)

Population/Reproductive Ecology

As an R-selected prey species, successful reproduction is the primary driver of turkey populations. Proper management depends on an understanding of current demographics and status of populations. Nearly every member state (n=13) has conducted, or has plans to conduct, research (25 total projects) to describe key vital rates and better understand the factors affecting population dynamics in their state.

From completed projects and preliminary results of ongoing projects, we have learned nesting activity across the region peaks roughly in mid-April. In general, for turkey populations across the region we see:

- 67% - 76% of hens attempt a nest
- 19% - 39% of those hens attempt a reneest due to failure of their first nest
- 2% - 46% of all nest attempts result in a successfully hatched brood; in the lower Mississippi delta region, nesting success is strongly regulated by flooding events
- 17% - 40% of the hatched broods survive to 15-30 days, with 6% - 24% of the individual poults from all hatched nests surviving to at least a month of age

This ultimately means 0% - 19% of hens entering the nesting season successfully hatch and rear a brood to approximately 30 days of age.

The greatest source of mortality for both adult and subadult females is predation in the spring and summer during nesting and brood rearing and this can be exacerbated by factors such as spring precipitation. Annual survival of hens generally ranges from 51%-71%. How individual hen movement (i.e., nest recess) behavior during nest incubation affects her survival and likelihood of her nest successfully hatching is uncertain, but there may be a trade-off between hen survival and nest success.

Wild turkey population abundance and density remain difficult to accurately measure. Gobble counts using autonomous recording units (ARUs), aerial thermal imagery surveys, and camera surveys are promising, versatile tools that can provide unbiased information on density, distribution, and abundance, while limiting costs and direct impact to wild turkeys vs. traditional telemetry-based field studies. However, post-processing of these data can be time-consuming and labor-intensive, although utilization of machine learning can reduce these expenditures and produce equivalent results as manual interpretation (at least in some applications). Nevertheless, predictive models to explain survey data vary by classes (age/gender) of turkeys, as well as by study area, such that models cannot be simply applied to new areas without additional testing and calibration.

Turkey populations appear to experience regional synchrony whereby abundance trends are linked for populations in closer proximity to each other. One potential driving factor of this synchrony may be spring-summer weather. These results collectively suggest that trends in turkey abundance are likely determined at very large spatial scales. Interactions of sympatric species (e.g., hogs and wild turkeys) may also be a determinant of wild turkey population trends through interspecific competition or other mechanisms. Even though some work is delving into the field of genetics, we still know very little about

the role of genetics in observed turkey demographics and population dynamics. Turkey abundance may be determined by factors operating at large spatial scales and may be limited by uncontrollable broadscale environmental influences (i.e. weather). As a result, land managers should focus on factors within their control, such as managing for underrepresented habitat components within the overall landscape; this may help improve abundance due to strongly predicted relationships between landscape attributes and forest cover.

Regarding the potential impact of hunting activity on turkey productivity, little work has been completed, but one study found hunting effort (i.e., pressure) had more influence (negatively) on the proportion of sampling sites occupied by turkey poults than did changes to season timing (i.e., a 9-day delay). Further, the study speculated that a 9-day season delay may be insufficient to affect poult production. However, it was noted that effects from a 9-day delay may be too small to detect in a single year (the length of this particular study) and that environmental variables such as weather may confound results.

Major Findings

Reproductive Vital Rates

- The greatest source of mortality for both adult and subadult females was predation in the spring and summer during nesting and brood rearing. (AL - 2)
- Confirmed Williams and Austin's (1988) finding that hens have a habitual and narrow temporal egg-laying window. (FL - 7)
- Laying bird behavior did not distinctly vary from non-nesting hens, but incubation had an obvious behavior signature. (FL - 7)
- Recess behavior did not influence nest success. (FL - 7)
- Nest chronology: On the study sites (Cedar Creek WMA and B.F. Grant WMA), incubation efforts began around April 1 and peaked around April 15, on average. (GA - 1)
- Nest Behavior strategies: found that females who took longer recess bouts had higher individual survival, but had increased nest loss. Females who recessed more frequently had lower individual survival. Our findings suggest behavioral decisions made during incubation represent life-history trade-offs between predation risk and reproductive success on an unpredictable landscape. (GA - 1)
- From 2010 - 2013, seasonal survival estimates for females varied from a high during fall ($\hat{S} = 0.94$) to a low during spring ($\hat{S} = 0.76$). Survival of incubating females was 0.82 and survival of non-incubating females was 0.67. Annual survival was 0.55. (GA-2)
- During 2011 - 2013, forty-two percent of nests (n=78) were successful with most nest loss resulting from predation. Thirty-seven percent of females re-nested following loss to predation, fire, or other factors. Of these, 43% successfully hatched. (GA-2)
- Of 34 broods monitored during 2011-2013, 11 (32%) survived the 14-day flightless period. Of these 11 broods, 7 (64%) survived the following 2-week period (i.e., days 15-30). GA-2
- Habitat characteristics at the nest-site and patch-level had little influence on nest survival, suggesting that once a nest site is chosen, nest predation occurs randomly with respect to habitat characteristics. (GA-2)
- During 2015 and 2016, nest success for first, second, and third nests were 34%, 65% and 0%, respectively. (GA - 2)

- Of 25 broods monitored 2015-2016, Nine broods (36%) survived the initial 14 days, 6 survived to 28 days post-hatch. Overall brood success was 24%. (GA-2)
- To date (in Louisiana study), nest success has ranged from 3%-46% (LA - 1)
- Nest success ranged from 2%-15% throughout the project period. (LA - 2)
- Females traveling shorter distances during pre-laying had higher nest success. (LA - 2)
- 73% of laying period utilization distributions overlapped and overlap positively impacted nest success, however the area of overlap was only 11%, thus there is evidence of nest site buffering. (LA - 2)
- Nest survival was negatively impacted by the amount of movements females make while incubating; however, female survival was positively impacted by female movements, indicating a survival/production tradeoff. (LA - 2)
- Brood survival to 28 days averaged 17% (range 2-27%) of successful nests. (LA - 2)
- Nest success in the MAV was regulated by flooding. (MS - 3)
- Over 4 years with 88 hens monitored entering nesting seasons:
 - 67% of hens attempted a nest
 - 19% of those hens attempted a renest due to 1st nest failure
 - 40% of nest attempts resulted in a successfully hatched brood
 - 40% of the hatched broods survived to 15 days
 - This ultimately means 13% of hens entering the nesting season hatched and reared a brood to 15 days old. (SC - 2)
- (Preliminary results) Nesting: average nesting rate (75.7%); clutch size of successful nests (9.3); renesting rate (39.3%); overall nest success (28.9%); median date of incubation of first nest attempts was 27 April. (TN - 1)
- (Preliminary results) Brooding: depending on the approach used, 1-month survival varied for the first two years of the project from 1.5% and 9.7% to 6.1% and 24.1%. (TN - 1)
- Preliminary results indicate that all reproductive parameters are less than estimates from earlier studies of stable or increasing populations and that seasonal productivity was affected at each stage of the nesting and brooding cycle. No significant differences were detected in preliminary results between experimental and control counties. (TN - 1)

Estimation of Size/Density/Occupancy

- Top model for detection of male turkeys on gobble count surveys was based on temperature, wind intensity, and study area. (AL - 4)
- Best model for detection indicated a relationship between probability of hearing male turkeys during a survey, wind intensity, temperature at the time of the survey and study area. (AL - 4)
- The best model for explaining variation in detection of all turkeys within a camera survey included days since bait was last replenished, study area, and a quadratic relationship with hour of the day. (AL - 4)
- Turkeys use and density correlated with the percent cover and composition of forested areas, the number and size of managed wildlife openings, and a quadratic function of shrub area. (AL - 4)
 - Results from gobble count surveys indicated for every percent increase in area occupied by non-pine forested habitat, the log density of male turkeys decreased.

- Results from camera surveys indicated for every 1 percent increase in pine forest, the probability of use by a turkey increased 1.050 times. (AL - 4)
- Camera surveys indicated poult and female density was best described by surrounding percent composed of forest and an interaction with the proportion of that forested area composed of hardwood trees. (AL - 4)
- Probability of habitat use changed according to the timing within the breeding season. (AL - 4)
- Gobble count surveys are a versatile tool that can provide information about density, distribution, and growth of turkey populations. (AL - 4)
- Camera surveys provide useful and precise information about turkey populations, while limiting cost and impact on survival. (AL - 4)
- Camera surveys in the breeding season offer less bias in estimates compared to opportunistic surveys. (AL - 4)
- Excluding the Poult 3 class, the best model for detection included study area, bait presence, site type, and time of day. (AL - 5)
- The best detection model included only the study area and time of day for Poult 3 class.
- The best model of occupancy dynamics varied among classes of turkeys. (AL - 5)
- For all turkeys and adult females, variation in occupancy was best explained by year, study area, and site type. (AL - 5)
- For adult males, all poults, and Poult 3, variation in occupancy was best explained by study area, year, and bait. (AL - 5)
- For Poult 2, study area and site type best explained variation in occupancy rates. (AL - 5)
- Results suggest surveys conducted only at wildlife openings using bait may result in biased estimates of some classes of turkeys. (AL - 5)
- Analysis demonstrated that, if interested in monitoring the female segment of the population, a random sample of survey sites is needed to obtain unbiased estimates of occupancy and abundance. (AL - 5)
- Machine learning used in combination with expert review can be used to derive population parameters from camera surveys that are comparable to estimates from manual image interpretation. (AL - 6)
- Hunting effort had more of an influence on occupancy rates of male and poults than season change (i.e. a 9-day delay). (AL - 6)
- Results indicated occupancy of poults was highest in areas with low hunting pressure compared to areas receiving high or medium hunting pressure. (AL - 6)
- Effects of an experimental 9-day season delay may be too small to detect in a single year. (AL - 6)
- Effects of a 9-day reduction in season may not be sufficient to affect poult production. (AL - 6)
- Poult detection was very low compared to other classes of turkey, but may be detectable as an increase in recruitment in subsequent years. (AL - 6)
- Occupancy may not be sensitive enough to detect a change in poult production. (AL - 6)
- Effects of season change may be concealed by environmental variables such as weather. (AL - 6)
- Estimates of male turkey density were low, with an average density of 0.32 male turkeys per square kilometer across the 3 study sites (range: 0.16 – 0.46 turkeys/km²). (AR - 2)
- Results of two species occupancy modelling suggest that feral hogs and turkeys have high overlap in use of space, but presence of hogs resulted in decreased detections of wild turkeys at baited camera sites. (AR - 2)

- Results suggested that three distinct genetic lineages of wild turkeys exist in Mississippi. These lineages are not geographically distinct. Rather, individuals of each lineage are intermixed and living near one another. This study did not investigate the causal mechanism for this scenario. These distinct lineages may be a lingering consequence of trap and transfer efforts from the 1950s – 1990s or may be exacerbated by positive genetic assortment in which mate selection tends toward genetically similar individuals. (MS - 2)
- Based on long-term harvest records, trends in turkey populations appeared linked for populations within approximately 150 miles of one another. This regional synchrony accounted for 60% of the variance in harvest per unit effort trends. Regional synchrony was possibly explained by spring-summer weather; trends in wild turkey populations were negatively related to maximum spring-summer temperatures. (MS - 2)
- These results collectively suggest that trends in turkey abundance are likely determined at very large spatial scales. Managers should recognize that their ability to increase turkey abundance may be limited by factors beyond their control and should instead focus on providing habitat components which may be underrepresented in the overall landscape. (MS - 2)
- Survival rates of translocated wild turkeys in the MAV were similar to studies elsewhere (annual survival = 51-57%) and were negatively affected by spring precipitation. (MS - 3)

Habitat

There have been numerous studies conducted across the southeast over the previous decade, with a total of 19 unique studies reported herein addressing one or more concerns related to wild turkey habitat use and relationships between general forest management practices or the controversial application of prescribed fire during the nesting season. Technological advancement over this time period has generated insight into wild turkey movement and space use at a resolution unattainable with Very High Frequency (VHF) transmitters alone. The development of Global Positioning System transmitters small enough to affix to wild turkeys has allowed researchers to monitor wild turkeys remotely and extensively during reproductive periods and throughout the year. This technology has allowed for monitoring of wild turkeys during extreme weather events (i.e. flooding), space use of females and their broods, and helped improve accuracy of home range estimation and habitat use. Of the studies reported herein, several themes continue to be elucidated by the data. Wild turkeys exhibit strong ties to hardwood forest systems interspersed within southern pine landscapes, and they exhibit strong selection for areas that exhibit well developed and open habitat conditions (i.e. early successional graminoid and herbaceous communities) during reproductive behaviors. In general, during these reproductive periods female wild turkeys select nest locations in areas with increased visual obstruction.

With continued perceived declines in turkey populations across the region, there have been growing calls of concern surrounding forest management practices and how they relate to wild turkey reproductive effort. Research indicates understory cover may be more impactful to turkey use than forage availability, while abundance may be driven at larger spatial scales based on overall availability of certain cover types (i.e. hardwoods). The use of prescribed fire during the growing season has generated concern from resource managers and the public alike. The resulting conditions generated by the practice result in vegetative structure and composition that turkeys select for preferentially on the landscape. The

six studies described generated very similar conclusions, prescribed fire resulted in little to no nest loss (< 5%), turkeys preferentially selected for vegetative conditions produced by prescribed fires within 3 years of a fire event during nesting, and vegetative conditions within two years of the most recent fire event during brood rearing. These thoughts are further expounded upon in a recent review regarding the practice¹², and an associated resolution drafted by the SEWTWG and adopted by the WRC in 2020 (Appendix II).

¹²Wann, G.T., J.A. Martin, and M.J. Chamberlain. 2020. The influence of prescribed fire on wild turkeys in the Southeastern United States: A review and synthesis. *Forest Ecology and Management*. 455: 117661.

