



UNIVERSITY OF  
**GEORGIA**

# COOPERATIVE RESEARCH



Daniel Sullivan



iStock Photo



Jeremy Wood



Georgia DNR

## Fire and Wild Turkeys at Silver Lake Wildlife Management Area: Implications for Longleaf Pine Savanna Management



### SUMMARY

1. Prescribed fire is commonly used to maintain pine savannas, which are imperiled habitats in the southeastern United States
2. A recent study examined the influence of prescribed fire on turkeys at Silver Lake Wildlife Management Area, an area with pine savanna that was once common in Georgia. Turkeys were found to disproportionately use burned areas during the reproductive season
3. Prescribed fire did not negatively impact turkeys during the nesting and brood-rearing stages. Rather, prescribed fire is critical to maintain habitat for wild turkeys in pine savannas



### INTRODUCTION

Fire is a critical component of healthy functioning habitats throughout many types of coniferous forests in North America [1]. The frequency at which fires occur (i.e., return interval) and the degree to which forests burn (i.e., burn intensity) interact to determine habitat composition and suitability for various species of wildlife. This is particularly true for longleaf pine ecosystems in the southeastern United States, which support a diverse array of wildlife, including game species such as white-tailed deer, northern bobwhite, and Eastern wild turkey (hereafter turkey), and non-game species such as red-cockaded woodpecker, Bachman's sparrow, and gopher tortoise. The longleaf pine ecosystem (e.g., "pine savannas") once spanned an estimated 37 million hectares in the southeastern United States, but today occupies less than 1 million hectares [2,3]. Frequent, low intensity fire is important in pine savannas, which are susceptible to succession of woody vegetation, including encroachment and conversion to loblolly and slash pine dominated forests.

In Georgia, pine savannas are confined to less than 150,000 hectares, a fraction of the 1.6 million hectares occupied in the early 1900s. The Georgia Department of Natural Resources actively manages public lands with

prescribed fire to keep remaining pine savannas healthy and restore additional acreage. Prescribed fire is also the primary tool used by resource managers to maintain habitat for game species such as turkeys. The Silver Lake Wildlife Management Area (Silver Lake) in southwestern Georgia is an example of the pine savanna ecosystem once common throughout Georgia. Silver Lake is composed largely of pine savanna actively managed using prescribed fire. Turkeys are native to longleaf pine forests throughout Georgia, and Silver Lake supports a healthy population that is actively hunted. This document outlines recent research conducted on the impact of prescribed fire on turkeys at Silver Lake, including how prescribed fires influence habitat selection, and nesting and brooding ecology, of wild turkeys at Silver Lake.



## **FIRE AT SILVER LAKE WMA**

Silver Lake is a 3900 hectare state-managed land located in southwestern Georgia. The site is dominated by pine forests (longleaf and loblolly). Georgia DNR uses prescribed fire to mimic historic fire regimes that were beneficial to longleaf pines. Prescribed fires maintain a mosaic of habitats used by many native wildlife species. Prescribed fires at Silver Lake occur annually, with many patches burned every 1–3 years and an average burn area of 14 hectares. Mechanical removal of hardwoods also occurs in areas where they are too large to be controlled by fire.



## **THE RESPONSE OF TURKEYS TO FIRE**

Previous studies examined the influence of fire on wild turkeys, but they were primarily limited to hardwood forests, making informed management decisions in other forest types difficult. Research in longleaf pine savannas have only recently occurred. Faculty and graduate students at the University of Georgia began an intensive turkey study at Silver Lake in 2015 by capturing and marking females with GPS units to collect information on daily movements and survival [5,6]. Some of the primary goals of this study were to address the following questions:

- How do turkeys use burned areas?
- Do turkeys preferentially select or avoid burned areas relative to unburned areas?
- How does fire affect nest and brood survival?

### **TRACKING TURKEYS**

A total of 63 female turkeys were captured with rocket nets during January–March in 2015 and 2016. All females were fitted with backpack-style and remotely-downloadable GPS units which were programmed to record 17 locations per day. Each GPS unit also had an affixed radio transmitter that allowed field crews to directly track females to make behavioral observations and record the number of poults alive at the time a visit occurred (for females that successfully hatched a nest).

