



PennVet
UNIVERSITY of PENNSYLVANIA

Wildlife
Futures
Program

WILDLIFE FUTURES PROGRAM
ANNUAL REPORT



2022 - 2023





PennVet
UNIVERSITY of PENNSYLVANIA

Wildlife
Futures
Program

ANNUAL REPORT // 2022–2023

MESSAGE FROM THE CO-DIRECTORS

Launched in 2019, the Wildlife Futures Program is a novel partnership between the Pennsylvania Game Commission (PGC) and the University of Pennsylvania's School of Veterinary Medicine (Penn Vet) aimed at strengthening the resilience of the Commonwealth's 480 species of birds and mammals. By combining the vast experience and resources of the PGC and Pennsylvania's only veterinary school, this program implements a forward-thinking approach to ensuring that Pennsylvania's wild species thrive for generations.

With our new wildlife pathologist working in tandem with our diligent field crew of wildlife health technicians, we sampled 1,000 more animals for testing compared to last year. The Sample Resource Manager catalogued and organized our tissue biorepository, which houses over 20,000 animal samples. Our Communications Coordinator increased our visibility and engagement with key stakeholders and partners at numerous events and across multiple platforms.

Several impactful research projects were launched, including a study of the potential effects of anticoagulant rodenticides and neonicotinoid insecticides on barn owl populations. Barn owls are declining in Pennsylvania, making them a Species of Greatest Conservation Need, and this study aims to determine whether these toxicants may be a contributing factor.

Wildlife Futures became integrated into Penn Vet's newly redesigned core veterinary curriculum this year through our inaugural wildlife health capstone and wet lab experiences. We continue to train students in the field and laboratory, including fifteen summer students across 2022 and 2023.

Our program has continued to be an integral part of the massive national response to highly pathogenic avian influenza. Working in partnership with the Pennsylvania Animal Diagnostic Laboratory System, over 1,000 Pennsylvania wildlife specimens were tested, resulting in 102 non-negative results in a variety of wild bird species and five red foxes.

In a world of accelerating change, we are working to engage and empower our stakeholders, including agencies and citizens, to take informed actions to help maintain resilient populations of wildlife for generations to come.

JULIE C. ELLIS, MS, PhD AND LISA MURPHY, VMD, DABT
Co-Directors, Wildlife Futures Program

MISSION

The Wildlife Futures Program is committed to discovering innovative and proactive solutions to a variety of complex wildlife health challenges. We are a collaborative, supportive, and inclusive team that educates the next generation of wildlife professionals, and empowers our stakeholders to make informed management decisions.

FIELD SUPPORT



Our **FIELD OPERATIONS** span all six regions of Pennsylvania. From assessing wildlife health concerns to collecting samples for ongoing research, our Wildlife Health Technicians and wildlife veterinarians are crucial to our operations and the safeguarding of wildlife health.

WILDLIFE HEALTH TECHNICIANS

Our Wildlife Health Technicians (WHTs) are valued resources for Pennsylvania wildlife health, investigating causes of wildlife mortality and collecting samples for research projects. They gather numerous samples for chronic wasting disease (CWD) testing, contribute to a repository of samples for future research in our biobank, and enter data into the Pennsylvania Game Commission's Wildlife Health Information Network database. The WHTs have expanded their skills and adaptability by becoming certified CWD technicians and Pennsylvania certified poultry technicians. This team of field experts has been instrumental in many research projects conducted by the Wildlife Futures Program and its partners, ensuring a finger is kept on the pulse of wildlife health across the state.

ASSISTING THE PENNSYLVANIA GAME COMMISSION

Our Wildlife Health Technicians continue to provide valuable assistance to Pennsylvania Game Commission (PGC) operations. Field support has included training PGC staff; collecting samples for research and diagnostics; assisting in PGC research captures and banding/collaring of ducks, geese, kestrels, peregrine falcons, turkeys, deer, and bear; and conducting surveys for bats, grouse, goshawks, herons, hares, and woodrats. In addition, our wildlife veterinarians provided their veterinary expertise to many of the PGC's field projects, including seasonal bear den checks, barn owl banding, elk captures, and more.