Major Findings

Use and Selection

- During the non-reproductive period female turkeys were 1.29 times more likely to select hardwood forests compared to their availability on the landscape. (AL - 1)
- Mixed and pine forests were both 1.36 times more likely to be selected in the non-reproductive period. (AL - 1)
- Female turkeys selected south-facing forested slopes 1.73 times more than their availability in the non-reproductive period. (AL - 1)
- During the reproductive period (15 Mar – 30 Sept) primarily used hardwood forest. (AL- 1)
- Females used open space in proportion to availability during the reproductive period and avoided it during the rest of the year. (AL- 1)
- Females selected bottomlands during the reproductive period and used them in proportion to their availability on the landscape during the rest of the year. (AL- 1)
- During hunting season, forests constituted approximately 80% of the locations used and available land cover categories in each season. (AL- 1)
- Probability of use for each female, at each camera site, during each week was 1.78 times more likely to increase when bait was present versus when bait was absent. (AL- 1)
- Turkeys use and density correlated with the percent cover and composition of forested areas, the number and size of managed wildlife openings, and a quadratic function of shrub area. (AL - 4)
 - Results from gobble count surveys indicated for every percent increase in area occupied by non-pine forested habitat, the log density of male turkeys decreased.
 - Results from camera surveys indicated for every 1 percent increase in pine forest, the probability of use by a turkey increased 1.050 times. (AL - 4)
 - Camera surveys indicated poult and female density was best described by surrounding percent composed of forest and an interaction with the proportion of that forested area composed of hardwood trees. (AL - 4)
- Probability of habitat use changed according to the timing within the breeding season. (AL - 4)
- Turkeys selected nest sites with higher visual concealment, percent slope and woody ground cover. (AR- 1)
- Nest survival was on the low end of the reported literature (~20%). (AR- 1)

- Male wild turkeys selected for pasture (open) habitats during spring though use decreased significantly with the onset of hunting seasons. As hunting season waned, use began to increase, suggesting males may disproportionately select these areas for breeding activities and are subsequently disrupted by hunter pressure during the hunting season. (AR - 2)
- Prior to the hunting season, males selected roosts nearest to hardwood and pine forests. Roost site fidelity was low and distances between roosts were large. After the onset of hunting, males selected pine forests less and exhibited greater plasticity in roost selection while fidelity remained minimal, suggesting that males may have altered selection to mitigate risk from hunting while maintaining the strategy of moving about their ranges and roosting at different sites on consecutive nights. (GA - 1)
- With regards to nest site habitat, nest sites were more likely to occur with increases in vegetation height, and less likely to occur with increases in canopy closure. At a larger spatial scale, total ground cover, canopy closure, edge density, and percent land cover type had minimal influence on nest site selection. (GA-2)
- Females roosted broods at sites with increased ground cover and decreased visual obstruction, and daytime use by broods was most related to increases in ground cover. (GA-2)
- Females selected hardwood stands during pre-nesting and post-nesting phases but avoided them during the incubation phase. Females used open vegetation communities during all phases of reproduction following pre-nesting. (GA-2)
- We observed differential habitat selection across 2 scales (study area and seasonal area of use) and 3 seasons (fall-winter: 1 Oct–30 Jan; pre-breeding: 1 Feb–19 Apr; and summer: 16 Jun–30 Sep). During fall-winter, turkeys selected mature pine, mixed pine-hardwoods, hardwoods, and young pine stands, albeit at different scales. During pre-breeding, turkeys selected mature pine, mixed pine-hardwoods, hardwoods, young pine, and shrub-scrub, although at different scales. During summer, turkeys also demonstrated scale-specific selection but generally selected for mature pine, hardwoods, and shrub-scrub. (GA-2)
- Males selected for mature forest habitat types, specifically mature pine habitats. Males also selected hardwood habitats within the study areas and mixed pine-hardwood habitats within their home ranges. They selected roosts in or near mature pine or hardwood habitats with a dense herbaceous understory, and avoided roosting near pine plantations, shrub/scrub habitat, and roads—though they occasionally roosted in plantation pines. (GA-2)
- (Preliminary results) Nesting: Nest-site selection was positively associated with the amount of early succession/pasture and shrubland cover types available in pre-nesting home ranges, and hens selected for greater vegetative cover around the nest (i.e., visual obstruction and cover above the nest), which was also associated with greater survivability of the nest. (TN - 1)
- (Preliminary results) Brooding: resource selection was strongly related to presence of herbaceous (particularly forb) cover and in association with deciduous forest. Greater daily brood movements, later hatch dates, and nest sites closer to travel paths and roads were linked to increased likelihood of poult survival. (TN - 1)
- Preliminary results suggest management that promotes favorable nesting cover and that increases forb abundance and facilitates movement of poults on the landscape may lead to increased nest success and increase poult survival during the critical first 30 days of life. (TN - 1)

- Points used by brooding hens occurred more frequently in openings ($n=124$, 71%) than paired random locations ($n=65$, 40%) and, correspondingly, less often in pine forest ($n=31$, 18%), hardwood forest ($n=13$, 7%), and pine/hardwood mixed forest ($n=6$, 3%). (TX - 1)
- Mass and abundance of Hemiptera, Orthoptera, and Aranea and abundance of Coleoptera were all greater at brood locations than at random points. Mass and abundance of invertebrates captured in pitfall traps did not differ between brood and random locations; however, the trend was for greater abundance and/or mass in seven of ten comparisons. (TX - 1)

Impacts of Prescribed Fire

- Turkeys have not benefited from the current approach to woodland/savanna restoration. Landscape level early growing season prescribed fire had not created woodland or savanna conditions across the landscape and likely would require more time (≥ 25 years). (AR - 1)
- Prescribed fire at the landscape-scale ($>10,000$ ha) did not appear to significantly improve nest survival/success in upland hardwood forests. (AR - 1)
- Of 78 nests monitored in 2 longleaf pine-dominated forests in southwestern Georgia during 2011-2013, five nests were exposed to prescribed fire events (2 were successful; 3 were unsuccessful). One of 34 broods was lost to growing season prescribed fire during the study. (GA-2)
- At the local scale, turkeys nested in areas with higher percent ground cover vegetation. Turkeys selected to nest in forest stands burned 2 years prior. Nest survival was not affected by percent ground cover, distance to roads, or distance to edge but was negatively associated with time-since fire; turkey nests in stands burned >3 years prior had lower survival than nests in stands burned the current year. (GA-2)
- Days-since-fire did not influence selection of stands managed by frequent fire (≤ 3 yr). In cases where female turkeys used pine-dominated stands (i.e., mature pine, young pine, and mixed pine-hardwoods), selection was not influenced by days-since-fire; however, these results are at least partially due to a lack of longer burn rotations (>3 yr) on our study areas. (GA-2)
- Of 76 nests monitored on Silver Lake WMA during 2015-2016, no active nests were exposed to fire during incubation, although 4 nests (5.4%) would have been prior to the projected hatch date had they not been depredated previously (GA-2).
- During 2015 and 2016, turkeys on Silver Lake WMA selected areas burned ≤ 2 years prior but used different seral stages of pine during different reproductive phases. Specifically, females selected for recently burned mature pine stands during incubation but then selected for recently burned young pine stands, mature pine stands burned 2 years earlier, and open vegetation communities during brooding. Time-since-fire and stand seral age interact to affect how turkeys use pyric landscapes. In general, pine stands providing ample understory vegetation are favored while females are reproductively active. (GA-2)
- Time-since-fire informed brood site selection but not nest site selection during 2015 and 2016. Females selected brood roost sites in stands not recently burned (3–6 yr post-fire) and selected daytime use sites in stands burned the current year (0 yr post-fire) and 2 years post-fire. We failed to observe links between selection of vegetation and landscape covariates and probability of nest or brood survival. Short (i.e., 1–2 yr) fire return intervals do not provide vegetation

communities selected by females to roost broods, though stands burned within the current year were important for daytime use by broods. (GA-2)

- Wild turkey females selected (>85%) nest sites in areas burned within the last 3 years. (LA - 2)
- Turkeys selected for burned areas within 250m of adjacent stands, implying that burn size matters. (LA - 2)
- Nesting female wild turkeys selected for sites burned 2 years prior. (LA - 3)
- Turkeys used the edges of burned areas immediately following prescribed fire (LA - 3)
- No turkey nests failed during the study due to prescribed burning (LA - 3)
- Turkey use was greatest in areas with vegetative conditions produced by combining canopy reductions and prescribed fire. (MS - 1)
- Estimated nest survival was greater in riparian ecotones than in adjacent uplands. (NC - 1)
- Though 20% of the area was burned during the nesting period, only 3.3.% of nests were destroyed by fire. (NC - 1)
- No more than 6% of nests were exposed to fire annually. (NC - 1)
- Growing-season burns have minimal direct effect on turkey nest survival. (NC - 1)
- Less than 1% of nests are lost to fire. (SC - 2)
- Turkeys did not select for pine stands that have experienced ≥ 3 growing seasons post-burn during any part of the reproductive period, and may actually avoid these stands during pre-nesting and brooding. (SC - 2)
- From a brooding perspective, stands burned the current year and previous year (1 yr. rough) are important for foraging areas. Broods select them, rivaled only by hardwood areas within the pine matrix. (SC - 2)
- Hens preferentially select stands managed with fire, vs other habitats available to them, with the selection primarily geared towards older pine stands burned within 2 years of when the hen is monitored. (SC - 2)
- Fire does not displace birds, with 50% of birds reoccupying burned stands within 48 hrs. of the burn event. Within a week, stands are used as they were prior to the burn. (SC - 2)

Impacts of forest management

- Turkey use was positively associated with percent coverage of grasses, woody species, and brambles, all of which constituted cover and food. (MS - 1)
- Turkey use was negatively associated with percent coverage of invasive plant species. (MS - 1)
- Results suggested that cover, as measured by attributes of the forest understory, was more influential in dictating turkey use than was food availability. The authors speculate this may suggest predator avoidance has a greater influence on turkey habitat selection than does foraging opportunities. (MS - 1)
- East-central Mississippi had the highest wild turkey habitat suitability, whereas the Delta region had the lowest. (MS - 2)
- Wild turkey abundance was strongly predicted by landscape attributes and forest cover. Turkey abundance increased with forest availability until forested cover constituted approximately 60% of the landscape, after which point the trend between turkey abundance and forest cover flattened. Turkey abundance was furthermore driven by increasing landscape diversity and

interspersed, i.e., turkey abundance was highest where many different landcover types (pine forests, hardwood forests, mixed forests, fields and openings, etc.) were highly intermingled and in close proximity. (MS - 2)

- Wild turkey abundance in Mississippi is explicitly tied to the availability of hardwood forests. Turkey abundance declined sharply when hardwood forest occupied less than 30% of large landscapes. Turkey abundance peaked when hardwood forests were highly interspersed, well connected, and represented approximately 40% of an area equivalent to the bird's annual home range. This translated into approximately 250 acres of well-scattered hardwoods per square mile. (MS - 2)
- Wild turkey preference for certain landcover types varied by study site. Wild turkeys exhibited a functional response to forest cover and hardwood forest availability, i.e., the strength of wild turkey selection of these features was dependent upon their availability within the landscape. As their prevalence in the landscape was reduced, turkeys showed intensified selection for them. (MS - 2)
- These results collectively suggest that trends in turkey abundance are likely determined at very large spatial scales. Managers should recognize that their ability to increase turkey abundance may be limited by factors beyond their control and should instead focus on providing habitat components which may be underrepresented in the overall landscape. (MS - 2)
- Only 8.5% of the MAV within the State of Mississippi was suitable for wild turkeys. Within this area, only 184,573 acres (3.7% of the region) was highly suitable. (MS - 3)
- Mature hardwood was the primary habitat selected by translocated wild turkeys throughout the year. Turkeys preferred to nest in hardwood reforestation areas (CRP and WPR) and nest sites were characterized by high visual obstruction. Hardwood reforestation stands were generally avoided by non-reproductively active birds until the stands reached approximately 25-30 years of age, at which point adult turkeys used them at availability. (MS - 3)
- As seen in other regions, wild turkeys in the MAV exhibited gender-specific niche specialization and separation. (MS - 3)
- For wild turkey restoration in the Delta to be successful, translocation sites should ideally contain $\geq 3,200$ acres of mature hardwood forests and $\geq 2,000$ acres of regenerating forests. (MS - 3)

Turkey Movements

- During incubation, nest attentiveness was 84% and females took between 1 and 7 recesses per day (mean of 1.5) (LA - 2)
- Movements during incubation average 85 m (range 5 to 1000 m) (LA - 2)
- Brooding ranges average 6.9 ha on day of hatch to 27.9 ha by day 28 (LA - 2)
- Broods moved ~500 m from nest on day of hatch, and ~1,000 m daily thereafter and females with broods moved farther from the nest site each day, showing little to no fidelity to nest locations (LA - 2)
- Space use and daily movements vary little between Eastern and Rio Grande subspecies (LA - 4)
- Movements associated with roosting differ strongly between Eastern and Rio Grande subspecies (LA - 4)

- Roost site availability may greatly impact daily movements and behavior of Rio Grande wild turkeys and may have limited impacts to Eastern wild turkeys. (LA - 4)
- Rapid, intense, widespread flooding created by the opening of the Morganza Spillway had negative impacts on turkey populations. (LA - 5)
- Only 25% of tagged individuals found dry ground and survived the event. (LA - 5)
- Compared to the previous research prior to landscape level restoration efforts, all hen home range sizes were larger. (AR- 1)
- Turkey movements and home range sizes increased with landscape fragmentation. (MS - 3)

Predators

Six projects deal with predators of wild turkey, either directly or indirectly. A study of coyote diets in FL did not detect turkey remains among coyote food items, even during the nesting season, instead finding that grass, leaves, seeds, fruits, and anthropogenic items were most common. A study in progress in SC will use molecular DNA techniques to estimate the percentage of turkey in coyote fecal samples during nesting and brood-rearing seasons. Coyotes are commonly implicated in turkey decline, but multiple species are important. Mesocarnivore predation was the primary cause of known mortality events of adult turkeys in Georgia, with avian predation via Great-Horned Owls also accounting for nearly 20% of mortalities. A recently completed study in LA assessed the density, occurrence, distribution, and habitat preferences of several turkey nest predator species and found that successful nests had lower relative predator abundance than unsuccessful nests. The authors suggest that spatial placement of turkey nests relative to predators may drive nest loss, as certain predator species avoid specific habitats. A study underway in MO seeks to determine how turkey nest success and poult survival are affected by predator densities and occupancy, respectively, along with other factors such as weather, landscape characteristics, invertebrates, and habitat. Lastly, a study of forest management practices in southern pine forests in MS suggested that turkeys may select habitat based on predator avoidance more than food availability.

Major Findings

- Grass and leaves were the most common item found in the coyotes' stomach (51% of cases) (FL - 1)
- Followed by insects (33%), seeds and fruit (29%), anthropogenic (23%) - (FL - 1)
- No turkey remains were identified in the 237 samples (FL - 1)
- We estimated causes of death for 37 mortality events with predation serving as the leading known cause of mortality, with 35.1% of mortalities attributed to mesocarnivore predation (e.g., bobcat, coyote, and gray fox) and 18.9% to great-horned owl predation. One female (2.7%) was hit by a vehicle. (GA-2)
- Successful nests had significantly lower relative predator abundance indices (1.8) than unsuccessful nests (10.4). (LA - 6)
- Spatial placement of the nest on the landscape relative to use by potential predator species may be the driver for nest loss. (LA - 6)
- Certain nest predator species avoid specific habitat types and nests in those habitat types have a significantly higher likelihood of survival. (LA - 6)

- There remains a need to better categorize space use by potential nest predator species during the reproductive season. (LA - 6)

Disease

Disease investigations have occurred or are occurring in FL, KY, NC, MS, TN, and TX. Surveillance has been conducted for turkey carcasses submitted for testing (MS), hunter-harvested turkeys (KY, NC, TN), live-captured turkeys (FL, KY, NC, TN, TX), and supplemental feed available to turkeys (MS). Studies in KY, MS, and NC documented occurrence of Lymphoproliferative Disease Virus (LPDV) in 39%, 82%, and 46% of submitted specimens, respectively, with regional variation and mostly in adult turkeys (typical for such investigations, highlighting the need to investigate effects on poults). Female turkeys made up 82% of LPDV diagnoses in the MS study, and in the NC study there was no correlation between LPDV prevalence and hunter harvest rates or reproductive output. Hunter-harvested turkeys in a TN study showed evidence of previous exposure, but no active or previous infection, to avian influenza, New Castle disease virus, and Mycoplasma species, and there were no major differences between turkeys from counties with or without significant turkey population decline. Two of 24 turkeys experimentally exposed to poultry litter tested positive for blackhead disease, which suggests a potential cause for concern and the need for further research to confirm possible population-level impacts to turkeys. Testing of >100 live, apparently healthy Rio Grande turkeys in TX showed 3 positive to avian influenza and 2 positive to reticuloendotheliosis virus (REV; closely related to LPDV). A MS study showed that while aflatoxin prevalence in feeders and in bagged/bulk feed was low, environmental exposure of corn during summer dramatically increased aflatoxin to levels harmful for turkeys within a few days to a week. Encouragingly, ongoing projects in FL, KY, MS, NC, and TN will add to the body of knowledge on diseases like LPDV for the next several years.

