

# Connecting the Dots

UPDATES ON TENNESSEE  
MALLARD RESEARCH

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**Picture a crisp morning in early January.** The first rays of sun peek out to illuminate the marsh. Several dozen decoys are bobbing and swimming on the light chop in front of the blind. Duck-shaped silhouettes begin to zip and dive near the hole. You can almost feel the anticipation between friends and family in the blind as they countdown to legal shooting light. After the first volley, we laugh together over coffee and breakfast as we take light-hearted jabs over the decoy spread set-up and who forgot to click their safety off. The most memorable experiences while duck hunting are the comradery and conversations shared between hunting partners. Sometimes our conversations are about on-goings of life or the joys of watching our kids and family grow; but on a slow morning when the ducks aren't



flying, conversations inevitably turn towards “where are the ducks and what are they doing?” If your conversations are anything like ours, these topics center around stale ducks, flooded corn, and hunting pressure.

Researchers at Tennessee Tech University have partnered with Tennessee Wildlife Resources Agency to address some of these hot topics in waterfowl ecology and management in West Tennessee using state-of-the-art backpack-style GPS transmitters. We’ve deployed GPS transmitters on 500 male and female mallards over the past three years which have provided nearly 1.5 million locations and allowed us to better understand mallard movements with respect to refuges, weather, hunting pressure, and food. Let’s discuss what we have found so far and what questions have arose.

One of the most striking findings from the first three years of the project has been the migration patterns of our mallards. We caught ducks in West Tennessee during winter and watched them migrate north to their breeding grounds across the western Great Lakes states and the Prairie Potholes of the Dakotas and Canada each spring. Of those that survived the breeding season, 60% migrated back to the mid-south in the fall, and many of them came right back to West Tennessee. Additionally, our mallards rarely left West Tennessee once they got here... only a handful crossed the Mississippi River into Missouri and Arkansas and less than 5% went farther south than Memphis! Clearly, winter fidelity to West Tennessee and the surrounding region is very high, suggesting we have what ducks need. *But what exactly are we providing that ducks are keying in on?*

Ducks primarily need food, water, and safety during winter. The food part is self-explanatory, but our research reveals

» **Top:** A hen mallard with a backpack-style GPS transmitter. Transmitters are attached using elastic bands that allow for bird movement and growth.

**Middle:** A successful hunt in West Tennessee with a diversity of waterfowl species in the bag.

**Bottom:** Duck blinds on private lands in West Tennessee. Risk of leaving refuge areas is high for wintering waterfowl when most available habitat is being hunted outside of the refuge.

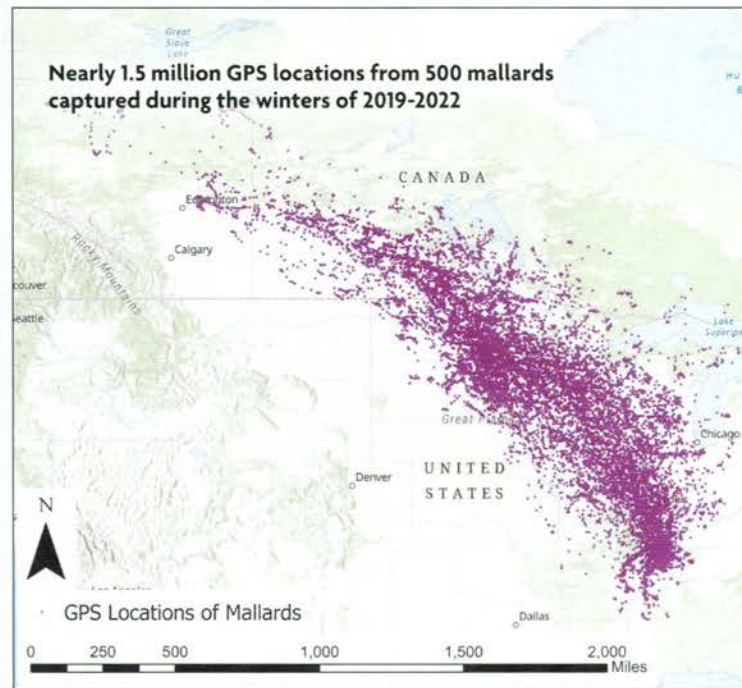
just how important and limited safety is for these ducks. We flew aerial surveys in a high-wing monoplane aircraft to learn the distribution of water, ducks, and hunting blinds across West Tennessee. We considered blinds to be hunted when we saw robo-ducks spinning (which were pretty easy to spot!). Our aerial surveys revealed that there are very few places outside of waterfowl refuges that are not hunted, and on any given day, anywhere from 70-90% of blinds were being hunted. The bottom line is that West Tennessee is a very risky place to be a duck.