### **HABITAT SELECTION**

Tracking individual females throughout the breeding season revealed habitat preferences [5]. Female turkeys selected hardwood forests during the pre-laying and post-nesting phases, but selected open vegetation habitats during the egg-laying, incubation, and brood-rearing reproductive stages. In addition, pine habitats that were recently burned ( $\leq 2$  years prior) were selected by females during the same reproductive stages. More specifically, female turkeys selected older pine stands that were recently burned during the incubation stage, but then selected younger pine stands that were recently burned, and mature pine stands burned 2 years earlier. Open habitats were also used during these same reproductive stages.

Female turkeys tended to nest in areas with increased ground cover (i.e., more vegetation at ground level), which conceals nests from predators [6]. Females also took their broods to areas with increased ground vegetation but low visual obstruction, which provided enough cover to conceal poults but was also low enough so that females could locate predators. At night, females selected brood-roost sites in forests not recently

burned (3–6 years post-fire). In contrast, brooding females used areas burned the same year or 2 years previously for feeding throughout the day.

Contrary to popular belief, these results indicate that female turkeys actually actively seek pine forests that have been recently burned to nest and raise their young. These results also indicate that a range of different habitats are critical for turkeys to survive and raise their young, including both hardwood forests (pre-laying) and recently burned pine forests (laying through brood rearing), in addition to open vegetation communities. Essentially, all of these different habitat types are used by turkeys at least periodically throughout the reproductive season.

## NEST AND BROOD SURVIVAL

The researchers monitored 78 nests, of which 29 successfully hatched  $\geq 1$  egg (37% success rate). The nests that failed were attributed to predation (71%), abandonment (8%), or undetermined causes (20%). No nests were lost due to prescribed fire [6].

Females with broods were monitored until 28 days after they hatched, which is an important milestone for turkey poults as they are better at evading predators through flight at this age. Of 25 broods monitored, 6 survived to 28 days post-hatch (24%). Similar to nests, no monitored broods were exposed to fire, instead brood loss was mostly due to predation.



## CONCLUSIONS

Prescribed fires will continue to be a critical component of pine savanna restoration and management because the natural fire regimes that once allowed these forests to thrive no longer exist. The work conducted by University of Georgia faculty and graduate students demonstrates that prescribed fires greatly enhance habitats used by wild turkeys at Silver Lake. In fact, Silver Lake currently has a robust population that has apparently benefited from Georgia Department of Natural Resources habitat management plan, which relies largely on prescribed fire to maintain habitat heterogeneity and open stands of longleaf pine. Female turkeys selected pine forests that were recently burned throughout several critical periods of their reproductive cycle. Furthermore, nest and brood survival was not negatively impacted by prescribed fires. These results are similar to those reported in previous studies examining the effects of prescribed fires on turkeys, which did not find prescribed fires to be harmful to turkeys [4].



## KEY REFERENCES

1. Glitzenstein et al. 1995. Effects of Fire Regime and Habitat on Tree Dynamics in North Florida Longleaf Pine Savannas. *Ecological Monographs* 65: 441–476.
2. Brockway, D.G., Outcalt, K.W., Tomczak, D.J., Johnson, E.E., 2005. Restoring longleaf pine forest ecosystems in the southern U.S. In: Stanturf, J.A., Madsen, P. (Eds.), *Restoration of Temperate and Boreal Forests*. CRC Press, Boca Raton, FL, USA, pp. 501–519.
3. Jose, S., Jokela, E.J., and Miller, D. L. *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*. New York: Springer, 2007. Print.
4. Little et al. 2014. Eastern wild turkey reproductive ecology in frequently-burned longleaf pine savannas. *Forest Ecology and Management* 331: 180–187
5. Wood et al. 2018a. 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.
6. Wood et al. 2018b. Nest and brood site selection of eastern wild turkeys. *The Journal of Wildlife Management*: 10.1002/jwmg.21562

### DOCUMENT PREPARED BY:

Gregory Wann, PhD  
[greg.wann@warnell.uga.edu](mailto:greg.wann@warnell.uga.edu)

### DOCUMENT POINT-OF-CONTACT:

Michael Chamberlain, PhD  
[mchamberlain@warnell.uga.edu](mailto:mchamberlain@warnell.uga.edu)