▲ Wildlife Health Technician Ian Gereg assists in the monitoring of an anesthetized female black bear during a seasonal den visit.

**3,068 ANIMALS
SAMPLED**

JULY 2022 – JUNE 2023

White-Tailed Deer	1,119
Non-Game Birds	581
Furbearers	544
Turkeys	326
Small Game Mammals	194
Waterfowl	165
Bear	45
Non-Game Mammals	36
Elk	22
Non-Native Mammals	16
Webless Game Birds	14
Pheasants/Quail/Doves	6

SURVEILLANCE & DIAGNOSTICS

To provide comprehensive **SURVEILLANCE AND DIAGNOSTICS**, the Wildlife Futures Program utilizes its suite of trained technicians, laboratory equipment, and broad research expertise to accurately analyze and report results. Our findings aim to inform the strategic allocation of resources for priority wildlife health issues.

CHRONIC WASTING DISEASE

Chronic wasting disease (CWD) is a contagious, always-fatal disease that has been affecting Pennsylvania's wild deer population since its first detection in the state in 2012. Wildlife Futures continues to inform and improve CWD management efforts in Pennsylvania and beyond. Critical testing of Pennsylvania deer for CWD is performed using the gold standard tests, Enzyme-Linked ImmunoSorbent Assay (ELISA) and Immunohistochemistry (IHC). In the past fiscal year, 8,195 ELISA tests and 329 IHC tests were completed for Pennsylvania alone. An additional 1,989 IHC tests were performed for other states, including New Jersey, New Hampshire, Rhode Island, and Connecticut. Most of these samples were submitted during hunting season, with further samples acquired through roadkill mortalities, targeted removals, and clinical suspects throughout the year.

During the 2022-2023 hunting season, the average turnaround time for hunter-harvested CWD diagnostic testing, from receipt of sample to issue of preliminary report, was five days. Outside of hunting season, Wildlife Futures tested samples and reported results within three days.

► Field Operations Manager and wildlife veterinarian Erica Miller and Wildlife Health Technician Matt Shaub collect blood from an owllet for Wildlife Futures' barn owl toxicology study.

TOXICOLOGY EXPERTISE

Barn Owl Study

Barn owl populations have been rapidly declining, making them a Species of Greatest Conservation Need. Wildlife Futures has partnered with the Pennsylvania Game Commission to investigate the presence of environmental contaminants, such as anticoagulant rodenticides and neonicotinoid insecticides, in Pennsylvania barn owl populations. This study involves taking blood samples, collecting owl pellets from nest boxes, and performing opportunistic necropsies to gauge the impact of environmental contaminants on barn owls in the state.

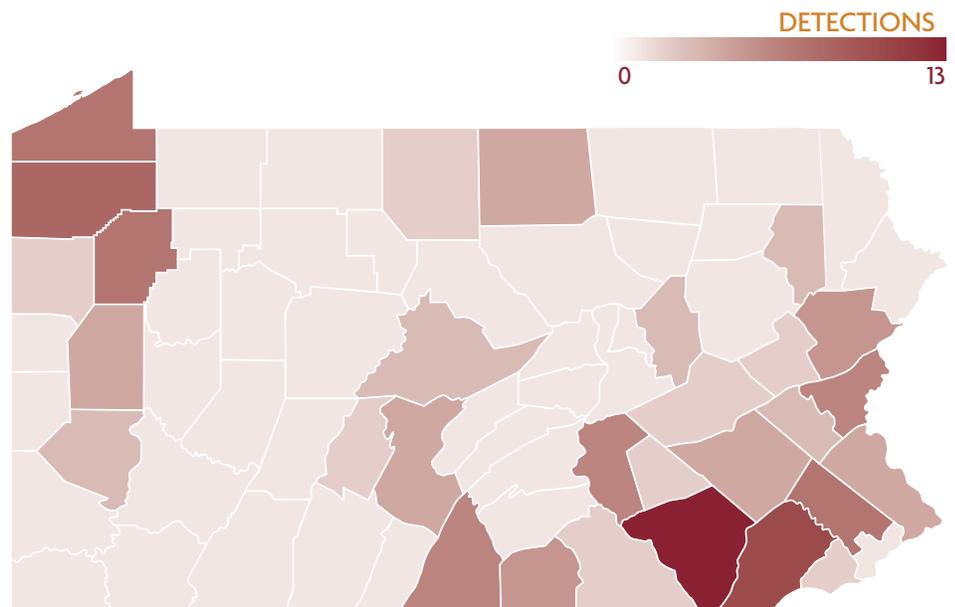


HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI)

