

## A Commentary on Potential Implications of the COVID-19 Pandemic on Wild Turkey Populations

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During early 2020, countries across the globe were impacted by a rapidly spreading virus (COVID-19) that has impacted nearly every facet of daily life. As COVID-19 is spread via contact between infected individuals, social distancing has been widely implemented worldwide in attempts to dampen effects of the pandemic. This social distancing places restrictions on both human movement and person to person interactions, and is designed to reduce transmission of the virus. Although reducing spread of the virus and the ongoing loss of human life are of paramount concern, social distancing and the sudden changes to how people interact and behave have potential implications to many parts of our economy, mental and physical health, and societal activities enjoyed by millions worldwide.

Across the United States, many forms of recreational activity occur during spring, including notable increases in recreational fishing and hunting. Within many states, sportspersons are being allowed, and in some cases encouraged, to spend time outdoors enjoying these recreational activities, which allow these sportspersons to practice social distancing while also participating in recreational activities they enjoy and cherish. Specific to hunting, the pursuit of the wild turkey is a socially and economically important activity that is enjoyed by millions of hunters annually, including ourselves. Wild turkeys are the only gamebird in the conterminous United States hunted primarily during their breeding season, which occurs during spring. At the writing of this commentary, we note that nationwide, hunting seasons for wild turkeys have been ongoing in many states, and are beginning in many others. With millions of Americans ordered to practice social distancing and refrain from their regular daily social activities, substantive potential exists that hunters pursuing wild turkeys could increase the amount of time they spend hunting (hereafter hunter effort). As such, we believe there may be potentially significant implications to wild turkey populations because of changes in hunting activity during spring 2020. Our concerns are predicated on well-documented, long-term declines in abundance and productivity of Eastern wild turkey populations throughout broad portions of the subspecies range, declines which we note have been ongoing for years and are of significant concern to many state wildlife agencies. All available science suggests that these long-term declines are at least partially driven by reduced reproductive success of females, manifested through later dates of nest initiation, reduced nest success, and poor brood survival. Likewise, predation, changes in land-use, disease, and harvest are all factors influencing turkey populations throughout their range. Notably, there is potential that the impacts of COVID-19 on human behavior and hunter effort could have dramatic, far-reaching, and long-term implications to wild turkey populations across the species range. Herein we outline and briefly discuss several of these implications.

First, our concerns are predicated on the assumption that the COVID-19 pandemic has increased hunter effort. We base this assumption on the recognition that reduction in competing activities (e.g., work, school, sports) has in effect increased the abundance of wild turkey hunters during the 2020 spring season. The current state-level restrictions on movements in support of social distancing have often included specific exemptions to allow citizens to use natural areas including private lands, wildlife management areas (WMAs), and other federal/public lands.

Continued utilization of natural areas, when combined with limited competing activities, has resulted in marked increases in hunter effort across broad areas of the southeastern United States. For instance, as of today, numbers of hunters using WMAs in Georgia have increased 47% from 2019 (Georgia Department of Natural Resources, unpublished data). Likewise, hunter effort across WMAs in Mississippi has greatly increased relative to both 2019, and the previous 10-year average (Mississippi Department of Wildlife, Fisheries, and Parks, unpublished data).

Second, research across the United States has shown that wild turkey harvest (number of individuals harvested per season) is directly related to the number of hunter days occurring each year, the associated level in harvest intensity (removal per unit area) and harvest rate (% of the available male population harvested). Hence, the increase in hunter effort due to the COVID-19 pandemic will likely increase total harvest across states, resulting in significantly more males being removed than during a typical hunting season. As of today, harvest during the first 23 days of the statewide season in Georgia is 26% greater than in 2019, and 43% higher on public lands – despite no appreciable recent increases in production across populations. Furthermore, the percentages of hunters that have harvested 2 birds has increased 34%, whereas hunters harvesting 3 birds (state bag limit) has increased 46% from 2019. In Mississippi, statewide harvest numbers are currently similar to previous years, but harvest on state WMAs has increased by 60% relative to 2019. In North Carolina, 2020 harvest is up 34.8% over the average from the previous 3 years. In Tennessee, statewide harvest is currently 50% higher than at this same point in the 2019 season. And in Louisiana, youth season harvest increased 47% and 2020 harvest for the 1st week of the turkey season is up 13.6%.

Besides the direct effects of increased hunter effort and harvest on wild turkeys during the 2020 spring season, we offer the following thoughts relative to other aspects of harvest and landscape management that could impact Eastern wild turkey populations.