Major Findings

Environmental Toxins

- Although this project was primarily aimed at white-tailed deer, several of its findings were relevant to wild turkeys, as wild turkeys used 34% of monitored feeder sites. (MS - 4)
- Over 107 feeders and 64 bagged/bulk were sampled for aflatoxins. Aflatoxin prevalence in feeders and bagged/bulk feed was generally low and beneath levels previously reported in the literature. (MS - 4)
- Conversely, environmental exposure of corn during summer dramatically increased aflatoxin levels and prevalence. Within 3-5 days of environmental exposure, corn placed on the ground contained aflatoxin levels which would be harmful to wild turkey poults. At just over one week of environmental exposure, all experimental corn piles contained aflatoxins at levels which would cause severe morbidity and possibly outright mortality in wild turkeys. (MS - 4)

Bacterial and Viral Pathogens

- Overall, the toms we examined during this assessment appeared to be in good health. (KY - 2)
- Based on the testing completed, no major concerns were revealed. (KY - 2)

- Obviously, there were significant age and sex biases in this survey and results should therefore be interpreted with caution. (KY - 2)
- Future work focusing on poults could be very beneficial, as there may be significant age-related differences in susceptibility to various pathogens or other disease-causing agents (e.g., toxins). (KY -2)
- The environmental load of coccidia, a subclass of gastrointestinal parasites which can have detrimental effects on game birds, was increased near feeders. Certain species of coccidia, especially those within the *Eimeria* genus, have been shown to induce population cycling or reductions in abundance of certain game birds. In this study, coccidia exhibited a four-fold increase at feeder sites vs. nearby unfed controls. Amongst feeder sites, the environmental load of coccidia at spin-cast feeder sites was three times greater than feeder types which do not place feed directly on the ground. (MS - 4)
- Lymphoproliferative Disease Virus (LPDV) was found in nearly 82% of submitted specimens over the past decade. LPDV was in association with other viral co-infections in 52% of cases. (MS - 5)
- Female wild turkeys constituted 82% of all LPDV positive diagnoses. Adult turkeys constituted 86% of all positive diagnoses. (MS - 5)
- Three distinct clusters of disease reports existed: northeast MS along the Alabama border, northwest MS adjacent to the Mississippi River, and throughout south and southwestern Mississippi. (MS - 5)
- Reports of diseased turkeys were highest in April and from October to December. (MS - 5)
- Overall LPDV prevalence of 46.1%. (NC - 3)
- Higher LPDV prevalence in adult birds and in the mountain region. (NC - 3)
- No correlation between LPDV prevalence and hunter harvest rates or reproductive output estimates from summer brood surveys. (NC - 3)
- Laboratory analysis of 218 hunter-harvested turkeys showed the presence of antibodies to several pathogens (indicating previous exposure) including avian influenza, New Castle Disease virus and *Mycoplasma* species (respiratory infections). None of these birds had microscopic evidence of an active or previous infection of avian influenza, New Castle Disease virus and *Mycoplasma* species. There was no indication of major differences in disease antibodies between birds from experimental counties and those from control counties. (TN - 2)
- Three of the 218 (or 1.4%) hunter-killed turkeys (all from experimental counties) examined showed DNA evidence of blackhead. (TN - 2)
- Two of 24 (or 8.3%) turkeys raised on chicken litter tested positive for blackhead. None of the 12 turkeys raised on clean wood shavings (control group) tested positive for blackhead. (TN - 2)
- Collectively, results suggest that blackhead may be associated with poultry litter and may be a cause for concern for wild turkeys in this region. However, further research is needed before this connection can be confirmed and before any possible population-level impacts to wild turkeys can be assessed. (TN - 2)
- N = 42, 11, 36, and 31 wild turkeys in Childress, Collingsworth, Cottle, and Hardeman counties, respectively. (TX - 3)
 - All individuals appeared healthy when captured. (TX - 3)
 - Of the 120 wild turkeys sampled, none were positive for Salmonella or Pullorum. (TX - 3)
 - Two (2) wild turkeys received false positives for *Mycoplasma gallisepticum* & *synoviae* but were found to be negative following additional testing (ELLISA and Plate Agglutination). (TX - 3)

- Three (3) wild turkeys were serum positive for avian influenza including 1 wild turkey captured in Childress county and 2 wild turkeys captured in Cottle counties. The Childress County AI positive lacked enough serum to determine the strain of AI. One of the two Cottle County serum positive AI birds was delineated as being exposed to the H7N1 strain. The second serum-positive AI wild turkey from Cottle county was delineated to H7 but lacked enough serum to identify the N strain. All AI serum positive wild turkeys were assumed to be low path as the birds were alive and appeared healthy upon capture and release. (TX - 3)
- Two (2) of the Cottle county wild turkeys also tested positive for reticuloendotheliosis virus (REV) and interestingly one was a wild turkey that also tested positive for AI. (TX - 3)
- TPWD staff provided 99 fecal samples for parasite testing of which 33 bore parasites. (TX - 3)
 - Parasites were observed in 32%, 100%, 7%, and 42% of wild turkeys sampled in Childress, Collingsworth, Cottle, and Hardeman County, respectively. (TX - 3)
 - Parasites included Eimeria ranging in quantity from rare to many and tapeworm eggs. (TX - 3)

Knowledge Gaps

The following are future research priorities (FRP) as identified at the 2018 Southeast Wild Turkey Working Group Meeting. Some of the FRPs were based on input from Dr. Mike Chamberlain, Dr. Mike Byrne, and Dr. Bret Collier as a result of the Southeastern Cooperative Wild Turkey Research Project, which involved a retrospective analysis of productivity data from the Southeastern U.S. All of these FRPs are in response to trying to better understand the dynamics and drivers of “post-restoration era” wild turkey populations in light of relatively recent widespread declining productivity and falling population numbers. Topics are grouped into priority tiers based on voting by member states, wherein each representative was asked to rank their top four priority topics. Many studies are underway or planned across the region to begin or continue to address these topics.

Highest Priority

- Methods of estimating wild turkey population size across large spatial scale
- Male wild turkey survival and harvest mortality across various regulatory frameworks, turkey densities, including relation to hunter satisfaction
- Estimates of female wild turkey survival and productivity in relation to hunting pressure (or lack thereof)
- Impact of various diseases (e.g., LPDV, WNV, Blackhead/Histomoniasis related to poultry operations) on wild turkey population dynamics (e.g., female productivity, poult survival/recruitment, adult survival/health)

Medium Priority

- Identifying how changes in predator numbers/communities and landscapes affect wild turkey survival and productivity
- Estimates of female wild turkey survival and productivity at varying levels of turkey abundance/density

Lower Priority

- Impact of habitat availability/changing landscapes on wild turkey brood survival, movements, and space use
- Regional scale comparison of human dimensions (e.g., hunter satisfaction, season timing/length opinions, perspectives on population trends, attitudes towards management practices such as Rx fire, etc.
- Defining what landscape attributes, vegetation conditions, or other characteristics constitute “quality” nesting habitat in terms of selection/use and survival/success

APPENDIX I: STATE LISTING OF PROJECTS

Alabama

1.

- **Title of Study:**
 - Resource Selection and Bait Response by Female Eastern Wild Turkey in Alabama
- **Objectives:**
 - Describe use of land cover and landform types during reproductive period, hunting season, and non-reproductive period
 - Identify land cover and landform types that may be limiting to distribution of turkeys in Alabama
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**
 - U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
 - Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**
 - Lee Aaker Margadant, Auburn University (MS)
 - Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
 - Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis: Margadant, L.A. 2019. Resource Selection and Bait Response by Female Eastern Wild Turkey in Alabama
 - Final Report

2.

- **Title of Study:**
 - Factors Influencing Post-Capture Survival and Survival of Eastern Wild Turkeys in Alabama
- **Objectives:**
 - Determine factors that influence post-capture survival.
 - Estimate annual and seasonal survival rates of each turkey age and sex class.
 - Determine the relationship of turkey survival to temperature, precipitation, forest composition, road density, and study area.
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**

- U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
- Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**
 - Stephen Zenas, Auburn University (MS)
 - Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
 - Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis: Zenas, S. J. 2018. Factors Influencing Post-Capture Survival and Survival of Eastern Wild Turkeys in Alabama
 - Final Report

3.

- **Title of Study:**
 - Comparing Harvest Management Alternatives for Eastern Wild Turkeys in Alabama
- **Objectives:**
 - Develop a decision model for Alabama turkey populations that emulates current conditions and can be used to predict population dynamics and harvest.
 - Predict the effect of multiple harvest management alternatives on turkey populations and harvest under a wide variety of population conditions.
 - Evaluate the outcomes of the various harvest management alternatives based on values elicited from stakeholders.
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**
 - U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
 - Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**
 - Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
 - Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
 - Carolyn E. Moore, Auburn University, Alabama Cooperative Fish and Wildlife Research Unit (Research Assistant)
 - Briana D. Stewart, Auburn University, Alabama Cooperative Fish and Wildlife Research Unit (MS)
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Final Report

- Grand, J.B., A.L. Silvano, S.W. Barnett, C.E. Moore, and B.D. Stewart. 2021. Comparing Harvest Management Alternatives for Eastern Wild Turkeys in Alabama.

4.

- **Title of Study:**
 - Estimating Use, Density, and Productivity of Eastern Wild Turkey in Alabama
- **Objectives:**
 - Increase precision and accuracy of population estimates by identifying and estimating influences of weather, timing, and study area on the probability of detecting turkeys during a survey.
 - Estimate wild turkey probability of use and density within the study areas.
 - Identify potential sources of bias in estimates of turkey use and density due to landcover characteristics.
 - Identify sources of variation in detection during camera surveys.
 - Estimate use and density of males, females, poults, and total turkeys counted across the study areas during the brood rearing season.
 - Identify land cover characteristics that explain variation in use and density of turkeys.
 - Estimate productivity of turkeys on the study areas as poults produced per hen.
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**
 - U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
 - Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**
 - Matthew Gonnerman, Auburn University (MS)
 - Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
 - Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis: Gonnerman, M. B. 2017. Estimating Use, Density, and Productivity of Eastern Wild Turkey in Alabama
 - Final Report

5.

- **Title of Study:**
 - Comparing Camera Survey Methods for Monitoring Eastern Wild Turkey Populations
- **Objectives:**
 - Compare estimates of detection and occupancy dynamics for turkey populations between camera surveys conducted on wildlife openings versus randomly selected sites

- Investigate effects of bait on estimates of detection and occupancy dynamics for turkey populations
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**
 - U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
 - Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**
 - Skylar R Keller, Auburn University (MS)
 - Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
 - Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis: Keller, S.K. 2019. Comparing Camera Survey Methods for Monitoring Eastern Wild Turkey Populations
 - Final Report

6.

- **Title of Study:**
 - Occupancy Rates of Eastern Wild Turkeys: Estimating Effects of Experimental Harvest Regulations and Automating Image Analysis
- **Objectives:**
 - Develop models using supervised classification and Machine Learning (ML) to determine the presence or absence of turkeys in images
 - Estimate how misclassification of images using ML would affect estimates of occupancy
 - Examine the effects of delaying the opening date of spring turkey season on turkey populations
 - Estimate population occupancy, detection probability, and spring production on seven Alabama WMAs
 - Estimate the effects of hunting effort on occupancy
 - Estimate the effects of a 9-day delay in the opening date and a reduction in season length on occupancy
- **Principal Investigator:**
 - Dr. James B. Grand
- **Affiliated Entities:**
 - U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit
 - Auburn University
- **Cooperating Partners:**
 - Alabama Department of Conservation and Natural Resources
 - Division of Wildlife and Freshwater Fisheries (DWFF)
- **Cooperating Personnel:**

- Briana Stewart, Auburn University (MS)
- Amy L. Silvano, ADCNR, DWFF Assistant Chief of Wildlife
- Steve Barnett, ADCNR, DWFF Wild Turkey Project Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis: Stewart, B. D. 2019. Occupancy Rates of Eastern Wild Turkeys: Estimating Effects of Experimental Harvest
 - Final Report

Arkansas

1.

- **Title of Study:**
 - Effects of Large Scale Growing Season Prescribed Burns on Movements, Habitat Use, Productivity, and Survival of Female Wild Turkeys on the White Rock Ecosystem Restoration Project of the Ozark-St. Francis National Forest
- **Objectives:**
 - Document pre-nesting movements of hens and relate those movements to nest and hen breeding success.
 - Estimate period and annual hen survival, and productivity.
 - Compare current habitat use, movements and vital rate estimates against comparable values for radio-marked wild turkey hens monitored at the same site prior to application of large scale growing season prescribed fire on the study area.
 - Develop management recommendations to enhance nesting habitat availability, hen survival and recruitment in the Central Hardwood Region.
 - Examine habitat selection of female wild turkeys at multiple spatial scales and seasons with respect to burn regimes.
- **Principal Investigator:**
 - Dr. David Krementz
- **Affiliated Entities:**
 - Arkansas Cooperative Fish and Wildlife Research Unit
 - University of Arkansas
- **Cooperating Partners:**
 - Arkansas Game and Fish Commission
 - United States Forest Service
- **Cooperating Personnel:**
 - Jason Honey, AGFC Turkey Program Coordinator
 - H. Tyler Pittman, University of Arkansas (Phd)
- **Estimated Timeline for completion:**
 - Completed - 2014
- **Publications Generated:**

- Pittman, H.T. and Krementz, D. G. 2016. Impacts of short-rotation early-growing season prescribed fire on a ground nesting bird in the central hardwoods region of North America. PLoS One. 11:1-14.
- Pittman, H.T. 2014. Effects of large scale growing season prescribed burns on movement, habitat use, productivity, and survival of female wild turkey on the White Rock Ecosystem Restoration Project of the Ozark-St. Francis National Forest. Dissertation, University of Arkansas, Fayetteville, USA.

2.

- **Title of Study:**
 - No-Jake Harvest: Implications for Survival, Harvest, Habitat Use, and Population Estimates in the Arkansas Mountains
- **Objectives:**
 - Determine annual survival probabilities of male turkey by age-class
 - Estimate seasonal survival probabilities of male turkey by age-class during hunting and non-hunting seasons
 - Evaluate the utility of trail camera surveys and spatial capture-recapture models to derive density estimates from a partially marked population of wild turkey
 - Investigate the influence of seasonal landscape-level patterns on male turkey habitat selection
 - Investigate factors influencing habitat selection within home ranges of male turkeys during reproduction and hunting pressure.
 - Evaluate spatial variation in turkey density as a response to prescribed fire and wildlife openings
- **Principal Investigator:**
 - Dr. Douglas Osbourne
- **Affiliated Entities:**
 - University of Arkansas at Monticello
- **Cooperating Partners:**
 - Arkansas Game and Fish Commission
 - United States Forest Service
- **Cooperating Personnel:**
 - Jason Honey, AGFC Turkey Program Coordinator (Project Inception)
 - Jeremy Wood, AGFC Turkey Program Coordinator (Project Conclusion)
 - Pedro Ardapple, University of Arkansas Monticello (MS)
 - Joshua Nix, University of Arkansas Monticello (MS)
 - Clay Walters, University of Arkansas Monticello (MS)
- **Estimated Timeline for completion:**
 - Completed - 2020
- **Publications Generated:**
 - Ardapple-Kindberg, P. 2018. Survival, harvest and recruitment of an eastern wild turkey population with restricted jake harvest. Thesis, University of Arkansas Monticello, Monticello, USA.

