

Title: Spatially Explicit Densities of Deer, Turkey, and Coyote in Indiana

Institution: Purdue University, Department of Forestry and Natural Resources

Location: Purdue University West Lafayette, IN.

Job Category: PhD Student

Salary: \$28,000 - \$30,000 with standard benefits for a PhD student in the Department of Forestry and Natural Resources at Purdue University.

Duration of Appointment: Four-year project beginning in January of 2024 and end in December of 2027.

Pertinent Websites: <https://www.purdue.edu/fnr/sites/zollner/>

Start Date: January of 2024

Position Description/Project Role: The selected person will be supervised by Dr. Pat Zollner and will work with project Co-PIs (see below) to accurately and precisely estimate how densities of wildlife (deer, coyotes, and turkey) change across the state of Indiana. Related previous work determined that aerial sampling with infrared and color video was the most cost-effective method for estimating the density of deer in a variety of different landscape types in Indiana. This project will follow up on that work by using crewed and uncrewed (i.e., drones) aircraft equipped with infrared and color cameras to develop spatially explicit counts of wildlife across replicate sampling locations. The infrared and red-green-blue video from these flights will be recorded across regions of Indiana. After recording, human viewers or automated machine learning models will review videos and count deer, coyote, and turkey while recording the spatial coordinates of each animal to associate with environmental covariates. Counts of deer, coyote, or turkey will be modelled as a function of those covariates. After fitting and selecting a model that predicts animal density well, the student will estimate environmental predictors of animal density across the state of Indiana and develop map of predicted density for deer, turkey, and coyote. These density estimates will be used by the Indiana DNR to inform management planning and by project Co-PIs who are investigating relationships between deer density and several diseases. This is a great opportunity for individuals interested in wildlife management, modeling animal densities, and aerial surveying. The position provides relevant experience for a career trajectory within a government agency or a research career at a university or NGO. Team members for the larger project include Dr. Joe Caudell and Dr. Zack Delisle of the Indiana DNR as well as Dr. Wendy Dr. Beauvais of Purdue University College of Veterinary Medicine, and Dr. Sonja Christensen of Michigan State University Department of Fisheries and Wildlife.

Specific Duties: In collaboration with project team members and with mentorship from Dr. Zollner the person hired for this PhD position will design, plan and implement field collection of aerial survey videos. Doing so may require driving and flying over much of the state of Indiana and potential long days in the field including nocturnal sampling. This person will be in charge of the scoring the resulting videos to count observation of wildlife. That work will likely include either supervising a team of undergraduate researchers and/or implementing automated algorithms to score detections. This person will also develop statistical models of densities from the count data in the videos and relate that to environmental covariates. This person will also extrapolate the best of those statistical models to estimate statewide density of wildlife species. Therefore, this person will need to have a passion for figuring out complex quantitative analyses. Finally, this student will have opportunities to collaborate with a postdoctoral scholar at Purdue and a PhD student at Michigan State University who are focused on the disease ecology components of the larger project to develop additional papers and provide further insights.

Qualifications: An MS degree in wildlife biology, ecological modeling, mammalogy, landscape ecology, or a related field as well as an interest in wildlife density estimation are required.

Furthermore, this student should be prepared to work long days both in the field collecting data and at a computer analyzing that data and writing manuscripts resulting from that work. Applicants should be highly motivated with a documented ability to work independently and collaboratively. The person that we hire should be able to readily interact with partners including government agencies across many levels as well as non-governmental organizations. Applicants with excellent interpersonal skills, experience modeling wildlife population density, publishing peer-reviewed journal articles or technical documents, and prior experience with collaborative interdisciplinary projects will be the most competitive. Other skills in quantitative ecology, proficiency in R, and familiarity with challenges of managing focal wildlife species (white-tailed deer, coyotes, and wild turkey) will make applicants more competitive. The ideal candidate will have:

- 1) Demonstrated experience learning and using a range of packages within R software for statistical analyses and population modeling.
- 2) Strong skills with scientific writing and preparing papers. As well the ability to read and synthesize data from published papers and reports.
- 3) Exceptional organization and planning skills.
- 4) Experience or familiarity with the operation of drones and/or crewed aircraft for wildlife surveys.
- 5) Motivated and hardworking research with a passion for the research questions underlying this project.
- 6) Ability to effectively communicate with external partners and other interested parties about the goals, methods and results of this project.
- 7) Ability to collaborate effectively with a larger research team.

How to Apply: Interested applicants should compile all of the following materials into a single pdf file; a CV that includes contact information for three professional references, a 1-page statement of interest in this position, and responses to the following 7 questions (each of these responses should be 250 words or less). When preparing materials (statement of interest & response to the 7 questions) applicants should explicitly address their scientific writing skills, organizational skills, interest/background in population modeling, quantitative skills, and their ability to work in a team.

1. Describe a situation that demonstrates your work ethic and ability to complete complex tasks in a timely manner.
2. Provide an example of a work/academic situation that typifies how you handle adversity when striving to attain a goal.
3. What motivates you to pursue this job, and how will participation in this project help you achieve your career goals?
4. Please describe a specific example from your work/academic experience that demonstrates your curiosity and creativity.
5. What are your strengths and weaknesses with regard to achieving goals individually and in collaboration with others?
6. Why you would be a good fit to fulfill the roles described above for this specific project?
7. What do you find particularly interesting about wildlife density estimation in general and this project in particular?

That single pdf should be attached to an email that has a subject line of “Application for Drone Wildlife Density PhD position”. That email should be sent to Dr. Patrick Zollner (pzollner@purdue.edu) and applicants should understand that their application materials may be reviewed by other project collaborators as part of application evaluation. ***Application review will begin on Monday November 20th*** and continue as applications are received until a suitable applicant is hired for the position.

The Community: Purdue is a land-grant university of over 40,000 students and ranked the 10th best public university in the U.S. The Department of Forestry and Natural Resources is housed administratively in the College of Agriculture (#7 US ranking) and offers vibrant, nationally ranked graduate programs in wildlife and ecology. Located in West Lafayette, Indiana, Purdue is an easy drive from Indianapolis and Chicago. The West Lafayette-Lafayette area is home to a diverse community of 174,000, with good schools, safe neighborhoods, over 40 parks and extensive trail systems, active Farmers Markets, and community festivals and art events throughout the year.

Contact Persons: Dr. Patrick Zollner

Contact Phones: (765) 496-9495

Contact e-mails: pzollner@purdue.edu

Purdue University is an EOE/AA employer. All individuals, including minorities, women, individuals with disabilities, and veterans are encouraged to apply.