Wildlife Futures and New Bolton Center's Pennsylvania Animal Diagnostic Laboratory System are actively monitoring HPAI in wild and domestic animals in Pennsylvania. Since March 2022, 1,010 wild bird and wild mammal samples have been tested, with 102 non-negative detections occurring in wild birds and five occurring in red foxes.

HPAI DETECTION

MARCH 2022 THRU JUNE 2023



OUR BARN OWL STUDY INVOLVES TAKING BLOOD SAMPLES, COLLECTING OWL PELLETS FROM NEST BOXES, AND PERFORMING OPPORTUNISTIC NECROPSIES TO GAUGE THE IMPACT OF ENVIRONMENTAL CONTAMINANTS ON BARN OWLS IN THE STATE.

WILDLIFE PATHOLOGY SERVICE

As of August 2022, Wildlife Futures has provided wildlife pathology diagnostics to its partners through its Wildlife Pathology Service. The service has examined over 300 Pennsylvania wildlife cases, with the caseload increasing every month. In addition to providing diagnoses on suspected and unusual animal mortalities, the service assists researchers on projects investigating causes of mortality in a variety of species. With a dedicated wildlife pathologist on the team, Wildlife Futures provides in-depth analysis and diagnostics for wildlife cases submitted to our labs, giving agencies key insights into the region's wildlife health concerns.

► Wildlife Health Technician Lane Potts performs an HPAI test on a juvenile eagle. The eagle, who fell out of its nest and fractured a wing, was swabbed following protocols established in our HPAI for Wild Bird Facilities guidelines.

WILDLIFE HEALTH SURVEILLANCE PLAN

A formalized Wildlife Health Surveillance Plan for Pennsylvania has been updated for the 2023–2024 fiscal year. The plan outlines priorities for disease and health surveillance for Pennsylvania wildlife. This living document will continue to be modified over time to address emerging disease issues and health concerns.





RESEARCH

The Wildlife Futures Program conducts **RESEARCH** to improve diagnostic capacities, understand disease effects on wildlife populations, and guide disease management efforts. Our team leverages innovative approaches and collaboration with expertise across the University of Pennsylvania to address complex problems facing wildlife disease.

CHRONIC WASTING DISEASE

RT-QuIC

Wildlife Futures continues its research into the effectiveness of Real-Time Quaking-Induced Conversion (RT-QuIC) for early and rapid detection of chronic wasting disease (CWD). RT-QuIC allows for sensitive and specific identification of CWD prions from multiple sample sources, including postmortem, live animal, and environmental samples. In the past year, Wildlife Futures worked to standardize assays, providing more diagnostic capabilities for this disease. The overarching goal of our RT-QuIC work is to better inform hunters on the disease status of the deer they harvest, advise management of disease prevalence, and better understand how prions move across the landscape.

Deer Collaring

In addition to laboratory work, Wildlife Futures collaborated with the Pennsylvania Game Commission and Penn State University to launch a field research project to better understand cause of death, behavioral changes, and population level effects of CWD on white-tailed deer in the CWD-established area of Pennsylvania. The project involves collaring and sampling white-tailed deer within the CWD established area. Biological samples are being taken to determine if deer are infected, and to develop and validate new assays for future CWD diagnostic testing. The tracking collars monitor the deer's movement over time, giving us key insights into the mechanisms of spatial distribution of CWD across Pennsylvania.

► Postdoctoral researcher Jennifer Høy-Petersen and Sample Resource Manager Casey Maynard assisted with the deer collaring field study this past March, offering field and veterinary experience.

Conservation K9s

A proof-of-concept study conducted by Penn Vet's Working Dog Center has shown that dogs can differentiate feces of CWD-positive white-tailed deer from those that are CWD negative. The research was published in the journal *Prion* in February 2023, and the Wildlife Futures' Conservation K9 Team is currently assessing their dogs' detection success rates to determine how this research can be applied in the field.