- Nix, J.H. 2019. Impacts of hunting disturbances on habitat selection of male eastern wild turkeys in mountain regions of Arkansas. Thesis, University of Arkansas Monticello, Monticello, USA.
- Walters, C.M. 2020. Population dynamics of wild turkeys and wild pigs in the mountain regions of Arkansas. Thesis, University of Arkansas Monticello, Monticello, USA.

Florida

1.

- **Title of Study:**
 - Coyote Diet in Florida
- **Objectives:**
 - Determine what percentage of coyotes' diet made up of wild turkey with particular focus during the nesting season
- **Principal Investigator:**
 - Daniel Caudill
 - Gretchen Caudill
- **Affiliated Entities:**
 - Florida Fish and Wildlife Conservation Commission (FWC)
- **Cooperating Partners:**
 - APHIS
 - Private Landowners
- **Cooperating Personnel:**
 - Roger Shields, former FWC Wild Turkey Program Coordinator
 - Bobbi Carpenter, FWRI Game Bird Researcher
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Final Report

2.

- **Title of Study:**
 - Disease in Female Turkeys in Peninsular Florida
- **Objectives:**
 - Determine prevalence of lymphoproliferative disease virus (LPDV) and reticuloendotheliosis virus (REV) in female turkeys.
- **Principal Investigator:**
 - Bobbi Carpenter
- **Affiliated Entities:**
 - Florida Fish and Wildlife Conservation Commission (FWC)
- **Cooperating Partners:**
 - SCWDS
- **Cooperating Personnel:**
 - Buddy Welch, FWC Wild Turkey Program Coordinator
 - Hannah Plumpton, FWC Wild Turkey Assistant Program Coordinator

- Andrea Sylvia, FWC--FWRI Biostatistician
- **Estimated Timeline for completion:**
 - Planned - 2028

3.

- **Title of Study:**
 - Density Dependent Harvest Rates
- **Objectives:**
 - Assess spring harvest rates under two regulatory frameworks
 - Assess harvest as a function of regulation and density
- **Principal Investigator:**
 - H. Tyler Pittman
 - Bobbi Carpenter
- **Affiliated Entities:**
 - Florida Fish and Wildlife Conservation Commission (FWC)
- **Cooperating Partners:**
 - St. Johns Water Management District
 - Weyerhaeuser
 - Straughn Farms
- **Cooperating Personnel:**
 - Roger Shields, former FWC Wild Turkey Program Coordinator (Project Inception)
 - Buddy Welch, FWC Wild Turkey Program Coordinator (Project Conclusion)
 - Florent Bled, FWC--FWRI Statistician
- **Estimated Timeline for completion:**
 - Ongoing – 2021

4.

- **Title of Study:**
 - Gobbling and Nesting Chronology
- **Objectives:**
 - Determine if there is a relationship between the proportion of hens incubating nests and gobbling activity
 - Determine how well Florida's turkey hunting season is correlated with gobbling and nesting
- **Principal Investigator:**
 - Daniel Caudill
 - H. Tyler Pittman
- **Affiliated Entities:**
 - University of Tennessee
- **Cooperating Partners:**
 - Tall Timbers Research Station
 - St. Johns Water Management District
 - Weyerhaeuser
 - Straughn Farms
- **Cooperating Personnel:**

- Roger Shields, former FWC Wild Turkey Program Coordinator
- Bobbi Carpenter, FWRI Game Bird Researcher
- Andrea Sylvia, FWRI Biostatistician
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Griffith, A., D. Buehler, R. Shields, D. Caudill, H. Pittman, B. Carpenter, A. Sylvia, A. Cox, and T. Terhune, II. (In preparation.) Using Wild Turkey Gobbling Activity to Inform Regionally Explicit Harvest Seasons in Florida.
 - Thesis
 - Final Report

5.

- **Title of Study:**
 - Gobbling and Nesting Chronology in Peninsular Florida
- **Objectives:**
 - Determine if there is a relationship between the proportion of hens incubating nests and gobbling activity
 - Determine how well Florida's turkey hunting season is correlated with gobbling and nesting
- **Principal Investigator:**
 - Bobbi Carpenter
- **Cooperating Partners:**
 - USFWS
- **Cooperating Personnel:**
 - Buddy Welch, FWC Wild Turkey Program Coordinator
 - Hannah Plumpton, FWC Wild Turkey Assistant Program Coordinator
 - Andrea Sylvia, FWRI Biostatistician
 - Brittany Bankovich, FWRI, Center for Spatial Analysis, GIS Specialist
- **Estimated Timeline for completion:**
 - Planned - 2028

6.

- **Title of Study:**
 - Estimating Turkey Densities
- **Objectives:**
 - Assess the use of camera-trap data to estimate turkey densities
- **Principal Investigator:**
 - H. Tyler Pittman
 - Bobbi Carpenter
- **Cooperating Partners:**
 - St. Johns Water Management District
- **Cooperating Personnel:**
 - Roger Shields, former FWC Wild Turkey Program Coordinator (Project Inception)
 - Buddy Welch, FWC Wild Turkey Program Coordinator (Project Conclusion)

- Florent Bled, FWRI Statistician
- Brittany Bankovich, FWRI, Center for Spatial Analysis, GIS Specialist
- **Estimated Timeline for completion:**
 - Ongoing – 2022

7.

- **Title of Study:**
 - Assessment of Wild Turkey Reproductive Rates and Nesting Behavior
- **Objectives:**
 - Develop and evaluate methods to predict reproductive behavior in female wild turkeys with a measure of predictive accuracy
 - Determine recess frequencies and durations of female wild turkeys during incubation, and how the quality and availability of habitats surrounding nest-sites influences recess frequencies and durations and ultimately nest success
- **Principal Investigator:**
 - H. Tyler Pittman
- **Affiliated Entities:**
 - University of Florida
- **Cooperating Partners:**
 - Tall Timbers Research Station
 - St. Johns Water Management District
 - Weyerhaeuser
 - Straughn Farms
- **Cooperating Personnel:**
 - Roger Shields, former FWC Wild Turkey Program Coordinator
 - Bobbi Carpenter (MS)
 - Brittany Bankovich, FWRI, Center for Spatial Analysis, GIS Specialist
 - Andrea Sylvania, FWRI Biostatistician
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Thesis
 - Final Report
 - Manuscript in press

Georgia

1.

- **Title of Study:**
 - Ecology of Wild Turkeys in the Piedmont Region of Georgia
- **Objectives:**
 - Estimate harvest rates of male wild turkeys.
 - Spatially and temporally describe gobbling activity and relate gobbling activity to nesting chronology of females.

- Determine space use, habitat selection, and survival of male and female wild turkeys
- Assess nesting ecology of female wild turkeys, with a focus on thoroughly describing nesting chronology and behavior of females during the nesting season.
- Evaluate the genetic mating system of wild turkeys and describe patterns of parentage in clutches of females.
- Assess brooding ecology (movements, survival, area of use, habitat selection) of wild turkeys, with an emphasis on describing and predicting movements relative to habitat characteristics
- Describe vegetative and habitat characteristics associated with nest sites and areas used by brooding females
- Estimate population size and density of wild turkeys across study sites.
- **Principal Investigator:**
 - Dr. Michael Chamberlain
- **Affiliated Entities:**
 - Warnell School of Forestry and Natural Resources, University of Georgia (WSFNR)
- **Cooperating Partners:**
 - Georgia Department of Natural Resources, Wildlife Resources Division
 - United States Forest Service
- **Cooperating Personnel:**
 - James A. Martin, Ph.D., WSFNR (current cooperating investigator)
 - Bradley Cohen, Ph.D., WSFNR (former cooperating investigator)
 - Emily Rushton, GA DNR-WRD (current wild turkey coordinator)
 - Bobby Bond, GA DNR-WRD
 - Kevin Lowrey, GA DNR-WRD
 - Patrick Wightman, UGA WSFNR (Ph.D.)
 - Calvin Wakefield, UGA WSFNR (MS)
 - Ashley Lohr, UGA WSFNR (MS)
 - Kelsey McLearn, UGA WSFNR (MS)
 - Nicholas Bakker, UGA WSFNR (Ph.D.)
 - Sara Watkins, UGA WSFNR (MS)
 - Paige Goodman, UGA WSFNR (MS)
- **Estimated Timeline for completion:**
 - Ongoing - 2027
- **Publications Generated:**
 - Lohr AK, Martin JA, Wann GT, Cohen BS, Collier BA, Chamberlain MJ. 2020. Behavioral strategies during incubation influence nest and female survival of Wild Turkeys. *Ecol. Evol.* 10:11752–11765.
 - Lohr, A.K. 2019. Effects of individual recess behaviors on nest and female survival of eastern wild turkeys. M.S. Thesis, University of Georgia, Athens, GA, USA.
 - Wakefield, C.T., P.H. Wightman, J.A Martin, B.T. Bond, D.K. Lowrey, B.S. Cohen, B.A. Collier, and M.J. Chamberlain 2019. Hunting and Nesting Phenology Influence Gobbling of Wild Turkeys. *The Journal of Wildlife Management* 84:448-457

- Wakefield, Calvin T. 2019. Gobbling activity, roosting behavior, and reproductive ecology of eastern wild turkeys (*meleagris gallopavo silvestris*) in the Piedmont of Georgia. M.S. Thesis, University of Georgia, Athens, GA, USA.
- Wakefield, C.T., J.A. Martin, P.H. Wightman, B.T. Bond, D.K. Lowrey, B.S. Cohen, B.A. Collier, and M.J. Chamberlain 2020. Hunting Activity Effects on Roost Selection by Male Wild Turkeys. *The Journal of Wildlife Management* 84: 458-467.
- Final Report(s)

2.

- **Title of Study:**
 - Movement ecology of female wild turkeys during nesting and brooding seasons on Silver Lake Wildlife Management Area
- **Objectives:**
 - Assess nesting ecology of female wild turkeys, with a focus on thoroughly describing nesting chronology, behavior of females while incubating, and vegetative characteristics of nests
 - Assess brooding ecology (movements, survival, area of use, habitat selection) of wild turkeys, with an emphasis on describing and predicting movements relative to habitat characteristics
 - Describe vegetative and habitat characteristics associated with nest sites and areas used by brooding females; relate movements of female turkeys during prenesting, nesting, and brood-rearing to forest management strategies such as prescribed burning.
- **Principal Investigator:**
 - Dr. Michael Chamberlain
 - Dr. Robert Warren
- **Affiliated Entities:**
 - Warnell School of Forestry and Natural Resources, University of Georgia (WSFNR)
 - Joseph W. Jones Ecological Research Center (JWJERC)
- **Cooperating Partners:**
 - Georgia Department of Natural Resources, Wildlife Resources Division
- **Cooperating Personnel:**
 - L. Mike Conner, Ph.D., JWJERC (Cooperating Investigator)
 - Kevin Lowrey, Former GA DNR-WRD Wild Turkey program Coordinator
 - Derek Colbert, UGA WSFNR (MS)
 - Christina Perez, UGA WSFNR (MS)
 - James Ruttinger, UGA WSFNR (MS)
 - Mary Streich (Williams), UGA WSFNR (MS)
 - Andrew Little, UGA WSFNR (Ph.D.)
 - Nathan Yeldell, UGA WSFNR (MS)
 - Jeremy Wood, UGA WSFNR (MS)
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**

- Colbert, D.S., J.A. Ruttiger, M. Streich, M. Chamberlain, L.M. Conner and R.J. Warren 2015. Application of autonomous recording units to monitor gobbling activity by wild turkey. *Wildlife Society Bulletin* 39:757-763.
- Colbert, Derek S. 2013. Breeding season gobbling chronology in hunted and non-hunted populations of eastern wild turkey (*Meleagris gallopavo silvestris*) in southwestern Georgia. M.S. Thesis, University of Georgia, Athens, GA, USA.
- Cohen, B.S., T.J. Prebyl, B.A. Collier, and M.J. Chamberlain 2018. Home range estimator method and gps sampling schedule affect habitat selection inferences for wild turkeys. *Wildlife Society Bulletin* 42:15-159.
- Little, A.R., M.M. Streich, M.J. Chamberlain, L.M. Conner, and R.J. Warren 2014. Eastern wild turkey reproductive ecology in frequently-burned longleaf pine savannas. *Forest Ecology and Management* 331:180-187.
- Little, A.R., M.J. Chamberlain, L.M. Conner, and R.J. Warren 2016. Habitat selection of wild turkeys in burned longleaf pine savannas. *The Journal of Wildlife Management* 80: 1280-1289.
- Little, A.R., J.F. Benson, M.J. Chamberlain, L.M. Conner, and R.J. Warren 2016. Survival and cause-specific mortality of female eastern wild turkeys in two frequently-burned longleaf pine savannas. *Wildlife Biology* 22:238-245.
- Little, A.R., N.P. Nibbelink, M.J. Chamberlain, L.M. Conner, and R.J. Warren 2016. Eastern wild turkey nest site selection in two frequently burned pine savannas. *Ecological Processes* 5:4.
- Perez, Christina M. 2013. Seasonal area of use and habitat selection by female wild turkeys in response to prescribed fire in a managed longleaf pine savanna in southwestern Georgia. M.S. Thesis, University of Georgia, Athens, GA, USA.
- Ruttiger, J.A., D.S. Colbert, R.J. Warren, L.M. Conner, and M.J. Chamberlain 2014. Using thermal imaging cameras with radiotelemetry to locate roost sites of male wild turkeys. *Wildlife Society Bulletin* 38:884-886.
- Ruttiger, J.A.. 2013. Habitat and roost site selection by male eastern wild turkeys in southwestern Georgia. M.S. Thesis, University of Georgia, Athens, GA, USA.
- Streich, M.M., A.R. Little, M.J. Chamberlain, L.M. Conner, and R.J. Warren. 2015. Habitat characteristics of eastern wild turkey nest and ground-roost sites in 2 longleaf pine forests. *Journal of the Southeastern Association of Fish and Wildlife Agencies* 2:164-170.
- Williams, Mary M. 2012. Effects of growing-season prescribed fire on eastern wild turkey (*Meleagris gallapavo silvestris*) nest success and poult survival in southwestern Georgia. M.S. Thesis, University of Georgia, Athens, GA, USA.
- Wood, J.D., B.S. Cohen, T.J. Prebyl, L.M. Conner, B.A. Collier, and M.J. Chamberlain 2018. Time-since-fire and stand seral stage affect habitat selection of eastern wild turkeys in a managed longleaf pine ecosystem. *Forest Ecology and Management* 411:203-212.
- Wood, J.D., B.S. Cohen, L.M. Conner, B.A. Collier, and M.J. Chamberlain 2019. Nest and brood site selection of eastern wild turkeys. *The Journal of Wildlife Management* 83:192-204.

Kentucky

1.

