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PHOTO BY MATT HEWITT/BRI

Two black bear cubs watch from nearby as researchers put a new collar on their mother.

Fine-Scale Behavioral Patterns of Newly Recolonizing Black Bears in West Texas

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American black bears (*Ursus americanus*) exhibit considerable behavioral flexibility which allows them to inhabit a diverse range of ecosystems ranging from the boreal forests of Canada to the desert landscapes of the American southwest. As of 2014, the southwestern and south-eastern United States had suffered the greatest loss of black bears' historical range. However, many areas within these regions have seen population increases as bears have begun to recolonize parts of their historic range in recent years. In Texas, black bears began naturally recolonizing West Texas in 1988 after being extirpated from the state in the 1950s due to predator control measures and unregulated hunting. Bears

inferences on potential negative impacts those behavioral adaptations could have on their health and survival (i.e., foraging during suboptimal times). Additionally, human-bear conflicts are on the rise in this region, and understanding when and how often bears are using supplemental resources (such as deer feeders and garbage) can help guide the development of targeted and proactive management strategies that can minimize these conflicts.

In order to investigate the behavioral patterns of this recolonizing population, we captured and GPS collared 23 black bears (14 males, 9 females) between September 2022 and July 2024 throughout the Trans-Pecos. The collars



PHOTO BY MATT HEWITT/BRI

A black bear cub peeks out of a deer feeder after climbing in for a large meal.

returned to Texas in Big Bend National Park from the mountains of northern Coahuila, Mexico, where remnant populations survived. Black bears are listed as state threatened, but recent expansion from Big Bend to adjacent areas suggests natural recovery is underway, and in its early stages. Consequently, little is known about this population and there is no information on their fine-scale behavioral patterns.

The hot, arid climate of the Chihuahuan Desert within the Trans-Pecos, combined with the abundance of supplemental feed on the landscape, has unique implications for bear behavior. We can better understand how bears adapt to these unique local conditions by examining their behavioral patterns and activity budgets (i.e., time spent per activity). For example, investigating how those patterns fluctuate throughout the year, particularly during the summer, can illuminate the extent of their behavioral flexibility and guide



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A view from a bear travel corridor in Black Gap Wildlife Management Area near the Mexico border.

recorded locations every two hours, and a total of 56,809 locations representing 5,429 bear-days were included in our analyses. We used statistical models to identify distinct behaviors in these data. Our models ultimately identified four kinds of behavior: traveling, resting, foraging, and using localized attractants (attractant-use) such as deer feeders, water sources, or dumpsters. These models used characteristics of the bears' movements, such as how fast they were moving, how straight they were walking, how long they spent at a given point, and how many times they revisited that point, to identify these behaviors. We then examined variation in activity budgets by looking at the influence of season, time of day, and sex on the proportions of time spent in each behavioral state.

Black bears in West Texas were more likely to be foraging and traveling during early morning and evening, which is consistent with crepuscular activity patterns documented across a large portion of their geographic range. When bears used localized attractants (e.g., deer feeders), they spent a disproportionately high amount of time at these sites compared to resting or at natural foraging sites and revisited them five times more frequently than locations associated with the other three behaviors. During April, females spent a higher proportion of time in the attractant

PHOTO BY DAVID WELLBORN/BRI



Graduate research assistant Nicole Dickan records GPS coordinates of a potential bear bed site in Black Gap Wildlife Management Area.



A black bear culvert trap placed in Terlingua Ranch, a small rural community near Big Bend National Park.

state than males throughout the day. This could be a result of high nutritional demands associated with lactation and replenishing energy reserves post-denning, or a means to provide supplemental nutrients for offspring. However, there was considerable variability in how frequently or long bears used attractants between individuals. Proportion of time that bears used feeders or other attractants ranged from 2% to 28%, showing that some bears heavily rely on these supplemental resources, whereas others rarely take advantage of them.

Activity budgets also varied substantially depending on the month. Both sexes spent more time travelling during the summer months, but more so for males who generally search for mating opportunities or disperse during this time. During the fall, bears reduced time spent travelling and increased time spent using attractants. Given the opportunistic nature of bears, it is not surprising that use of an abundant, localized, and easy to access food source such as a deer feeder would spike as they begin hyperphagia, when bears attempt to intake as many calories as possible to prepare for denning. However, we did see instances of bears forgoing denning and using these resources

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throughout the winter. This could have negative long-term health consequences, such as increased cellular aging and decreased gut microbiome diversity. However, supplemental feed could serve as a nutritional subsidy for bears during times of natural food failures. Thus, the potential effects of this behavior are complicated and merit further study.

Interestingly, summer activity patterns differed from other bear populations. Trans-Pecos bears were more active near dawn and from dusk into the early night in the summer months. Contrastingly, studies in more northern populations saw increased daytime activity in summer compared to other seasons, indicating that this may be a behavioral adaptation to cope with extreme desert temperatures. Despite this shift, bears did not avoid activity altogether during the hottest part of the day, which could indicate that they are able to sufficiently select for microhabitats (i.e., shaded wooded habitats) that help with thermoregulation (thermal refugia) in between bouts of activity.

This research provides novel insights into behavioral patterns of the newly recolonizing West Texas black bear population and improves our understanding on how bears adapt to the extreme, highly variable desert ecosystem. Furthermore, this understanding of temporal patterns associated with attractant use behaviors will help guide decisions by Texas Parks and Wildlife Department about when to prioritize conflict mitigation and prepare for potential increases in bear use of human-derived resources during the fall. Proactive management techniques, such as bear-proof dumpsters and electric fencing around deer feeders can reduce human-bear conflict, the number of lethal removals and translocations, and property damage. As human and bear populations continue to grow in this region, there will be greater potential for human-bear conflicts, and proactive management will be necessary to facilitate amiable coexistence and ensure the continued recovery of black bears in Texas. 🌟



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