Luckily, West Tennessee has state and federal waterfowl refuges which keep ducks in the area and provide safety away from all that hunting pressure. Our mallards spent about 75% of their time during the day on refuges in December. Time spent during the day on refuges decreased to about 40% in January; colder days, more water, and less food likely forced ducks to move off refuge more often. Furthermore, most flooded corn fields on private lands were not heavily used until early January. Unsurprisingly, ducks flew back and forth from food to safe areas, and typically only used hunted areas at dawn, dusk, and night.

From this information, two questions naturally arose: Does hunting pressure force these ducks to only fly at night? And will disturbing ducks on refuge during the day help move them around and make them more susceptible to harvest? The answer to the first question is no, our ducks are not nocturnal. In fact, mallards barely fly at night – less than 10% of flights were at night. Our ducks actually fly most at dawn and dusk. Especially intriguing is that our ducks were actually twice as likely to fly at dusk compared to dawn. It makes you wonder just how in tune these ducks are with hunter's schedules...

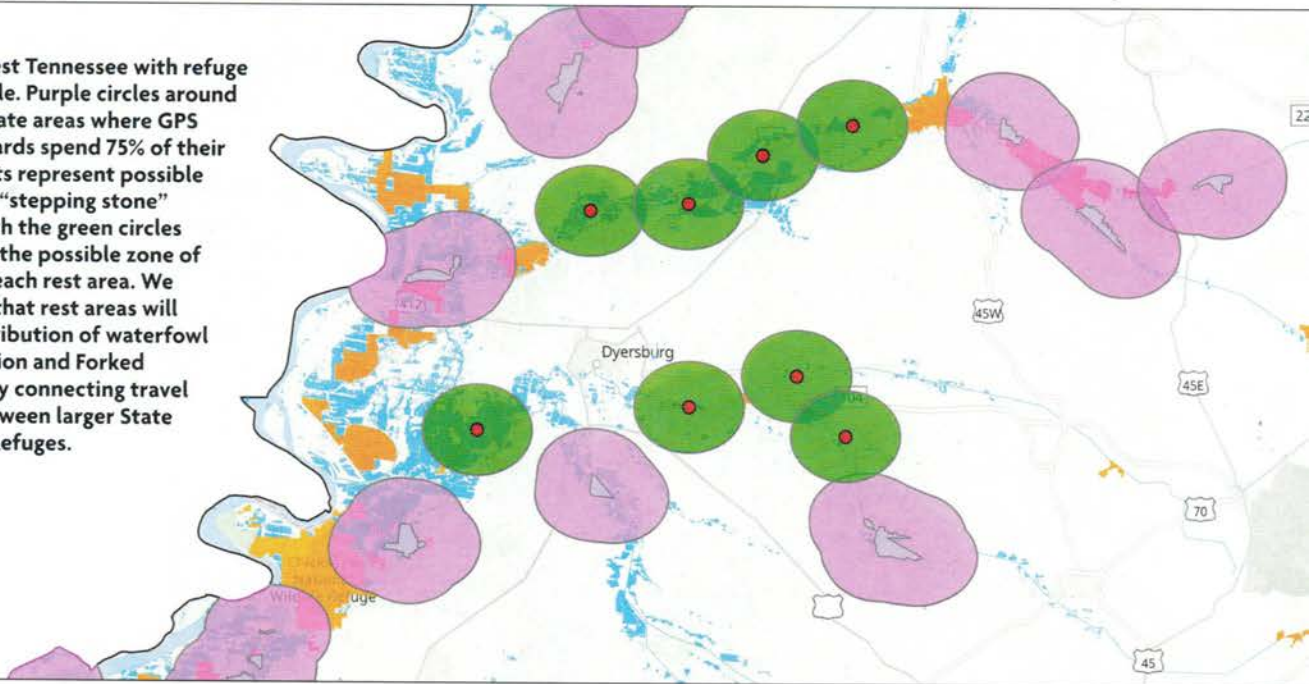
Now let's address our second question. As part of our project, we tried to move ducks around by purposefully disturbing refuges. In theory, we would spook ducks off refuges and they would fly around and provide harvest opportuni-