- **Title of Study:**
 - A Multi-State Banding Project to Investigate Factors Affecting Gobbler Harvest Rates and Assess Population Health.
- **Objectives:**
 - Document survival and harvest rates of adult and juvenile gobblers across Kentucky
 - Identify biological, landscape, and hunting regulation variables that influence observed harvest rates and determine which variables have the strongest influence
 - Predict how various regulatory changes could influence harvest and population numbers
 - Gather data to use in conjunction with summer turkey survey data to calculate relative turkey abundance
 - Perform pathogen screening and describe a baseline health assessment for wild turkeys in Kentucky.
- **Principal Investigator:**
 - Dr. Christine Casey
 - Dr. Bradley Cohen
- **Affiliated Entities:**
 - Tennessee Tech University
 - Kentucky Department of Fish and Wildlife Resources
- **Cooperating Partners:**
 - Southeastern Cooperative Wildlife Disease Laboratory
- **Cooperating Personnel:**
 - Dr. Mark Ruder, SCWDS
 - Dr. Nicole Nemeth, SCWDS
 - Zak Danks, KDFWR Turkey Program Coordinator
- **Estimated Timeline for completion:**
 - Ongoing - 2025

2.

- **Title of Study:**
 - Baseline Health Assessment of Adult Male Wild Turkey from Kentucky
- **Objectives:**
 - Perform health assessment of hunter-harvested wild turkeys in 2 western Kentucky counties with localized population decline.
 - Included gross and microscopic necropsy examination, identification of ectoparasites and endoparasites, selected pathogen testing, and selected toxicological screens.
- **Principal Investigator:**
 - Southeastern Cooperative Wildlife Disease Laboratory
- **Affiliated Entities:**
 - Kentucky Department of Fish and Wildlife Resources
- **Cooperating Personnel:**
 - Dr. Mark Ruder, SCWDS
 - Dr. Nicole Nemeth, SCWDS

- Zak Danks, KDFWR Turkey Program Coordinator
- Dr. Iga Stasiak, KDFWR Wildlife Veterinarian
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - SCWDS Summary Report

Louisiana

1.

- **Title of Study:**
 - Evaluating Landscape-Level Drivers of Demography of Wild Turkeys in Louisiana and Initiating Development of a Range-Wide Habitat Suitability Index (HSI) for Louisiana
- **Objectives:**
 - Assess male survival/harvest rates between western and southeastern LA
 - Determine factors driving variation in space use, habitat selection, and survival of female wild turkeys between western and southeastern LA
 - Determine factors driving variation nest success and brood survival between regions
 - Enumerate vegetative and habitat characteristics associated with nest sites and areas used by incubating and brooding females between regions
 - Assess regional variation in reproductive ecology of female wild turkeys, with a focus on thoroughly describing nesting chronology (nest attempts, nest timing, reproductive output) relative to landscape designation, fragmentation rate, and vegetative community availability and structure for HSI development.
- **Principal Investigator:**
 - Dr. Bret Collier
- **Affiliated Entities:**
 - Louisiana State University
- **Cooperating Partners:**
 - LDWF, United States Forest Service
 - Department of Defense
- **Cooperating Personnel:**
 - Cody Cedotal, LDWF Turkey Program Manger
 - Chad Arabright, LSU
 - Andy Byers, LSU
 - Matt Pardue, Biologist USFS
 - Ashley Strum, Biologist USFS
 - Numerous other LDWF staff and US Forest Service Staff
- **Estimated Timeline for completion:**
 - Ongoing - 2023
- **Publications Generated:**
 - Plan to develop multiple theses and manuscripts
 - 2 manuscripts in review (brood habitat ecology, hurricane impacts)

2.

- **Title of Study:**
 - Movement and Reproductive Ecology of Eastern Wild Turkeys in Western LA
- **Objectives:**
 - Using GPS technology to evaluate movement ecology and population dynamics of Eastern wild turkeys in west central Louisiana.
 - Evaluating how habitat selection and use, including estimates of home range size, fine-scale movement rates, nest initiation timing, hen success, nest success, and brood survival differ based on forest stand type.
- **Principal Investigator:**
 - Dr. Bret Collier
- **Affiliated Entities:**
 - Louisiana State University
- **Cooperating Partners:**
 - LDWF, United States Forest Service
 - Department of Defense
- **Cooperating Personnel:**
 - Cody Cedotal, LDWF Turkey Program Manager
 - Nick Bakner, LSU (MS)
 - Landon Scofield, LSU (MS)
 - Erin Urley, LSU (MS)
 - Numerous other LDWF staff and US Forest Service Staff
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Bakner, N. W., L. R. Schofield, C. Cedotal, M. J. Chamberlain and B. A. Collier. 2019. Incubation recess behaviors influence nest survival of wild turkeys. *Ecology and Evolution* 9: 14053–14065. [\[.pdf\]](#)
 - Bakner, N. W., B. S. Cohen, B. A. Collier and M. J. Chamberlain. 2021. Recursive movements of Eastern wild turkey broods in the southeastern United States. *Special Issue: Wildlife Society Bulletin*, In Press.
 - Byrne, M. E., B. S. Cohen, B. A. Collier and M. J. Chamberlain. 2021. Nest site fidelity and nesting success of female wild turkeys. *Special Issue: Wildlife Society Bulletin*, In Press.
 - Crawford, J. C., W. F. Porter, M. J. Chamberlain, and B. A. Collier. 2020. Wild turkey nest success in pine-dominated forests of the southeastern United States. *Journal of Wildlife Management* 85: 498–507.
 - Chamberlain, M. J., B. S. Cohen, and B. A. Collier. 2020. Ecology of Eastern wild turkey broods in the southeastern United States. *Journal of Wildlife Management* 84: 1139–1152.
 - Lohr, A. K., J. A. Martin, G. T. Wann, B. S. Cohen, B. A. Collier, and M. J. Chamberlain. 2020. Effects of individual recess behaviors on nest and female survival of Eastern wild turkeys. *Ecology and Evolution* 10: 11752–11765.

- Sullivan, D. J., P. H. Wightman, B. A. Collier, and M. J. Chamberlain. 2021. How prevalent is brood parasitism in wild turkeys (*Meleagris gallopavo*)? Special Issue: Wildlife Society Bulletin, In Press.

3.

- **Title of Study:**
 - Influence of Prescribed Fire on Reproductive Ecology of Female Eastern Wild Turkey in West-Central Louisiana
- **Objectives:**
 - Using global positioning system technology (μ GPS) to evaluate behavioral responses of female wild turkeys to large-scale prescribed fires
 - Evaluating fine-scale movements of female wild turkeys with or without broods prior to, during, and after large-scale prescribed fires
- **Principal Investigator:**
 - Dr. Michael Chamberlain
- **Affiliated Entities:**
 - University of Georgia
- **Cooperating Partners:**
 - LDWF, United States Forest Service
 - Department of Defense
- **Cooperating Personnel:**
 - Norman j Stafford III, LDWF Turkey Program Manager
 - Nathan Yeldell, UGA WSNR (MS)
 - Numerous other LDWF staff and US Forest Service Staff
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Cohen, B. S., T. J. Prebyl, B. A. Collier and M. J. Chamberlain. 2019. Spatiotemporal variability of fire characteristics affect animal response in pyric landscapes. *Fire Ecology* 15:41.
 - Cohen, B. S., T. J. Prebyl, B. A. Collier and M. J. Chamberlain. 2018. Tricks of the trade-off: GPS fix schedule and home range estimator method affects habitat selection inferences. *Wildlife Society Bulletin* 42:150–159.
 - Cohen, B. S., T. J. Prebyl, N. J. Stafford III, B. A. Collier and M. J. Chamberlain. 2015. Space use, movements, site-fidelity, and habitat selection of translocated eastern wild turkeys. *National Wild Turkey Symposium* 11:165–173.
 - Conley, M. D., N. A. Yeldell, M. J. Chamberlain, and B. A. Collier. 2016. Do movement behaviors identify reproductive habitat sampling for wild turkeys? *Ecology and Evolution* 6:7103–7112.
 - Yeldell, N. A., B. S. Cohen, T. J. Preybl, B. A. Collier, and M. J. Chamberlain. 2017. Prescribed fire influences habitat selection of female Eastern wild turkeys. *Journal of Wildlife Management* 81:1287–1297.
 - Yeldell, N. A., B. S. Cohen, A. R. Little, B. A. Collier, and M. J. Chamberlain. 2017. Nest site selection and nest survival of eastern wild turkeys in a pyric landscape. *Journal of Wildlife Management* 81:1073–1083.

- Yeldell, N. A., B. S. Cohen, T. J. Prebyl, B. A. Collier, and M. J. Chamberlain. 2017. Use of pine-dominated forests by female eastern wild turkeys immediately after prescribed fire. *Forest Ecology and Management* 398:226–334.

4.

- **Title of Study:**
 - Space-Use, Daily Movements, and Roosting Behavior of Male Wild Turkey During Spring in Louisiana and Texas
- **Objectives:**
 - Determine movement patterns and roosting behavior of male wild turkeys in LA and TX
- **Principal Investigator:**
 - Dr. Michael Chamberlin
- **Affiliated Entities:**
 - University of Georgia
- **Cooperating Partners:**
 - LDWF, NWTf
- **Cooperating Personnel:**
 - Norman J Stafford III, LDWF Turkey Program Manager
 - Dr. Bret Collier, LSU
 - John Gross, UGA WSNR (MS)
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Byrne, M. E., B. A. Collier, and M. J. Chamberlain. 2015. Roosting behavior of Male Eastern and Rio Grande wild turkeys. *National Wild Turkey Symposium* 11:175–185.
 - Byrne, M. E., B. A. Collier, and M. J. Chamberlain. 2015. Potential density dependence in wild turkey productivity in the southeastern United States. *National Wild Turkey Symposium* 11:329–351.
 - Collier, B.A., and M. J. Chamberlain. 2011. Redirecting research for wild turkeys using global positioning system transmitters. *National Wild Turkey Symposium* 10:81-92.
 - Gross, J. T., A. R. Little, B. A. Collier, and M. J. Chamberlain. 2015. Space use, daily movements, and roosting behavior of male wild turkeys during spring in Louisiana and Texas. *Journal of the Southeastern Association of Fish and Wildlife Agencies* 2:229–234.
 - Guthrie, J. D., M. Byrne, J. B. Hardin, C. O. Kochanny, K. L. Skow, R. T. Snelgrove, M. J. Butler, M. J. Peterson, M. J. Chamberlain, and B. A. Collier. 2011. Evaluation of a GPS backpack transmitter for wild turkey research. *Journal of Wildlife Management*, 75:539-547.

5.

- **Title of Study:**
 - Wild Turkey Movements During Flooding After Opening the Morganza Spillway
- **Objectives:**
 - Assess wild turkey movements relative to intense flooding
- **Principal Investigator:**
 - Dr. Michael Chamberlain
- **Affiliated Entities:**

- University of Georgia
- **Cooperating Partners:**
 - LDWF, USFWS, US Army COE
- **Cooperating Personnel:**
 - Norman j Stafford III, LDWF Turkey Program Manager
 - Tony Vidrine, LDWF Biologist
 - Michael Byrne, UGA
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Chamberlain, M. J., M. E. Byrne, N. J. Stafford, K. L. Skow, and B. A. Collier. 2013. Wild turkey movements during flooding after opening of the Morganza Spillway, Louisiana. Southeastern Naturalist 12:93-98.

6.

- **Title of Study:**
 - Spatial Prediction of Wild Turkey Predator Distribution in West-Central Louisiana
- **Objectives:**
 - Identify density, occurrence, distribution and habitat preferences of wild turkey nest predator species
- **Principal Investigator:**
 - Dr. Bret Collier
- **Affiliated Entities:**
 - Louisiana State University
- **Cooperating Partners:**
 - LDWF, United States Forest Service, Department of Defense
- **Cooperating Personnel:**
 - Cody Cedotal, LDWF Turkey Program Manager
 - Erin Urley, LSU
 - Numerous other LDWF staff and US Forest Service Staff
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Ulrey, E., M. C. Chamberlain, and B. A. Collier. 2021. Spatial prediction of wild turkey nest predator distribution in west-central Louisiana. Special Issue: Wildlife Society Bulletin, In Press.

7.

- **Title of Study:**
 - Gobbler Mortality in Kisatchie National Forest
- **Objectives:**
 - Determine long-term direct recovery rates of male turkeys in all Ranger Districts of Kisatchie National Forest.
- **Principal Investigator:**
 - Norman J. Stafford III

- Cody Cedotal
- **Affiliated Entities:**
 - Louisiana State University
- **Cooperating Partners:**
 - United States Forest Service
- **Cooperating Personnel:**
 - Norman J. Stafford III, LDWF Turkey Program Manager (Project Inception)
 - Cody Cedotal, LDWF Turkey Program Manager (Project Conclusion)
 - Dr. Bret Collier, LSU
 - Numerous other LDWF staff, US Forest Service Staff, LSU students
- **Estimated Timeline for completion:**
 - Ongoing - 2023

8.

- **Title of Study:**
 - Comparison of Harvest Timing to Nest Timing in Louisiana
- **Objectives:**
 - Determine the relationship between harvest timing and nest timing in Louisiana based on recent reported harvest data and GPS nest data collected from nesting ecology studies
- **Principal Investigator:**
 - Cody Cedotal
- **Cooperating Partners:**
 - Louisiana State University
- **Cooperating Personnel:**
 - Cody Cedotal, LDWF Turkey Program Manger
 - Dr. Bret Collier, LSU
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Report to LWF Commission

9.

- **Title of Study:**
 - Movements of Wild Turkey Hunters During Spring in LA
- **Objectives:**
 - Determine movement patterns/distance of wild turkey hunters on Tunica Hills WMA
- **Principal Investigator:**
 - Dr. Michael Chamberlain
- **Affiliated Entities:**
 - University of Georgia
- **Cooperating Partners:**
 - LDWF, NWTF
- **Cooperating Personnel:**
 - Norman J Stafford III, LDWF Turkey Program Manger

- John Gross, UGA WSFNR (MS)
- Jeremy Wood, UGA
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Gross, J. T., B. S. Cohen, B. A. Collier, and M. J. Chamberlain. 2015. Influences of hunting on movements of male wild turkeys during spring. National Wild Turkey Symposium 11:259–268.

Mississippi

1.

- **Title of Study:**
 - The Effects of Common Forest Management Practices on Community Structure in a Southern Pine Forest
- **Objectives:**
 - Assessed common forest management practices (canopy reduction, prescribed fire, and selective herbicide application) and their combined effects on aspects of vegetation community structure.
 - Evaluated how microscale vegetation characteristics influenced use by white-tailed deer and wild turkey via trail cameras placed throughout different forest treatments.
 - Examined whether use by white-tailed deer and wild turkey was most influenced by cover (as measured via attributes of the forest understory) or food availability.
- **Principal Investigators:**
 - Dr. Marcus Lashley
 - Dr. Garrett Street
- **Affiliated Entities:**
 - Mississippi State University (MSU)
- **Cooperating Personnel:**
 - Dr. Bronson Strickland, MSU
 - Don Chance, MSU graduate student
- **Estimated Timeline for completion:**
 - Completed - FY2019
- **Publications Generated:**
 - Chance, D.P., J.R McCollum, G.M. Street, B.K. Strickland, and M.A. Lashley. 2019. Vegetation characteristics influence fine-scale intensity of habitat use by wild turkey and white-tailed deer in a loblolly pine plantation. Basic and Applied Ecology 43: 42-51.
 - Chance, D.P. 2018. The effects of common forest management practices on community structure in a southern pine forest. M.S. Thesis. Mississippi State University.

2.

