# Strong Partnerships Make Study Possible

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When DNR's Office of Applied Science (OAS) got the call to launch this project as part of the Governor's Initiative on CWD, we set out to design the largest and most comprehensive deer study ever undertaken in Wisconsin. Our driving question—does CWD significantly affect deer populations in our study area—turned into an umbrella for a host of other inquiries that need to be addressed if we're going to find the answer to that big question. We set a high bar for data quality, and we realized some of our questions would need outside expertise if we were going to answer them as rigorously as possible.

First, Dr. Daniel Storm, DNR's deer and elk research scientist, collaborated with our furbearer and carnivore research scientist, Dr. Nathan Roberts, to design the study. They drew on their experience from past projects and consulted with Wildlife Management to outline a study that could achieve our goals and be of greatest use to the Management program. Most of the work would be done in-house by OAS, but some of it would benefit from collaboration with external partners.

Our crew handles all data collection in the field. They set nets, sit blinds, handle every collared deer and remove biopsy and genetic samples. OAS staff then organize and analyze much of the data we gather. To process our biopsy samples, we chose to work with the Wisconsin Veterinary Diagnostic Laboratory (WVDL), part of UW's School of Veterinary Medicine. Working with WVDL is more efficient than running the labs ourselves, and we can take advantage of their diagnostic expertise. Having WVDL analyze our samples also guarantees that our CWD results are independently verified.

Linda Freshwaters Arndt
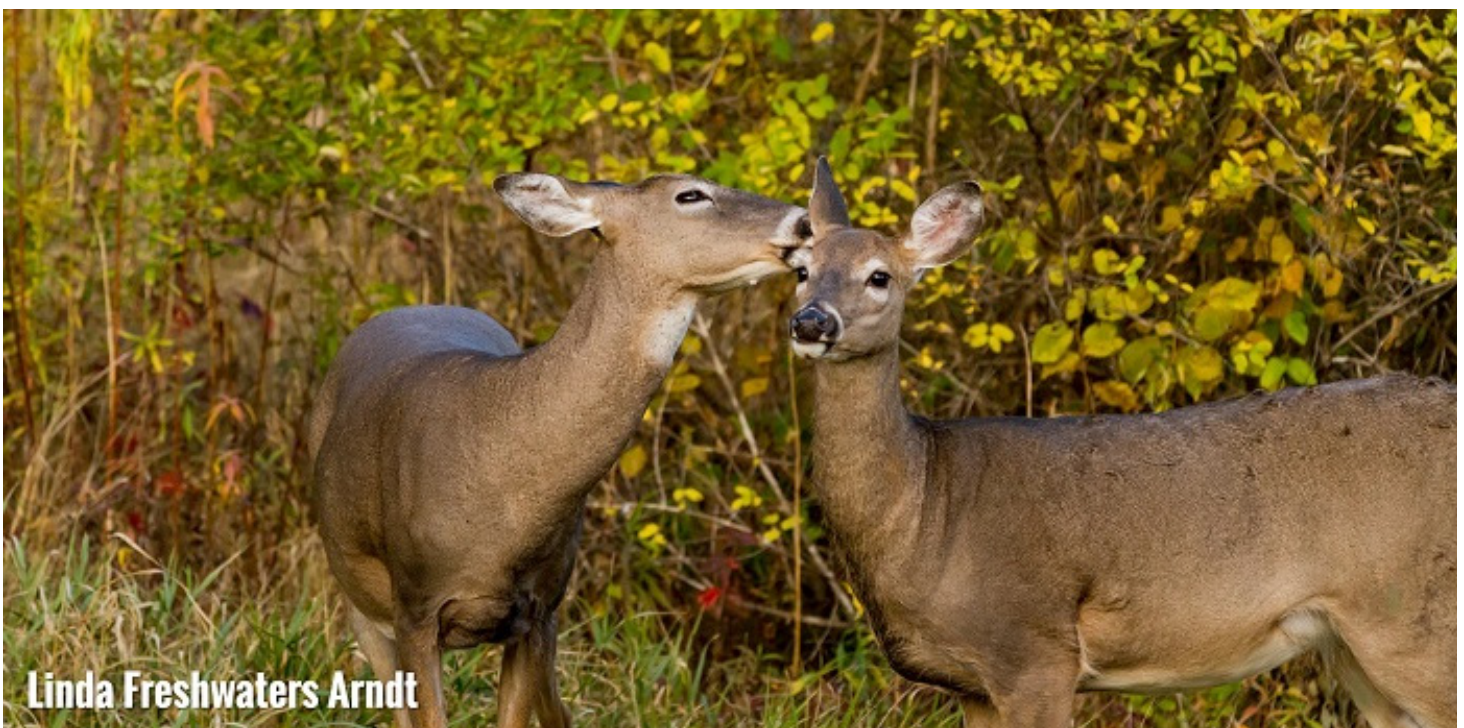
Our field crew also investigates mortalities any time a collared deer dies. We retrieve the collar and conduct a thorough site investigation for any clues of what may have killed the deer.