TURKEY HEALTH

Wildlife Futures has partnered with the Pennsylvania Game Commission (PGC) and Penn State University on the Wild Turkey Project, a four-year health study of wild turkey populations in Pennsylvania. This project involves the live capture of turkeys in Wildlife Management Units 2D, 3D, 4D, and 5C, obtaining biological samples for testing, and tagging the birds with radio transmitters to record their movements, habitat use, nest success, and survival rates. Wildlife Futures is leading the effort to determine the effects of pathogens on turkey populations. Spring 2023 marked Year Two of field captures and sampling, installation of new lab equipment for this project, and completion of other molecular work for the PGC. We have completed the first two years of viral testing and collated preliminary results. The inclusion of additional sampling and generation of demographic data will allow us to robustly determine Reticuloendotheliosis virus and Lymphoproliferative disease virus burdens across varying landscapes and link these to individual and population-level outcomes in wild turkeys.



▲ Wildlife Health Technician Lauren Maxwell holds a “transmitter hen” while assisting with the Wild Turkey Project.

SARS-COV-2

In the wake of the 2020 COVID-19 pandemic, Wildlife Futures continues to sample white-tailed deer for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). In 2023 Wildlife Futures joined the USDA on its One Health: Building an Early Warning System for SARS-CoV-2 and Other Animal Diseases project, which was funded by the 2021 American Rescue Plan. This project aims to strengthen the nation’s ability to respond to zoonotic diseases and help us better understand how SARS-CoV-2 is transmitted between animals and people.

WEST NILE VIRUS

West Nile virus (WNV) is a disease transmitted by mosquitos that can be fatal to wild bird species. Wildlife Futures is conducting a study to assess the potential influence of WNV on trends in bird populations in Pennsylvania, while also working with citizen science programs to improve monitoring of game species such as the ruffed grouse, our state bird. The work involves combining multiple modeling approaches to disentangle the effects of the virus from the multitude of other factors that influence bird populations.

BIOREPOSITORY

Wildlife Futures continues to make great strides in establishing a wildlife tissue biorepository. With the addition of our new Sample Resource Manager, over 21,000 samples have been extensively catalogued and organized, allowing researchers to efficiently locate and obtain samples for use. This sets the framework for our expansion of this resource.

WILDLIFE FUTURES HAS PARTNERED WITH THE PENNSYLVANIA GAME COMMISSION AND PENN STATE UNIVERSITY ON THE WILD TURKEY PROJECT, A FOUR-YEAR HEALTH STUDY OF WILD TURKEY POPULATIONS IN PENNSYLVANIA.

EDUCATION AND TRAINING

Uniquely positioned within Pennsylvania's only veterinary school, the Wildlife Futures Program provides **EDUCATION AND TRAINING** for the next generation of wildlife researchers, veterinary practitioners, and managers.

VET STUDENTS

Penn Vet Curriculum

Wildlife Futures was fundamental in the implementation of wildlife health courses within Penn Vet's curriculum redesign process. Starting in fall 2023, wildlife health topics will be featured in first-, second-, and third-year coursework for all vet students at Penn Vet.

Wet Labs

To help future veterinarians gain essential hands-on wildlife experience, Wildlife Futures personnel have hosted multiple "wet labs" throughout the year as part of the curriculum and as extracurricular activities for various student clubs. The wet labs, which cover a wide range of topics, from blood collection and fracture stabilization to necropsy and sampling techniques, give Penn Vet students an opportunity to apply their veterinary knowledge to wildlife species in an informative and memorable manner.

Summer Students

During the summers of 2022 and 2023, Wildlife Futures hosted fifteen summer students. These students worked under the direct supervision of Wildlife Futures faculty and staff on a wide array of projects, including wild turkey health, *Plasmodium odocoilei* in deer, canine distemper in wildlife, parasites in Mustelidae, chronic wasting disease, and more.