- **Title of Study:**

- Towards Adaptive Management of Mississippi Wild Turkeys: Demographic and Movement Responses to Management
- **Objectives:**
 - Developed a statewide wild turkey habitat suitability map.
 - Investigated the landscape ecology of wild turkeys. Determined the influence of landscape attributes, landcover, and spatial synchrony on wild turkey abundance at varying spatial scales.
 - Evaluated whether distinct wild turkey populations exist in Mississippi by examining genetic relatedness and population synchrony.
 - Assessed whether wild turkey resource selection varied throughout Mississippi based on retrospective examination of previous VHF telemetry studies coupled with current movement data obtained from GPS tagged turkeys at sites representing major physiographic regions.
- **Principal Investigator:**
 - Dr. Guiming Wang
- **Affiliated Entities:**
 - Mississippi State University
- **Cooperating Partners:**
 - Mississippi Department of Wildlife, Fisheries, and Parks
 - Mississippi Chapter of the National Wild Turkey Federation (funding)
- **Cooperating Personnel:**
 - Adam Butler, MDWFP
 - Dave Godwin, MDWFP (retired)
 - Annie Davis Farrell (MSU graduate student – completed thesis in 2016)
 - Ryo Ogawa (MSU graduate student – completed thesis in 2017)
 - J. Conner Almond (MSU graduate student – completed thesis in 2019)
- **Estimated Timeline for completion:**
 - Completed - FY2019
- **Publications Generated:**
 - Additional manuscripts currently *in prep*.
 - Farrell, A., G.M. Wang, J.A. Martin, J.L. Belant, A.B. Butler, S. Rush, and K.D. Godwin. 2019. Machine learning of large-scale spatial distributions of wild turkeys with high dimensions of habitat data. *Ecology and Evolution* 9: 5938-5949.
 - Wang, G.M. Hierarchical spatiotemporal dynamic models for the regional population dynamics of eastern wild turkeys. *Ecological Informatics* 45: 31-37.
 - Davis, A., G.M. Wang, J.A. Martin, J.L. Belant, A.B. Butler, S. Rush, and K.D. Godwin. 2017. Landscape-abundance relationships of male Eastern wild turkeys (*Meleagris gallopavo silvestris*) in Mississippi, USA. *Acta Ornithologica* 52: 127-139.
 - Almond, J.C. 2019. Fine-scale seasonal foraging movements and habitat selection by wild turkeys. M.S. Thesis, Mississippi State University.
 - Ogawa, R. 2017. Spatiotemporal variation in space use by Eastern wild turkeys in Mississippi. M.S. Thesis, Mississippi State University.

- Davis, A. 2016. Landscape ecology of wild turkeys in Mississippi. M.S. Thesis, Mississippi State University.
- Wang, G. and A.B. Butler. 2019. Towards adaptive management of Mississippi wild turkeys: demographic and movement responses to habitat management. Project W-48-56. Study 38. Final Report.

3.

- **Title of Study:**
 - Wild Turkey Restoration in the Mississippi Alluvial Valley
- **Objectives:**
 - Assessed the feasibility of wild turkey restocking and restoration in the Mississippi Alluvial Valley (MAV) by examining the suitability and distribution of wild turkey habitat in the region.
 - Restocked ≥ 35 wild turkeys at each of three study sites in the MAV. Each site represented a gradient in habitat quality.
 - Gathered information on wild turkey habitat selection, survival, and nest site vegetation in this unique ecoregion.
 - Assessed the value that hardwood reforestation via CRP and WRP may have had on sustaining turkey populations in the MAV.
- **Principal Investigator(s):**
 - Dr. Guiming Wang
- **Affiliated Entities:**
 - Mississippi State University (MSU)
- **Cooperating Partners:**
 - Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)
 - Mississippi Chapter of the National Wild Turkey Federation (NWTF; funding)
 - Delta Wildlife
- **Cooperating Personnel:**
 - Dave Godwin, MDWFP (retired)
 - Adam Butler, MDWFP
 - Matt McKinney, MSU graduate student
 - Kyle Marable, MSU graduate student
- **Estimated Timeline for completion:**
 - Completed - FY2014
- **Publications Generated:**
 - Marable, M.K., J.L. Belant, K.D. Godwin, and G. Wang. 2012. Effects of resource dispersion and site familiarity on movements of translocated wild turkeys on fragmented landscapes. *Behavioural Processes* 91: 119-124.
 - McKinney, M.R. 2013. Microhabitat use by translocated wild turkeys in the Mississippi Delta. M.S. Thesis. Mississippi State University.
 - Marable, M.K. 2012. Movement, space use, and cause-specific mortality of translocated wild turkeys in the Mississippi Delta. M.S. Thesis. Mississippi State University.

4.

- **Title of Study:**
 - Effects of Supplemental Feeding of White-tailed Deer on Deer Movement, Disease Prevalence, and Habitat
- **Objectives:**
 - Tested for the prevalence of aflatoxins in store-bought deer feed and deer feeders throughout Mississippi.
 - Quantified the increase in aflatoxin prevalence and levels for corn exposed to the environment during July and November.
 - Quantified how supplemental feeding may alter the prevalence of certain sources of disease in the environment, particularly ticks and gastrointestinal parasites.
- **Principal Investigators:**
 - Dr. Steve Demarais
- **Affiliated Entities:**
 - Mississippi State University (MSU)
- **Cooperating Partners:**
 - Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)
- **Cooperating Personnel:**
 - Dr. Bronson Strickland, MSU
 - William McKinley, MDWFP
 - Miranda Huang, MSU graduate student
- **Estimated Timeline for completion:**
 - Ongoing - FY2022
- **Publications Generated:**
 - Manuscripts currently *in prep*.
 - Huang, M.J. 2021. The effects of year-round supplemental feeding of white-tailed deer on sources of disease. M.S. Thesis. Mississippi State University.

5.

- **Title of Study:**
 - An Investigation of the Cause of Wild Turkey Mortality in Mississippi
- **Objectives:**
 - Necropsy recent wild turkey specimens submitted to MDWFP to diagnose cause of morbidity/mortality.
 - Retrospectively analyzed previously submitted diagnostic cases, along with citizen reports of diseased turkeys, from 2011 to 2020 to establish common patterns.
- **Principal Investigators:**
 - Dr. Natalie Armour,
 - Dr. Rachel Thiemann
- **Affiliated Entities:**
 - Mississippi State University (MSU)
 - Mississippi State University Veterinary Diagnostic Lab
- **Cooperating Partners:**
 - Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)
- **Cooperating Personnel:**

- Adam Butler, Mississippi Dept. of Wildlife, Fisheries, and Parks
- Dr. Martha Frances Dalton, MSU Veterinary Diagnostic Lab
- **Estimated Timeline for completion:**
 - Completed - FY2021
- **Publications Generated:**
 - One manuscript *in prep.*
 - Oral presentation delivered to the 2021 International Poultry Scientific Forum.

6.

- **Title of Study:**
 - Eastern Wild Turkey Population Analysis to Inform Mississippi's Harvest Framework: A Structured Decision-Making Approach
- **Objectives:**
 - Assess the effect of a delayed, shortened season (01 April – 01 May vs. 15 March – 01 May) on a subset of Wildlife Management Areas (WMAs) by utilizing observational data from hunter reporting stations.
 - Conduct a meta-analysis from published studies throughout the wild turkey's range to contrast demographic rates under varied conditions.
 - Correlate hunter satisfaction with hunter experiences based upon observational and opinion data gathered from avid hunters.
 - Utilize information from previous objectives to develop a stochastic population model within a structured decision-making framework to evaluate likely population and hunter satisfaction outcomes associated with different spring season framework scenarios.
- **Principal Investigator(s):**
 - (Co-PIs at MSU): Drs. Mark McConnell and Dana Morin
 - Adam Butler, MDWFP
- **Affiliated Entities:**
 - Mississippi State University
 - Mississippi Department of Wildlife, Fisheries, and Parks
- **Cooperating Partners:**
 - Mississippi Chapter of the National Wild Turkey Federation (NWTF; funding)
- **Cooperating Personnel:**
 - Dr. Zoe Nhleko, post-doctoral associate, Mississippi State University
- **Estimated Timeline for completion:**
 - Ongoing - FY2023
- **Publications Generated:**
 - (Oral presentation at 2021 SEAFWA): Assessment of evidence for wild turkey declines and possible causes.
 - Manuscripts in prep.

7.

- **Title of Study:**
 - Connecting Hunt Outcomes to the Demographics, Behaviors, and Experiences of Wild Turkey Hunters in Mississippi
- **Objectives:**

- Investigated the relationship turkey population abundance, along with hunter-specific behaviors, demographics, and tools, had on harvest per unit effort (HPUE) of spring turkey hunters.
- Hunter characteristics investigated included: hunter age, years of turkey hunting experience, hunting technique, localized hunting pressure, weapon, maximum shooting distance, and decoy usage.
- Also investigated the relationship hunter-specific behaviors, demographics, and tools had on the likelihood of missing a wild turkey within the hunting season.
- **Principal Investigator:**
 - Adam Butler
 - Dr. Guiming Wang
- **Affiliated Entities:**
 - Mississippi State University
 - Mississippi Department of Wildlife, Fisheries, and Parks
- **Estimated Timeline for completion:**
 - Completed.
- **Publications Generated:**
 - Butler, A.B. and G. Wang. *In press*. Connecting hunt outcomes to the demographics, behaviors, and experiences of wild turkey hunters in Mississippi. *Wildlife Society Bulletin - Special Edition: Proceedings of the National Wild Turkey Symposium 12*: xxxx-xxx.

8.

- **Title of Study:**
 - Using Avid Hunter and Brood Surveys to Predict Hunter Success and Assess Regulatory Changes in Spring Gobbler Seasons
- **Objectives:**
 - Investigated the feasibility of using easily obtained statewide monitoring data from brood surveys and avid hunters to predict future wild turkey spring harvest success and measure the impact of season framework changes.
 - Used data gathered from 1994 - 2011 to quantify the influence of reproductive indices, juvenile gobbler observations, and season framework on hunter harvest per unit effort (HPUE).
- **Principal Investigators:**
 - Adam Butler
 - Dr. Guiming Wang
- **Affiliated Entities:**
 - Mississippi State University
 - Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)
- **Cooperating Personnel:**
 - Dave Godwin, MDWFP (retired)
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**

- Butler, A.B., G. Wang, and K.D. Godwin. 2015. Using avid hunter and brood surveys to predict hunter success and assess regulatory changes in spring gobbler seasons. Proceedings of the National Wild Turkey Symposium 11: 225-235.

9.

- **Title of Study:**
 - Analysis of Long-term Wild Turkey Data Sets and Development of a Statewide Gobbling Call Count Protocol
- **Objectives:**
 - Developed and evaluated a standardized gobbling call count technique to assess temporal and regional variance in gobbling activity by monitoring gobbling in northern and southern Mississippi between 15 February and 01 June.
 - Determined whether hunter observations of juvenile gobblers could predict gobbling intensity and frequency in subsequent years.
- **Principal Investigator:**
 - Dr. Francisco Vilella
- **Affiliated Entities:**
 - Mississippi State University (MSU)
 - USGS, Mississippi Cooperative Fish and Wildlife Research Unit
- **Cooperating Partners:**
 - Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)
 - Mississippi Chapter of the National Wild Turkey Federation (NWTF; funding)
 - Greater Jackson Chapter of the NWTF (funding)
- **Cooperating Personnel:**
 - Dave Godwin, MDWFP (retired)
- **Estimated Timeline for completion:**
 - Completed - FY2011
- **Publications Generated:**
 - Palumbo, M.D., F.J. Vilella, G. Wang., B.K. Strickland, K.D. Godwin, P.G. Dixon, B.D. Rubin, and M.A. Lashley. 2019. Latitude and daily-weather effects on gobbling activity of wild turkeys in Mississippi. International Journal of Biometeorology 63: 1059-1067.
 - Palumbo, M.D., F.J. Vilella, B.K. Strickland, G. Wang, and K.D. Godwin. 2014. Brood surveys and hunter observations used to predict gobbling activity of wild turkeys in Mississippi. Journal of Fish and Wildlife Management 5: 151-156.
 - Palumbo, M.D. 2010. Influence of latitudinal and climatic variation, and field observations, on spring gobbling phenology of wild turkey in Mississippi. M.S. Thesis. Mississippi State University.

Missouri

1.

- **Title of Study:**
 - Factors Influencing Wild Turkey Nest Success and Poult Survival in Northern Missouri
- **Objectives:**

- Determine how weather (temperature and precipitation), landscape characteristics, predator densities, and their interactions affect turkey nest success.
- Determine how weather (temperature and precipitation), landscape characteristics, predator densities, and invertebrate abundance affect poult survival, and identify the main causes of poult mortality.
- Determine the most effective method of attaching radio-transmitters to turkey poults.
- Assess turkey brood-rearing habitat selection, identify important characteristics of quality brood-rearing habitat, and determine habitats where turkeys and predators are most likely to interact.
- **Principal Investigator:**
 - Dr. Michael Byrne
- **Affiliated Entities:**
 - University of Missouri
- **Cooperating Partners:**
 - Missouri Department of Conservation
 - University of Missouri
 - National Wild Turkey Federation
- **Cooperating Personnel:**
 - Reina Tyl, MDC
 - Laura Conlee, MDC
 - Dr. Michael Byrne, Univ. of MO
 - Mitch Weegman, Univ. of MO/Univ. of Saskatchewan
 - Alisha Mosloff, PhD Student, Univ. Of MO
 - Cara (CJ) Yocom-Russell, PhD Student, Univ. of MO
 - Charles Anderson, MDC
- **Estimated Timeline for completion:**
 - Ongoing - 2025

2.

- **Title of Study:**
 - Regional Turkey Population Monitoring for a Coordinated Harvest Management Strategy
- **Objectives:**
 - Develop a regional wild turkey SPR model, which in addition to estimates of natural survival and harvest rates, would provide abundance and population growth rate
 - Develop user-friendly SPR modeling software for future analysis of age-at-harvest and auxiliary data for wild turkeys and other harvested species in Missouri
 - Estimate sex and age class-specific seasonal and annual natural survival rates, and cause-specific mortality rates, for wild turkeys in Northeast Missouri
 - Estimate age class-specific harvest rates for male wild turkeys in Northeast Missouri during the spring hunting season
 - Estimate sex-specific harvest rates for wild turkeys in Northeast Missouri during the fall hunting season
- **Principal Investigator:**

- Jason Isabelle
- Dr. Joshua Millspaugh
- Dr. Michael Clawson
- **Affiliated Entities:**
 - University of Missouri
 - University of Montana
 - University of Washington
- **Cooperating Partners:**
 - Missouri Department of Conservation (MDC)
 - University of Missouri
 - University of Washington
 - University of Montana
 - National Wild Turkey Federation (NWTF)
- **Cooperating Personnel:**
 - Jason Isabelle, MDC
 - Joshua Millspaugh, Univ. of Missouri
 - Michael Clawson, Univ. of Washington
 - John Skalski, Univ. of Washington
 - John Burk, NWTF
- **Estimated Timeline for completion:**
 - Ongoing - 2022
- **Publications Generated:**
 - One manuscript on SPR models to be published in the 12th NWTS Proceedings.

3.

- **Title of Study:**
 - Regional Harvest Rate Estimation for Wild Turkeys in Missouri
- **Objectives:**
 - Estimate annual age-class specific (juvenile, adult) harvest probabilities, natural survival probabilities, and non-reward band reporting probabilities for male wild turkeys in the Ozark Border and Union Breaks TMUs.
 - Incorporate age-class specific male harvest rates and natural survival probabilities into regional male-only wild turkey SPR models.
- **Principal Investigator:**
 - Reina Tyl
- **Affiliated Entities:**
 - Missouri Department of Conservation (MDC)
- **Estimated Timeline for completion:**
 - Ongoing - 2025

4.