» A drake mallard hovers above an unharvested flooded corn field before landing and getting a bite to eat.



ties. Surprisingly however, mallard movements and harvest opportunities were actually reduced by 28% following a disturbance! Although, our GPS-data shows that ducks flew, they rarely landed beyond refuge borders and instead of resuming normal activities, they hunkered down once getting back to refuge. Imagine an intruder entered your home and made you jump out of your window. As soon as the intruder left, would you go to the grocery store or would you go back inside and lock all the doors until you felt safe? We think this shows just how important safe areas are to ducks – they would rather deal with us chasing them around, than land in a place that could be hunted. Disturbing waterfowl refuges didn't increase duck movements and hunter success like we thought, so what would increase duck movements?

A map of West Tennessee with refuge areas in purple. Purple circles around refuges indicate areas where GPS marked mallards spend 75% of their time. Red dots represent possible locations for “stepping stone” rest areas with the green circles representing the possible zone of influence of each rest area. We hypothesize that rest areas will increase distribution of waterfowl along the Obion and Forked Deer Rivers by connecting travel corridors between larger State and Federal Refuges.



## What's Next?

Often answers to burning questions just lead to more questions. Phase 1 of the mallard telemetry project opened our eyes to the dynamic landscape wintering waterfowl encounter in West Tennessee and beyond. The most astonishing revelation was the fact that a mallard that travels thousands of miles during migration could spend their entire winter in West Tennessee on a handful of properties. In fact, our mallards had winter range sizes similar to turkeys and white-tailed deer! Naturally, our next question became: why are mallards not flying more often and can we change those movement patterns? How can waterfowl biologists and land managers spread ducks across the landscape and provide more harvest opportunities? Phase 2 of the mallard telemetry project aims to answer these questions during winters 2022–2025.

We found that duck movement patterns are simple: they need safety, they fly out to get food during the safest times, and they return to the same safe spot during risky times. Indeed, 70% of our mallards only used one refuge during the entire winter. In other words, waterfowl refuges in West Tennessee are currently islands of safe habitat that are isolated from one another. Each refuge has its own population of ducks that know where the food is, where safety is, and especially where your decoy spread is. How can we increase duck movements up and down the river bottoms of West Tennessee? Perhaps, we need to connect those islands.

## West Tennessee Rest Areas

In Phase 2 of the project, we are working with Ducks Unlimited and private landowners to establish undisturbed rest areas along the Obion and Forked Deer rivers to serve as “stepping stones” of safe habitat which we hope will encourage

waterfowl to travel between larger state and federal refuges. Due to their small winter ranges, we speculate additional rest areas will increase waterfowl movements and range sizes and spread duck distributions up and down the river systems. Further, rest areas in close proximity may discourage waterfowl from setting up a home base like they do with our larger refuges. Subsequently, ducks won't be as familiar with their environment and will be more likely to land in your decoys. We hope that by connecting safe areas, we will reduce the number of stale ducks and increase harvest opportunities. Our private land rest areas will be typically be between 80 to 200 acres in size. We are specifically seeking areas that are difficult to access or hunt such as thick brush or unmanaged timber tracts. We hope this creates a win-win situation; landowners are able to lease this unproductive property and surrounding hunters may see more ducks flying that are susceptible to their calls.

## Rest Area Evaluation

We will be using a variety of technologies to test the effectiveness of rest areas in spreading ducks across the landscape and whether harvest opportunities increase. We will use drones to estimate weekly waterfowl use of rest areas. We will also use acoustic recording devices to count shotgun volleys to monitor whether harvest opportunities increase as a result of newly established rest areas. And of course, our best tool has been, and will continue to be, GPS transmitters on mallards to monitor movements and evaluate if rest areas are effectively trafficking ducks between refuges. All of this information will allow us to understand how refuge connectivity influences duck behavior, habitat use, and harvest opportunity. Be sure to follow our Facebook and Instagram pages @cohenwildlab to stay updated as our project continues.