GENERAL PUBLIC

Our Wildlife Health Technicians (WHTs) regularly interact with the public, offering wildlife education opportunities to community members, hunters, and other wildlife enthusiasts. WHTs gave lectures and sampling demonstrations for several high school and community groups, presented at sporting events, and provided necropsy training for Game Commission (PGC) cadets. Additionally, some WHTs gave lectures and demonstrations at the Wildlife Leadership Academy, a program that empowers high school students to become conservation ambassadors.

PENNSYLVANIA GAME COMMISSION

Wildlife Futures continues to assist the Pennsylvania Game Commission's Wildlife Health Division in the training and continuing education of wardens, biologists, interns, and other staff. This includes classroom and field instruction on wildlife immobilization, sampling techniques, and necropsy procedures.

WILDLIFE PROFESSIONALS

Wildlife Futures team members organized and moderated a symposium at the NEAFA annual conference titled, "Existing and Emerging Threats to Fish and Wildlife Health in the Northeastern United States." They highlighted their work in lead detection, turkey disease prevalence, training chronic wasting disease detection dogs, and more. They also co-led a workshop with PGC, "Field Response to Wildlife Health Events," which provided hands-on training for wildlife professionals in multiple state agencies.

COMMUNICATIONS AND OUTREACH



The Wildlife Futures Program applies a robust **COMMUNICATIONS AND OUTREACH** strategy to inform, educate, and advocate for wildlife health to an ever-expanding audience.

SHARED WILDLIFE HEALTH INFORMATION SYSTEM

The Shared Wildlife Health Information System (SWHIS) is an online database designed to facilitate the management, analysis, and reporting of wildlife health data. The SWHIS provides wildlife agencies with a user-friendly platform to record and visualize historic and ongoing data, as well as the tools needed to make data-driven decisions in response to wildlife health events. Since its release in October 2022, eight state agencies have been onboarded and trained in using the SWHIS. Ongoing developments include a collaboration with the New Jersey Department of Fish and Wildlife to build a feature service that will allow geospatial data entered into SWHIS to be directly imported into ArcGIS, enabling agencies to create maps and other visualizations outside of the SWHIS dashboard.

BOLSTERED COMMUNICATIONS

Over the past fiscal year, communications capabilities have greatly increased for Wildlife Futures, enabling us to reach more stakeholders. Team members have been prominently featured in the media, offering expertise on newsworthy topics such as the impacts of highly pathogenic avian influenza, potential applications of scent detection dogs in conservation work, and potential impacts of Canadian wildfire smoke on Pennsylvania wildlife. Additionally, Wildlife Futures has been repeatedly showcased on Penn Vet's social media channels, engaging a large, scientific, and wildlife-friendly audience.

WEBSITE REVISION

In April 2023 the Wildlife Futures website received a much-needed refresh. The new design, which reflects the program's strategic goals, gives visitors a clear and concise overview of the program and all its facets.

Visit www.vet.upenn.edu/wildlife-futures to learn more.

HPAI GUIDELINES

In response to the highly pathogenic avian influenza (HPAI) outbreak, Wildlife Futures and Pennsylvania Game Commission personnel created *HPAI Guidelines for Wild Bird Facilities*. These guidelines, which included FAQs, what to do when HPAI is suspected, biosecurity best practices, and information on state agency response measures, were distributed to wild bird facilities across the region, giving agencies and organizations the information needed to mitigate the spread of HPAI.

NATIONAL DEER ASSOCIATION

Wildlife Futures has communicated with key stakeholders in the deer hunting community through our partnership with the National Deer Association (NDA). Within the past year, two Wildlife Futures videos and one podcast were produced by NDA. The videos featured information on our Conservation K9s and chronic wasting disease (CWD) diagnostic lab procedures, while the podcast interviewed Wildlife Futures' Conservation K9 Supervisor on how the Conservation K9s can detect volatile organic compounds in CWD-positive deer feces.

2022–2023 PUBLICATIONS

Stone C, Petch R, **Gagne RB**, Nehring M, Tu T, Beatty JA, VandeWoude S. 2022. Prevalence and Genomic Sequence Analysis of Domestic Cat Hepadnavirus in the United States. *Viruses*, 14(10): 2091.