- **Title of Study:**
 - Determining Accuracy of Sex and Age Classification of Wild Turkeys Harvested During Fall Hunting Seasons in Missouri
- **Objectives:**

- Determine if fall harvested turkey age/sex distributions obtained through the Telecheck reporting system are different from those obtained by wildlife professionals using feather samples to determine turkey age/sex distributions.
- Determine if hunting method (firearms vs. archery), permit type (landowner vs. permittee), or region of harvest (i.e., Turkey Productivity Region) impact the accuracy with which hunters determine the age and sex of turkeys they harvest during fall hunting seasons.
- Develop models to correct the observed turkey age/sex distributions obtained through the Telecheck reporting system.
- **Principal Investigator:**
 - Reina Tyl
 - Dr. Joshua Millspaugh
 - Dr. Michael Clawson
- **Affiliated Entities:**
 - University of Missouri
 - University of Montana
 - University of Washington
- **Cooperating Partners:**
 - Missouri Department of Conservation (MDC)
 - University of Missouri
 - University of Washington
 - University of Montana
- **Cooperating Personnel:**
 - Reina Tyl, MDC
 - Dr. Joshua Millspaugh, Univ. of Missouri
 - Dr. Michael Clawson, Univ. of Washington
 - Dr. John Skalski, Univ. of Washington
- **Estimated Timeline for completion:**
 - Planned - 2025

North Carolina

1.

- **Title of Study:**
 - Wild Turkey Nesting Ecology and Nest Survival in the Presence of Frequent Growing-season Fire
- **Objectives:**
 - Resource selection in a landscape managed with frequent prescribed burns
 - Nest survival and nest-site selection in the presence of growing-season prescribed fire
- **Principal Investigators:**
 - Dr. Chris Moorman, NCSU
 - Dr. Chris Deperno, NCWRC
- **Affiliated Entities:**
 - North Carolina State University

- North Carolina Wildlife Resources Commission
- **Cooperating Personnel:**
 - Dr. Chris Moorman, NCSU
 - Dr. Chris Deperno, NCSU
 - Dr. David Cobb, NCWRC
 - Eric Kilburg, MS Candidate, NCSU
 - Craig Harper, UT
- **Estimated Timeline for completion:**
 - Completed - 2013
- **Publications Generated:**
 - Published Manuscript
 - Thesis
 - Final Report

2.

- **Title of Study:**
 - Multi-scale Assessment of Wild Turkey Ecology in North Carolina
- **Objectives:**
 - Determine nesting chronology in each of 3 regions
 - Determine nesting success for each of 3 regions
 - Determine gobbling chronology (via ARU's) in each of 3 regions
 - Determine seasonal and annual survival rates, portioning mortality by cause (e.g., hunter harvest, predation, disease, and other causes)
 - Provide blood, tissue, and other samples necessary for baseline disease and genetic information
 - Determine if NCWRC Summer Wild Turkey Observation survey provides useful trend or index information for reproductive output or gobbler harvest rates
- **Principal Investigators:**
 - Dr. Chris Moorman
 - Dr. Krishna Pacifici
 - Dr. Bret Collier
- **Affiliated Entities:**
 - North Carolina State University
 - Louisiana State University
 - North Carolina Wildlife Resources Commission
 - National Wild Turkey Federation (state and national)
- **Cooperating Personnel:**
 - Dr. Chris Moorman, NCSU
 - Dr. Krishna Pacifici, NCSU
 - Dr. Bret Collier, LSU
 - David Moscicki, Phd Candidate, NCSU
 - Chris Kreh – NCWRC Assistant Chief, Wildlife Management
- **Estimated Timeline for completion:**
 - Ongoing - 2023

- **Publications Generated:**
 - Published Manuscripts
 - Dissertation
 - Final Report

3.

- **Title of Study:**
 - Prevalence of Lymphoproliferative Disease Virus in Wild Turkeys in North Carolina
- **Objectives:**
 - Determine LPDV prevalence in each of 3 regions in North Carolina
 - Determine LPDV prevalence of by sex and age
 - Determine if LPDV prevalence is correlated with hunter harvest rates or reproductive output
- **Principal Investigators:**
 - Chris Kreh
 - Dr. Maria Palamar
- **Affiliated Entities:**
 - North Carolina Wildlife Resources Commission
- **Cooperating Personnel:**
 - Chris Kreh, NCWRC Assistant Chief, Wildlife Management
 - Dr. Maria Palamar, NCWRC Veterinarian
- **Estimated Timeline for completion:**
 - Completed in 2017
- **Publications Generated:**
 - Published Manuscript (included in 12th NWTS via WSB)
 - Final Report

4.

- **Title of Study:**
 - Wild Turkey Gobbling Chronology in North Carolina
- **Objectives:**
 - Determine best methods for using ARUs to research gobbling chronology
 - Use ARUs to collect gobbling chronology data to evaluate current time of spring hunting seasons
- **Principal Investigators:**
 - Chris Kreh
 - Dr. Krishna Pacifici
 - Brent Pease
- **Affiliated Entities:**
 - North Carolina Wildlife Resources Commission
 - North Carolina State University
 - National Wild Turkey Federation (state chapter)
- **Cooperating Personnel:**
 - Chris Kreh, NCWRC Assistant Chief, Wildlife Management
 - Dr. Krishna Pacifici, NCSU

- Brent Pease, NCSU
- **Estimated Timeline for completion:**
 - Completed - 2021
- **Publications Generated:**
 - Final Agency Report
 - Currently submitting manuscript to WSB

Oklahoma

- **Title of Study:**
 - Wild Turkey Population Dynamic and Brood Survival in Oklahoma
- **Objectives:**
 - Determine seasonal movement and habitat selection of female wild turkey as it relates to nest selection and breeding behavior in two regions of Oklahoma, SE and SW.
 - Determine how fragmentation and landscape features influence gene flow and genetic diversity among populations of turkeys in Oklahoma
 - Determine spatio-temporal patterns of hybridization and introgression between genetic stocks found by the Rio Grande and Eastern wild turkey subspecies
 - Provide best management practices for wild turkey management in the state of Oklahoma.
- **Principal Investigator:**
 - Dr. Dwayne Elmore
- **Affiliated Entities:**
 - University of Oklahoma State, Stillwater
- **Cooperating Partners:**
 - Oklahoma Department of Wildlife Conservation
- **Cooperating Personnel:**
 - Eric Suttles, ODWC Turkey Program Coordinator (Project Inception and Conclusion, SE)
 - Rod Smith, ODWC Turkey Program Coordinator (Project Inception and Conclusion, SW)
 - Kurt Kuklinski, ODWC Research Supervisor (Project funding and scheduled review)
 - Dr. Colter Chitwood, University of Oklahoma State, Stillwater (Project design and operation)
 - Dr. Randy De Young, University of Texas A&M (Genetic analysis)
 - Grad Students yet to be named (PhD) and (MS)
- **Estimated Timeline for completion:**
 - Planned – Start 2022

South Carolina

1.

- **Title of Study:**
 - Reproductive Ecology of Wild Turkeys in an Unhunted Population
- **Objectives:**

- Determining survival of male wild turkeys.
- Spatially and temporally describing gobbling activity and relating gobbling activity to nesting chronology of females and movement ecology of males.
- Determining survival of female wild turkeys.
- Assessing nesting and brooding ecology of female wild turkeys, with a focus on thoroughly describing nesting chronology and behavior of females during laying, incubating, and brooding.
- Evaluating the genetic mating system of wild turkeys and describing patterns of parentage in clutches of females.
- Determining space use, habitat selection, and survival of male and female wild turkeys.
- Describing vegetative and habitat characteristics associated with nest sites and areas used by brooding females.
- **Principal Investigators:**
 - Dr. Michael Chamberlain
 - Dr. Bret Collier
 - Dr. Michael Byrne
- **Affiliated Entities:**
 - University of Georgia
 - Louisiana State University
 - University of Missouri
- **Cooperating Partners:**
 - SCDNR
 - USDA Forest Service-Southern Research Station
- **Cooperating Personnel:**
 - Charles Ruth, SCDNR Big Game Program Coordinator
 - Jay Cantrell, SCDNR Assistant Big Game Program Coordinator
 - Dr. John Kilgo, Research Wildlife Biologist, USDA FS-SRS
 - Erin Ullrey, PhD Student, UGA
 - Holly Jamieson, MS Student, University of Missouri
- **Estimated Timeline for completion:**
 - Ongoing - 2024

2.

- **Title of Study:**
 - Preliminary Evaluation of Reproductive Phenology and Ecology of Eastern Wild Turkeys in South Carolina
- **Objectives:**
 - Evaluate gobbling chronology of male wild turkeys, hunting and non-hunting mortality of both male and female wild turkeys and evaluate wild turkey response to hunting activities.
 - Evaluate reproductive phenology, ecology and success of female wild turkeys
 - Evaluate movement ecology of both male and female wild turkeys and their broods.

- Evaluate wild turkey response to several different anthropogenic (land/wildlife management) activities and significant weather events.
- **Principal Investigator:**
 - Dr. Bret Collier
- **Affiliated Entities:**
 - Louisiana State University
- **Cooperating Partners:**
 - SC Department of Natural Resources
 - NWTf SC State Chapter
- **Cooperating Personnel:**
 - Charles Ruth, SCDNR Big Game Program Coordinator
 - Jay Cantrell, SCDNR Assistant Big Game Program Coordinator
 - Patrick Wightman, LSU (MS)
 - Alaina Gerrits, LSU (MS)
- **Estimated Timeline for completion:**
 - Completed - 2018
- **Publications Generated:**
 - Bakner, N. W., L. R. Schofield, C. Cedotal, M. J. Chamberlain and B. A. Collier. 2019. Incubation recess behaviors influence nest survival of wild turkeys. Ecology and Evolution doi: <https://doi.org/10.1002/ece3.5843>. [\[.pdf\]](#)
 - Bakner, N. W., B. S. Cohen, B. A. Collier and M. J. Chamberlain. 2021. Recursive movements of Eastern wild turkey broods in the southeastern United States. Special Issue: Wildlife Society Bulletin, In Press.
 - Byrne, M. E., B. S. Cohen, B. A. Collier and M. J. Chamberlain. 2021. Nest site fidelity and nesting success of female wild turkeys. Special Issue: Wildlife Society Bulletin, In Press.
 - Chamberlain, M. J., P. H. Wightman, B. S. Cohen, and B. A. Collier. 2019. Gobbling activity of eastern wild turkeys relative to male movements and female nesting phenology in South Carolina. Wildlife Society Bulletin 42: 632-642.[\[.pdf\]](#).
 - Chamberlain, M. J., B. S. Cohen, and B. A. Collier. 2020. Behavior and movement of wild turkey broods. Journal of Wildlife Management, DOI: 10.1002/jwmg.21883.[\[.pdf\]](#)
 - Cohen, B. S., T. J. Prebyl, B. A. Collier and M. J. Chamberlain. 2019. Spatiotemporal variability of fire characteristics affect animal response in pyric landscapes. Fire Ecology 15:41.[\[.pdf\]](#)
 - Cohen, B.S., T.J. Prebyl, B.A. Collier, and M.J. Chamberlain. 2018. Home range estimator method and GPS sampling schedule affects habitat selection inferences for wild turkeys. Wildlife Society Bulletin 42: 150-159.[\[.pdf\]](#).
 - Collier, B. A., P. Wightman, M. J. Chamberlain, J. Cantrell, and C. R. Ruth. 2017. Hunting activity and male wild turkey movements in South Carolina. Journal of the Southeastern Association of Fish and Wildlife Agencies 4:85-93.[\[.pdf\]](#).
 - Crawford, J. C., W. F. Porter, M. J. Chamberlain, and B. A. Collier. 2020. Wild turkey nest success in pine-dominated forests of the southeastern United States. Journal of Wildlife Management 85: 498-507.

- Gerrits, A. P., P. H. Wightman, J. R. Cantrell, C. Ruth, M. J. Chamberlain, and B. A. Collier. 2020. Movement ecology of wild turkey hunters on public lands in South Carolina, USA. *Wildlife Society Bulletin*, DOI: 10.1002/wsb.1094. [\[.pdf\]](#)
- Gerrits, A. P., P. H. Wightman, J. R. Cantrell, C. R. Ruth, M. J. Chamberlain and B. A. Collier. 2020. Eastern wild turkey response to feral hog hunting with dogs. *Journal of the Southeastern Association of Fish and Wildlife Agencies* 7: 159-163. [\[.pdf\]](#)
- Lohr, A. K., J. A. Martin, G. T. Wann, B. S. Cohen, B. A. Collier, and M. J. Chamberlain. 2020. Effects of individual recess behaviors on nest and female survival of Eastern wild turkeys. *Ecology and Evolution*, In Press. [\[.pdf\]](#)
- Moscicki, D. J., A. P. Gerrits, J. R. Cantrell, J. B. Hardin, M. J. Chamberlain, and B. A. Collier. 2021. Hurricane impacts to wild turkey survival, daily movements, and roost fidelity. Special Issue: *Wildlife Society Bulletin*, In Press.
- Sullivan, D., K. McEntire, B. Cohen, B. A. Collier and M. J. Chamberlain. 2020. Spatial scale and shape of prescribed fires influence use by wild turkeys. *Journal of Wildlife Management*, DOI: 10.1002/jwmg.21944 [\[.pdf\]](#)
- Sullivan, D. J., P. H. Wightman, B. A. Collier, and M. J. Chamberlain. 2021. How prevalent is brood parasitism in wild turkeys (*Meleagris gallopavo*). Special Issue: *Wildlife Society Bulletin*, In Press.
- Wightman, P. H., J. R. Cantrell, C. R. Ruth, M. E. Byrne, M. J. Chamberlain, and B. A. Collier. 2018. Impact of supplemental feeding for Northern Bobwhite on movement ecology of Eastern wild turkeys in South Carolina. 5: 114-124. *Journal of the Southeastern Association of Fish and Wildlife Agencies* [\[.pdf\]](#).
- Wightman, P. H., J. Kilgo, M. Vukovich, J. R. Cantrell, C. R. Ruth, B. Cohen, M. J. Chamberlain, and B. A. Collier. 2019. Gobbling chronology of eastern wild turkeys in South Carolina. *Journal of Wildlife Management* 83: 325-333. [\[.pdf\]](#).
- Wightman, P. H., D. W. Henrichs, B. A. Collier and M. J. Chamberlain. 2021. Comparison of methods for automated identification of wild turkey gobblers. *Wildlife Society Bulletin*, In Press.
- Wightman, Patrick H. 2017. Evaluation of reproductive phenology and ecology of Eastern Wild Turkey (*Meleagris gallopavo silvestris*) in South Carolina. M.S. Thesis, Louisiana State University, Baton Rouge, LA, USA.
- Gerrits, Alaina P. 2019. Movement ecology of Eastern Wild Turkeys and turkey hunters on public lands in South Carolina. M.S. Thesis, Louisiana State University, Baton Rouge, LA, USA.
- Wild turkey resources in South Carolina with recommendations on seasons and bag limits. Report of the Department of Natural Resources on Act 41 122nd Session of the South Carolina General Assembly (2015). November 1, 2018. [\[.pdf\]](#)

3.