1. In many states, spring hunting seasons are timed to open well before breeding is complete, resulting in the removal of males before females are breeding and laying clutches. We postulate that increased harvest of males, which by default disrupts and dissolves social groups of males, has potential to negatively influence reproduction, both through removal of dominant males and increased harvest of remaining males. Wild turkeys use a mating system that hinges on females being able to access not only dominant males that they have selected for breeding, but also multiple additional males to facilitate sperm and mate competition and improve fitness of offspring. Increased harvest of males within local regions has potential to extend breeding seasons, as females continually seek to access a declining number of males for breeding. Ongoing research throughout the southern United States has demonstrated that later nesting attempts in such prolonged breeding and nesting seasons are less successful, and contribute less to overall reproductive output. Additionally, females in populations witnessing dramatically higher harvest rates could lay clutches of both reduced size and greater rates of infertile eggs, which commonly occurs already in heavily hunted wild turkey populations.
2. Although exceptions exist, the timing of spring hunting seasons generally results in hunters being afield while females are actively laying and incubating nests. As such, potential exists for hunters to encounter and disturb these females, through no fault of their own. Previous research has shown that females that are disturbed early in the incubation sequence are more likely to

abandon the laying sequence or incubation of a clutch, and how human disturbance of females during laying influences female behavior is largely unknown. It is plausible that increased hunter effort could result in a greater frequency of hunters encountering laying and incubating females, which could translate to increased abandonment and nest loss. We encourage hunters that flush or otherwise encounter nesting females to refrain from approaching the nest, and to quickly leave the immediate area so that the attending female can return, thereby minimizing disturbance to vegetation around the nest.

3. There is growing potential that a host of land management activities that can benefit wild turkeys will be limited or greatly reduced in scope. Forestry and range management practices including rotational prescribed fire, brush management, and other practices used to manage habitats for wild turkeys may be limited or discontinued for the duration of the pandemic. Our concern stems directly from the cascading effects of these management activities on not only wild turkeys, but on a suite of other forest and range-dwelling species as well. Collectively, reductions in frequency and scope of land management activities would result in reduced availability of early successional vegetation communities not only during 2020, but well beyond. The potential impacts of altered land management strategies, coupled with increased harvest and potential for disturbance to laying and incubating females, warrants consideration. We encourage agencies and landowners to document the scope, scale, and frequency of land management activities conducted during 2020 as these data will provide important information as turkey populations respond in subsequent years.

4. As turkey hunters, we cherish opportunities to pursue gobbling males and spend time enjoying the solitude of the outdoors. Sunrises, listening to the world awaken around us, and testing our wits against crafty males—these experiences define spring turkey hunting. However, with increasing hunter effort, particularly on public lands, we would be remiss to not note that potential exists for increased interactions amongst hunters. These increased interactions could result in reduced hunter satisfaction, confrontations, and even safety concerns. We encourage hunters to be considerate of others, recognizing that many of us are feeling more stressed and frustrated with the unfortunate changes to our way of lives. In the end, we should all be concerned primarily with the wild turkey resource, which may require each of us to be more patient, more tolerant, and more forgiving of other hunters dealing with similar stresses in their lives.

5. Despite concerns that increased hunting effort and harvest could negatively influence populations of the Eastern subspecies, there is potential that effects of the COVID-19 to western subspecies (Rio Grande, Merriam's and Gould's) will be dramatically different. Although local hunters pursuing these subspecies will likely have increased opportunities and reduced pressure from non-resident hunters, similar to hunters in the southeastern United States, multiple states have greatly limited opportunities for nonresident hunters to purchase licenses. Likewise, widespread travel restrictions, requirements to quarantine after travel amongst states, and government-issued mandates to shelter-in-place so as to limit transmission of COVID-19 will greatly reduce non-resident opportunities to pursue and harvest western subspecies. For example, non-resident license sales in Texas are down 79% for the 2020 season relative to average license sales during 2016–2019 (Texas Parks and Wildlife Department, unpublished data). Whether reduced opportunities for non-resident hunters will translate to relevant

reductions in harvest of males in populations of the western subspecies is unclear, but is worthy of documentation and future synthesis.

Defining and quantifying the implications of the COVID-19 pandemic on wild turkey populations will require diligence, continued focus on data collection and synthesis, and time. We encourage agencies charged with managing wild turkeys consider evaluating impacts of the COVID-19 pandemic on hunter effort and harvest through the use of hunter surveys. Our above commentary is designed to articulate concerns of potential long-term implications of the significant increase in both hunter effort and harvest on wild turkey populations within the southeastern United States. As wildlife researchers and wild turkey hunters, we are admittedly concerned with how such increases in hunter effort and harvest may negatively influence wild turkeys, recognizing that these influences will not be uniform across landscapes or subspecies. However, as turkey hunters are stewards of the resource, we are more concerned with the potential implications that increased harvest could have on our future ability to pursue wild turkeys, and to manage sustainable populations given the myriad of challenges wild turkey populations face. We encourage hunters pursuing wild turkeys this spring to scrutinize their harvest decisions relative to local population trends, and consider practicing forms of restraint in harvesting males, such as a willingness to reduce personal bag limits, or alter timing of when males are removed to do so later in the season. As hunters, we cannot and should not impose one's own moral compass on others, as long as we all abide by state and federal hunting regulations. That being said, in these extraordinary and challenging times, the future ability for us to enjoy hunting wild turkeys could be negatively impacted by our collective actions during spring 2020. We hope all turkey hunters will agree, the future of the resource should be our singular most important focus. Should you have questions, comments, or concerns about our thoughts expressed above, do not hesitate to contact us.

Respectfully,

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