Bashor L, **Gagne RB**, Bosco-Lauth A, Bowen R, Stenglein M, VandeWoude S. 2022. Rapid evolution of SARS-CoV-2 in domestic cats. *Virus Evolution*, 8(2): veac092.

Kunkel MR, Brown JD, Williams L, **Niedringhaus KD**, Fenton H, Ruder MG, Nemeth NM. 2022. Comparison of Pathology and Immunohistochemistry in Natural and Experimental West Nile Virus Infections in Ruffed Grouse (*Bonasa umbellus*). *Journal of Wildlife Diseases*, 58(4): 919–925.

Sanz A, **Miller EA**, Harley N, Coffee L. 2022. Papillomatosis in a raccoon (*Procyon lotor*). *Wildlife Rehabilitation Bulletin*, 40:1, 22–26.

Weyna AAW, **Niedringhaus KD**, Kunkel MR, Fenton HMA, Keel MK, Webb AH, Bahnson C, Radisic R, Munk B, Sánchez S, Nemeth NM. 2022. Listeriosis with viral coinfections in 8 gray foxes, 8 wild turkeys, and 2 young cervids in the southeastern United States. *Journal of Veterinary Diagnostic Investigation*, 34(4): 654–661.

Alonso FH, **Niedringhaus KD**, Ceregatti MG, Maglaty MA. 2022. Case Report: Cytologic Description of Somatotroph Pituitary Adenoma in a Cat. *Frontiers in Veterinary Science*, 9: 934009.

Petch RJ, **Gagne RB**, Chiu E, Mankowski C, Rudd J, Roelke-Parker M, VandeWoude S. 2022. Feline Leukemia Virus Frequently Spills Over from Domestic Cats to North American Pumas. *Journal of Virology*, 96(23): e01201-22.

Mallikarjun A, Swartz B, Kane SA, **Gibson M**, Wilson I, Collins A, Moore MB, Charendoff I, **Ellis JC**, **Murphy LA**, Nichols T, Otto CM. 2023. Canine detection of chronic wasting disease (CWD) in laboratory and field settings. *Prion*, 17:1, 16–28.

Niedringhaus KD, Gordon M, Yabsley MJ, Gai J, Uzal FA, Woolard KD. 2023. Fatal balamuthosis in a Siberian tiger and a literature review of detection options for free-living amoebic infections in animals. *Journal of Veterinary Diagnostic Investigations*, 35(3): 311–316

Niedringhaus KD, Dumbacher JP, Dunker F, Medina S, Lawson B, Fenton HMA, Higley JM, Haynes E, Yabsley MJ. 2023. Apparent prevalence, diversity, and associated lesions of periorbital nematodes in a population of barred owls (*Strix varia*) from northern California, USA. *Journal of Wildlife Diseases*, 59(2): 299–309.

Anis E, Kattoor JJ, **Greening S**, Jones L, Wilkes RP. 2023. Investigation of the pathogens contributing to naturally occurring outbreaks of infectious bovine keratoconjunctivitis (pinkeye) using Next Generation Sequencing. *Veterinary Microbiology*, 282: e109752.

Sewall BJ, Turner GG, Scafina MR, Gagnon MF, Johnson JS, Keel MK, **Anis E**, Lilley TM, White JP, Hauer CL, Overton BE. 2023. Environmental control reduces white-nose syndrome infection in hibernating bats. *Animal Conservation*. First published 23 February 2023.

Xu X, **Murphy LA**. 2023. Simple and fast quantification of cannabinoids in animal feeds by liquid chromatography-tandem mass spectrometry. *Journal of Veterinary Diagnostic Investigation*, 17:10406387231169290.

Xu X, **Murphy LA**. 2023. Simultaneous determination of pyrethrins, pyrethroids, and piperonyl butoxide in animal feeds by liquid chromatography-tandem mass spectrometry. *Toxins*, 15(6): 401–412.

Murphy LA. 2023. Harmful Algal Blooms. *Fowler's Zoo and Wildlife Medicine*, Volume 10. Miller RE, Lamberski N, Calle P, eds. Elsevier, St. Louis, MO, 403–408.