- **Title of Study:**
 - Molecular Diet Analysis of Coyote Scat Through Implementation of DNA Metabarcoding
- **Objectives:**

- Analyze coyote fecal samples collected from sites across South Carolina for species-specific prey found through DNA metabarcoding. Estimate the percentage of wild turkeys in coyote diets during the spring and summer (nesting and brood rearing season).
- **Principal Investigators:**
 - Dr. Gino D'Angelo
 - Dr. Stacey Lance
- **Affiliated Entities:**
 - University of Georgia
 - Savannah River Ecology Laboratory
- **Cooperating Partners:**
 - SCDNR
 - USDA Forest Service, Southern Research Station
- **Cooperating Personnel:**
 - Jordan Youngmann, PhD Student, UGA
 - Dr. John Kilgo, USDA FS SRS
 - Charles Ruth, SCDNR Big Game Program Coordinator
 - Jay Cantrell, SCDNR Assistant Big Game Program Coordinator
- **Estimated Timeline for completion:**
 - Ongoing - 2022

4.

- **Title of Study:**
 - Variation of Chronology of Wild Turkey Gobbling in the Upstate of South Carolina
- **Objectives:**
 - Quantify turkey gobbling chronology and occupancy in relation to elevation and habitat within the Upstate of South Carolina.
- **Principal Investigator:**
 - Dr. Beth Ross
- **Affiliated Entities:**
 - Clemson University
 - USGS, SC Cooperative Fish & Wildlife Research Unit
- **Cooperating Partners:**
 - SC Department of Natural Resources
- **Cooperating Personnel:**
 - Charles Ruth, SCDNR Big Game Program Coordinator
 - Jay Cantrell, SCDNR Assistant Big Game Program Coordinator
 - Janelle Ostroki, Clemson University, Masters Student
 - Hannah Plumpton, Clemson Univ., Research Technician
- **Estimated Timeline for completion:**
 - Ongoing - 2021

Tennessee

1.

- **Title of Study:**
 - Tennessee Cooperative Wild Turkey Project
- **Objectives:**
 - Document age-specific harvest of declining (experimental) and stable (control) wild turkey populations
 - Document hunter numbers, effort, and satisfaction within experimental and control counties
 - Document wild turkey reproduction rates, and adult and poult survival rates of declining (experimental) and stable (control) wild turkey populations
 - Document wild turkey habitat use associated with successful nesting and brood rearing
 - Conduct disease surveillance of declining (experimental) and stable (control) wild turkey populations to identify potential disease issues related to a declining wild turkey population
 - Determine the impact of (spring) season timing on wild turkey reproductive performance
 - Identify alternative management strategies to address observed declines in harvest related to a declining wild turkey population
- **Principal Investigator:**
 - Dr. David Buehler
- **Affiliated Entities:**
 - University of Tennessee
- **Cooperating Partners:**
 - Tennessee Wildlife Resources Agency
- **Cooperating Personnel:**
 - Dr. Craig Harper, University of Tennessee
 - Dr. Richard Gerhold, University of Tennessee
 - Dr. Roger Applegate, TWRA Wild Turkey, Small Game and Furbearer Program Coordinator (Project Inception)
 - Roger Shields, TWRA Wild Turkey Program Coordinator (Project Conclusion)
 - Vincent Johnson, University of Tennessee (MS)
 - Lindsey Phillips, University of Tennessee (PhD)
 - Joseph Quehl, University of Tennessee (MS)
- **Estimated Timeline for completion:**
 - Ongoing - 2022
- **Publications Generated:**
 - Johnson, M. J. 2019. Nesting and brooding ecology of eastern wild turkey in south-central Tennessee. M.S. Thesis, University of Tennessee, Knoxville, TN, USA. [\[.pdf\]](#)

2.

- **Title of Study:**
 - Investigation of Hunter-harvested Carcasses and Laboratory Trial to Understand the Potential Transmission of Pathogens from Poultry Litter to Wild Turkeys
- **Objectives:**

- Perform serological testing and post-mortem examination of tissue sections collected from hunter-killed wild turkeys from experimental (area of population decline) and control counties (areas with stable populations) to determine what lesions and potential disease agents are present and to determine exposure to various infectious diseases
- Determine if birds from experimental areas have increased prevalence of various infectious diseases
- Expose turkeys to poultry litter in a laboratory setting to determine if litter is associated with wild turkey morbidity and/or mortality
- **Principal Investigator:**
 - Dr. Richard Gerhold
- **Affiliated Entities:**
 - University of Tennessee, College of Veterinary Medicine
- **Cooperating Partners:**
 - Tennessee Wildlife Resources Agency
- **Cooperating Personnel:**
 - Dr. Roger Applegate, TWRA Wild Turkey, Small Game and Furbearer Program Coordinator
 - Michelle Nobrega, University of Tennessee, College of Veterinary Medicine
- **Estimated Timeline for completion:**
 - Completed - 2016
- **Publications Generated:**
 - Gerhold, R., M. Nobrega, and R. Applegate. 2016. Investigation of hunter-harvested carcasses and laboratory trial to understand the potential transmission of pathogens from poultry litter to wild turkeys (*Meleagris gallopavo*). TWRA Wildlife Technical Report 16-3. [\[.pdf\]](#)

3.

- **Title of Study:**
 - A Large-Scale Banding Project to Investigate Factors Affecting Gobbler Harvest Rates
- **Objectives:**
 - Document survival and harvest rates of adult and juvenile gobblers across Tennessee
 - Identify biological, landscape, and hunting regulation variables that influence observed harvest rates and determine which variables have the strongest influence
 - Predict how various regulatory changes could influence harvest and population numbers
 - Gather data to use in conjunction with summer turkey survey data to calculate relative turkey abundance
- **Principal Investigator:**
 - Dr. Bradley Cohen
- **Affiliated Entities:**
 - Tennessee Tech University
- **Cooperating Partners:**
 - Tennessee Wildlife Resources Agency
 - Kentucky Department of Fish and Wildlife Resources
- **Cooperating Personnel:**
 - Roger Shields, TWRA Turkey Program Coordinator
 - Zak Danks, KDFWR Grouse & Turkey Program Coordinator

- **Estimated Timeline for completion:**
 - Ongoing - 2025

Texas

1.

- **Title of Study:**
 - Identifying Habitat Features Supporting Eastern Wild Turkey Populations in Texas
- **Objectives:**
 - Characterize fine-scale female eastern wild turkey (EWT) movements and habitat use during the reproductive period, with a focus on the 2-4 week post-hatching period of greatest vulnerability.
 - Characterize and quantify habitat opening quality, particularly for the post-hatching brood period, as related to relevant features, such as size, interspersion on the landscape, plant community structure and composition, invertebrate production, and proximity to EWT nest sites.
 - Evaluate the validity of the recently developed EWT Habitat Suitability Indices for use in evaluating potential super-stocking locations as well as developing more clear EWT planning, conservation, and management recommendations for public and private landowners in East Texas.
 - Contrast fine-scale movement patterns and habitat use at a site where EWT were super-stocked in 2007 with other recently stocked sites.
- **Principal Investigator:**
 - Dr. Chris Comer
- **Affiliated Entities:**
 - Stephen F. Austin State University
- **Cooperating Partners:**
 - Texas Parks and Wildlife Department
- **Cooperating Personnel:**
 - Jason Hardin, TPWD Wild Turkey Program Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Final Report – Federal Aid Grant No. W-149-R-1
 - GPS data was provided to LSU for analyses.

2.

- **Title of Study:**
 - Influences of Prescribed Fire on Movement and Reproductive Ecology of Female Wild Turkeys on the Angelina National Forest
- **Objectives:**
 - Evaluating movements and reproductive ecology of translocated wild turkeys

- Assessing influences of prescribed fires on movements, space use, and habitat selection of female wild turkeys
- Monitoring effects of prescribed fires on nesting and brooding ecology of female wild turkeys
- Quantifying vegetative characteristics associated with nest sites and locations used by brooding females
- **Primary Investigator(s):**
 - Michael Chamberlain, PhD
- **Affiliated Entities:**
 - University of Georgia Research Foundation
- **Cooperating Partners:**
 - Texas Parks and Wildlife Department
- **Cooperating Personnel:**
 - Jason Hardin, TPWD Wild Turkey Program Leader
- **Estimated Timeline for completion:**
 - Field work - Complete
 - Publication(s) pending
- **Publications Generated:**
 - Dissertation – Translocation and Reproductive Ecology of Wild Turkeys (Meleagris Gallopavo) in East Texas by Daniel Joseph Sullivan, Jr.
 - Federal Aid Report: W-164-R-1
 - Spatial Scale and Shape of Prescribed Fires Influence Use by Wild Turkeys - JWM

3.

- **Title of Study:**
 - Surveillance of Rio Grande Wild Turkey Diseases, Parasites, and Aflatoxin in the Eastern Rolling Plains of Texas
- **Objectives:**
 - Assess parasite loads using fecal samples or whole symptomatic birds.
 - Assess prevalence of salmonella sp, Mycoplasma sp, REV and LPDV as these diseases have been identified in or near the proposed study area in past surveillance efforts.

Principal Investigator:
- **Principal Investigation**
 - TPWD Staff
- **Affiliated Entities:**
 - Texas A&M Vet Lab
- **Cooperating Partners:**
 - Texas Parks and Wildlife Department
- **Cooperating Personnel:**
 - Jason Hardin, TPWD – Wild Turkey Program Leader
- **Estimated Timeline for completion:**
 - Ongoing - 2021
- **Publications Generated:**
 - Federal Aid Report pending

4.

- **Title of Study:**
 - Harvest and Abundance Estimation of Texas Rio Grande Wild Turkeys
- **Objectives:**
 - Estimate male Rio Grande wild turkey survival and recruitment rate into the ≥ 2 -year-old age class (typically classified as a mature male) in conjunction with both direct (within year) and indirect (>1 year removed) recovery (harvest) rate estimation for both spring and fall seasons in Texas.
 - Using recoveries of marked individuals in conjunction with harvest estimates, under a standard Lincoln estimator design estimate Rio Grande wild turkey population size at both the regional and statewide level.
- **Principal Investigator:**
 - Bret A. Collier, PhD
- **Affiliated Entities:**
 - School of Renewable Natural Resources - Louisiana State University
- **Cooperating Partners:**
 - Texas Parks and Wildlife Department
- **Cooperating Personnel:**
 - Jason Hardin, TPWD Wild Turkey Program Leader
- **Estimated Timeline for completion:**
 - Completed
- **Publications Generated:**
 - Publication(s) pending

5.

- **Title of Study:**
 - Application of Unmanned Aerial Vehicle (UAV) Thermal Imagery to Survey Wild Turkey Populations
- **Objectives:**
 - 1. Quantitative assessment of the effects of habitat and environmental conditions on detectability
 - 2. Differentiating wild turkeys and vultures
 - 3. Survey effort required and feasibility at multiple spatial scales
 - 4. Improvement of machine learning algorithms for automated detection
- **Principal Investigator:**
 - Dr. Michael Byrne
- **Affiliated Entities:**
 - University of Missouri – School of Natural Resources
- **Cooperating Partners:**
 - Texas Parks and Wildlife Department
- **Cooperating Personnel:**
 - Jason Hardin, TPWD – Wild Turkey Program Leader
- **Estimated Timeline for completion:**
 - Ongoing - 2022

APPENDIX II: GROWING SEASON FIRE RESOLUTION



Resolution #2020-05-21

RESOLUTION

USE OF GROWING SEASON PRESCRIBED FIRE AS A MANAGEMENT TOOL FOR WILD TURKEYS IN PINE FORESTS OF THE SOUTHEASTERN COASTAL PLAIN

WHEREAS: Wild turkey populations have been re-established in every Southeastern state through efforts by members of the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) and their partners; and

WHEREAS: Wild turkeys are recognized as an important species from an ecological, recreational, and economic standpoint and healthy wild turkey populations are a valued natural resource; and

WHEREAS: Studies have shown that nest success and poult survival are critical aspects of reproduction necessary for maintaining stable and growing wild turkey populations; and

WHEREAS: Quality nesting and brood rearing habitat are necessary to support successful wild turkey reproduction and robust populations; and

WHEREAS: Wild turkeys were historically abundant and evolved in fire-adapted communities that traditionally burned in the early growing season (April – June) from natural, lightning ignition sources; and

WHEREAS: Prescribed fire is a common management practice in coastal plain pine forests of the southeastern United States and is used for various vegetation management purposes, including creation and improvement of habitat for various wildlife species, including wild turkeys; and

WHEREAS: Use of prescribed fire during the growing season (~April – August; hereafter, growing season prescribed fire or GSPF) can be an effective and important tool for

establishing vegetative conditions conducive to successful nesting and poult survival, namely open, herbaceous-dominated communities and reduced coverage of hardwood species, many of which cannot be effectively controlled by dormant season burning alone; and

WHEREAS: Land managers over recent decades have increasingly incorporated GSPF into management planning, which, due to the ground nesting behavior and precocial young of wild turkeys, has given rise to public concern for the welfare of wild turkeys when GSPF is conducted during periods of nesting and brood rearing; and

WHEREAS: A growing body of research indicates low rates of direct loss for nests (<5%) and broods exposed to GSPF; moreover, research indicates that most female wild turkeys select nest sites in areas that were burned within the previous 3 years; and

WHEREAS: Growing season fires are generally only prescribed in areas after three or more years have passed since burning, effectively reducing exposure of wild turkey nests to GSPF, and that any nest loss that does occur is partially mitigated by propensity of female turkeys to renest; and

WHEREAS: Female wild turkeys frequently select areas burned within the previous two years for brood rearing and such use is associated with increased poult survival; and

WHEREAS: We acknowledge that factors besides seasonality associated with prescribed fire influence vegetation response and wild turkey resource use and behavior, including frequency (burn return interval), scale (extent), and severity of burning.

NOW, THEREFORE, BE IT RESOLVED that the Southeastern Association of Fish and Wildlife Agencies hereby advocates that member states:

1. Acknowledge that fire return intervals of ≤ 3 years and distributed in a mosaic pattern are an essential management practice needed to maintain and enhance habitat for wild turkeys throughout the upland pine forests of the southeastern coastal plain; and
2. Support use of GSPF as a tool for improving vegetation conditions in fire-adapted community types in the southeastern coastal plains for the benefit of wild turkeys, particularly where managers are unable to meet management objectives with dormant season prescribed fire alone; and
3. Urge caution in extensively using GSPF on a fire return interval ≤ 2 years because such application may pose risks to turkey nests and broods due to these stands being preferentially selected by females during the reproductive periods, recognizing, however, that such frequent application may be useful in the short-term on a limited basis for restoring overgrown, woody sites to more open, herbaceous, early successional community types and that such use would provide beneficial long-term

effects for turkey populations and pose minimal long-term deleterious effects to wild turkeys during a brief community restoration period; and

4. Acknowledge that a growing body of research suggests prescribed fires, regardless of the season they occur, conducted at sizes which encompass an area representative of the majority of a wild turkey's average seasonal home range may alter space-use throughout the landscape in which they occur, and create conditions in which interior areas (>250 m from edges) of burns are subsequently avoided by wild turkeys for a period of time;
5. Acknowledge that managers must consider many other factors in the decision to use prescribed fire at any particular season, frequency and scale, including such factors as multiple species interests, weather, staffing and equipment, number of burn-days available, current vegetation condition, etc.; and
6. Conduct additional research to further the collective knowledge about the relationship between the timing, scale and frequency of prescribed fire and its impact on wild turkey population demographics.



Approved this the 21st day of May 2020, in an official meeting by the Board of the Southeastern Association of Fish and Wildlife Agencies.

Charles F. Sykes, President