Whenever the condition of the remains allows, we remove the deer's body to the University of Wisconsin Veterinary Hospital's Department of Pathobiological Sciences, where Dr. Marie Pinkerton, DVM, performs a necropsy, an examination of the deer's remains similar to an autopsy.

Pinkerton is a clinical associate professor and head of anatomical pathology at the Veterinary School with nearly two decades of experience in wildlife pathology. She said that she enjoys working with deer. "They've got so many things that can go on," she said, "And they're so important to the state in a variety of ways."

Pinkerton sends a sample of spinal tissue to the WVDL for postmortem CWD testing, and she examines every organ system for clues that could lead to cause of death. Then she examines plated tissue samples under a microscope. "In some cases," she said, "I might take other samples for bacteria testing or toxics screening. It depends on the case. I have a standard procedure that I can tailor to the case as I go along. It's kind of like detective work. Each case is a puzzle that I have to figure out."

Caitlin Henning

A fawn collar found during a mortality investigation. We send investigation findings to Marie Pinkerton, DVM, at the UW School of Veterinary Medicine.

A wildlife study like this one relies not only on good data collection, it needs rigorous statistical modeling to interpret that data. To look at CWD in the context of forage availability, hunter harvest and depredation, we have to combine data on all these points into one composite model for analysis. With such a huge study scope, statistical modeling for a project this size is a full-time job from the outset.

To complicate things further, statistical models aren't one-size-fits-all. In fact, tools can vary widely depending on the type of question being asked. For our study, we require the expertise of wildlife statisticians whose work focuses on the analysis and modeling side of the equation. That's why OAS is working with Dr. Dan Walsh, quantitative ecologist with the U.S. Geological Survey and Dr. Alison Ketz,

assistant research scientist in UW-Madison's Department of Forest and Wildlife Ecology and the Wisconsin Cooperative Wildlife Research Unit.

As a quantitative ecologist, Walsh has many years of experience building and analyzing statistical models for studying wildlife, and he consults with Dan Storm and Ketz on the study's design and progress. Ketz has taken on the full scope of our statistical framework in collaboration with Storm and Walsh. She has experience designing and analyzing statistical models of elk populations in Colorado and a background in formal statistics.

According to Ketz, "What I love about this job is combining the formal math side with the development of new statistical models. And then I implement those models by writing computer programs, which I actually enjoy doing."

Statistics aren't only helpful once the data's been tabulated. Ketz is also using her statistical acumen to boost our data collection in the field. "This spring," she said, "I developed a way to take advantage of some machine learning methods to predict when a collared doe is giving birth." When the crew knows a doe has given birth, they have a better chance of locating and collaring her newborn fawns, bringing them into the study.

A project the size of the Southwest Wisconsin CWD, Deer and Predator Study has a lot of moving parts. Data collection to answer one question happens while we crunch the numbers to answer another. Our partnerships with UW's Veterinary School and Department of Forest and Wildlife Ecology, with the Wisconsin Cooperative Wildlife Research Unit and with the U.S. Geological Survey keep the project humming. It is a team effort, and we have assembled a great team to ensure our project is successful. In future articles, we'll explore more about the ins and outs of our work as well as how our partners contribute to our progress. Stay tuned!

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Hannah Manninen takes field notes during an adult deer capture event. Field data goes into the survival models used by our partners at UW Madison, USGS, and the Wisconsin Wildlife Cooperative Research Unit.