Miller EA, Rosenhagen N. 2023. Chapter 14: Native Wildlife. *Carpenter's Exotic Animal Formulary*, 6th ed. J.W. Carpenter and C.A. Harms, eds. Elsevier: St. Louis, MO, 736–756

Mwakibete L, **Greening S**, Kalantar K, Ah Yong V, **Anis E**, **Miller EA**, Needle DB, Oglesbee M, Thomas WK, Sevigny JL, Gordon LM. 2023. Metagenomics for pathogen detection during a wildlife mortality event in songbirds. *bioRxiv*, pp.2023-06.



◀ Field Operations Manager and wildlife veterinarian Erica Miller assisted with regional Capture Training and Use of Pharmaceuticals; a mandatory training for Pennsylvania Game Commission game wardens, wildlife biologists, and other agency personnel who administer immobilization drugs to wildlife.

NEW STAFF

August 2022



Kevin Niedringhaus, BVetMed, PhD, DACVP, Wildlife Pathologist, is an assistant professor of Wildlife Pathology at Penn Vet. Since completing veterinary school, he has spent over eight years training in veterinary diagnostic pathology, focusing on wildlife diseases with an interest in parasitology. He is tasked with determining the cause of disease and mortality in wildlife using necropsy, histopathology, and other diagnostic tests. In addition to diagnosing and describing emerging and novel diseases, his active areas of research include studying parasites of wildlife, particularly those with public health significance.



Cara Brennan, Wildlife Accessioning Technician, holds a BS in Ecology and a BA in Environmental Studies, with a background in aquatic ecology research, environmental planning and restoration, and quantification of microplastics in birds. She handles sample receiving and shipping for the chronic wasting disease lab, biobanking, and research projects, while also providing lab assistance in DNA extraction.

October 2022



Lisa Varotsis, Program Administrator, uses her thirty-five years of experience in business operations and logistics management to track all of Wildlife Futures' financial expenditures, while also coordinating with current partners to ensure routine meetings and productive collaboration occur. She also oversees the procurement of supplies for our research labs and office personnel.



Casey Maynard, Sample Resource Manager, comes to Wildlife Futures with extensive fieldwork spanning multiple states and regions. She oversees our biobanking needs and brainstorms creative solutions for future development. Thus far she has catalogued and organized over 4,000 samples in the program's five -80° freezers and is researching the selection of new collections management software for the program. She has also been assisting in the lab with Enzyme-Linked Immunosorbent Assay testing, DNA extraction, and Real Time Quaking-Induced Conversion testing of deer lymph nodes for chronic wasting disease.



▲ Thanks to Wildlife Futures' collaboration with the National Deer Association, an informative video about our chronic wasting disease scent detection dogs was produced, introducing the public to the Conservation K9 team and their ongoing field research.



Madison Stevens, Wildlife Prosector and Necropsy Technician, has a background in wildlife and marine science. She couples her knowledge with extensive field experience, having worked in conservation education, stewardship, and laboratory settings. She works on wild animal diagnostic cases and assists both Penn Vet's large-animal domestic pathology section and Pennsylvania Game Commission field personnel.

November 2022



Brooke Ezzo, Communications Coordinator, combines a long career in the marketing/communications field and a passion for wildlife to effectively communicate for Wildlife Futures. She works to bolster the program's visibility by collaborating with partnership organizations, coordinating content and media releases, and delivering timely and effective information to constituents.

January 2023



Jennifer Høy-Petersen, Cand.med.vet., postdoctoral researcher, is a wildlife veterinarian particularly interested in wildlife diseases and disease ecology. Her current project covers several aspects of research focused on chronic wasting disease (CWD) in cervids, which includes optimization of diagnostic methods to detect CWD using Real Time Quaking-Induced Conversion on samples from multiple tissue types.

May 2023



Axel O. G. Hoarau, PhD, postdoctoral researcher, is interested in investigating the ecology and evolution of zoonotic diseases in wildlife. He has experience studying the ecological factors driving viral transmission dynamics and diversity in bat communities of the Southwestern Indian Ocean territories. His research focuses on diverse approaches comprising field sampling, laboratory investigations, statistical and phylogenetic analyses, and epidemiological modeling. He will help establish new studies on zoonotic diseases and viral evolution following cross-species transmissions.

