SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY

SCWDS BRIEFS

A Quarterly Newsletter
Southeastern Cooperative Wildlife Disease Study
College of Veterinary Medicine
The University of Georgia
Athens, Georgia 30602

Summer 2024 — Volume 42 — Number 2

Eds. M. Ruder and B. Kurimo-Beechuk

Eastern cottontail, Deb Carter

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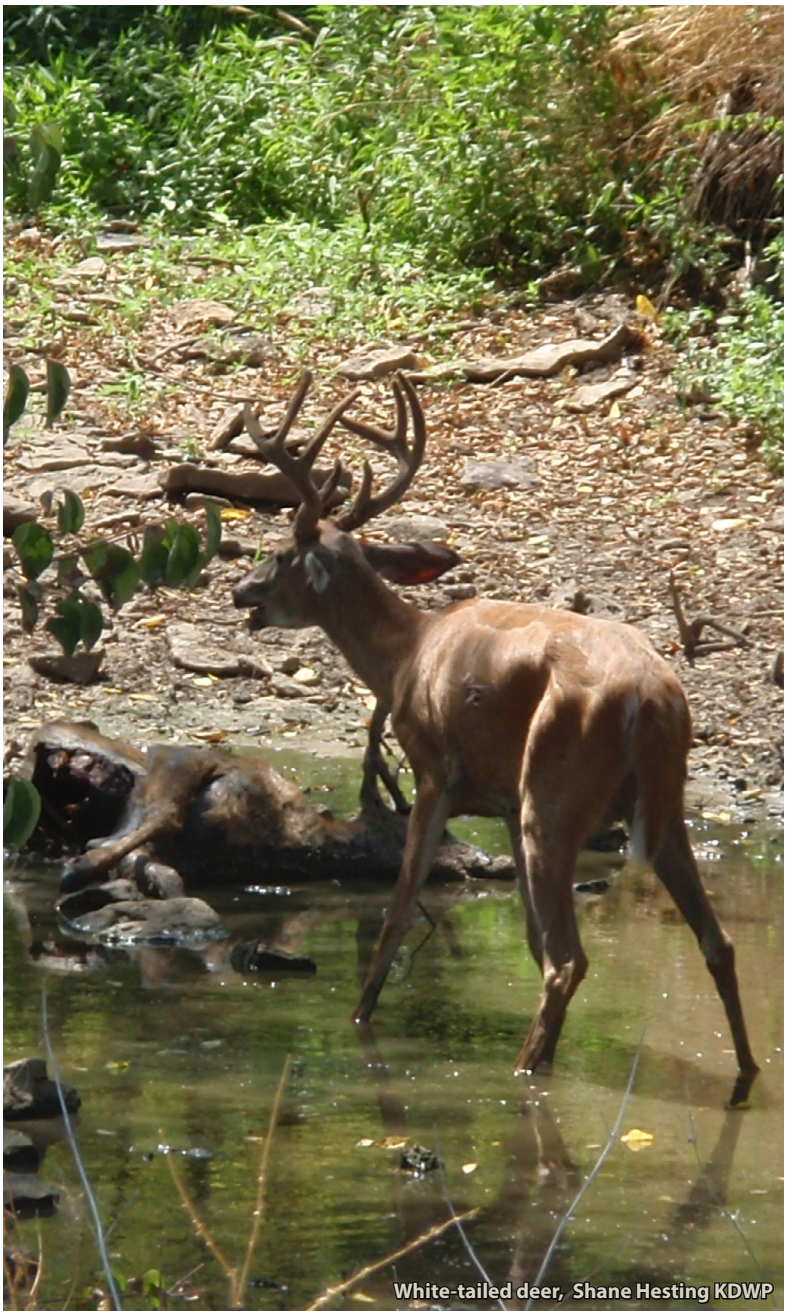
Cervid health updates

Heating up? 2024 HD update

We know that every year in the United States, there will be hemorrhagic disease (HD) mortality in white-tailed deer - the primary uncertainties are exactly where those outbreaks will occur, and how intense they will prove to be. Although we do not have a crystal ball and we are still early in the 2024 HD season, things have been pretty active thus far.

Caused by either bluetongue virus (BTV) or epizootic hemorrhagic disease virus (EHDV), HD is one of the most visible and important infectious diseases of white-tailed deer. Every summer and fall, wildlife professionals investigate wild ruminant (e.g., deer, pronghorn, elk) mortality events and frequently submit tissue samples to SCWDS for EHDV and BTV diagnostic testing. Typically, submissions begin in June and July, peak in August and September, and begin to taper in October and November. At SCWDS, samples are screened for BTV and EHDV by real-time reverse transcription polymerase chain reaction (RT-PCR) test. Virus isolation and serotype determination are attempted on positive samples.

From June through August, SCWDS has received 90 dead wild ruminant samples from 17 states, yielding 39 EHDV/BTV detections in 13 states. As expected, EHDV has predominated and has been confirmed in 12 states, including Louisiana, Arkansas, Georgia, Tennessee, Missouri, Kentucky, Indiana, North Carolina, Virginia, West Virginia, Maryland, and Pennsylvania. Although virus isolation and serotype determination are pending



White-tailed deer, Shane Hesting KDWP

2024 HD update

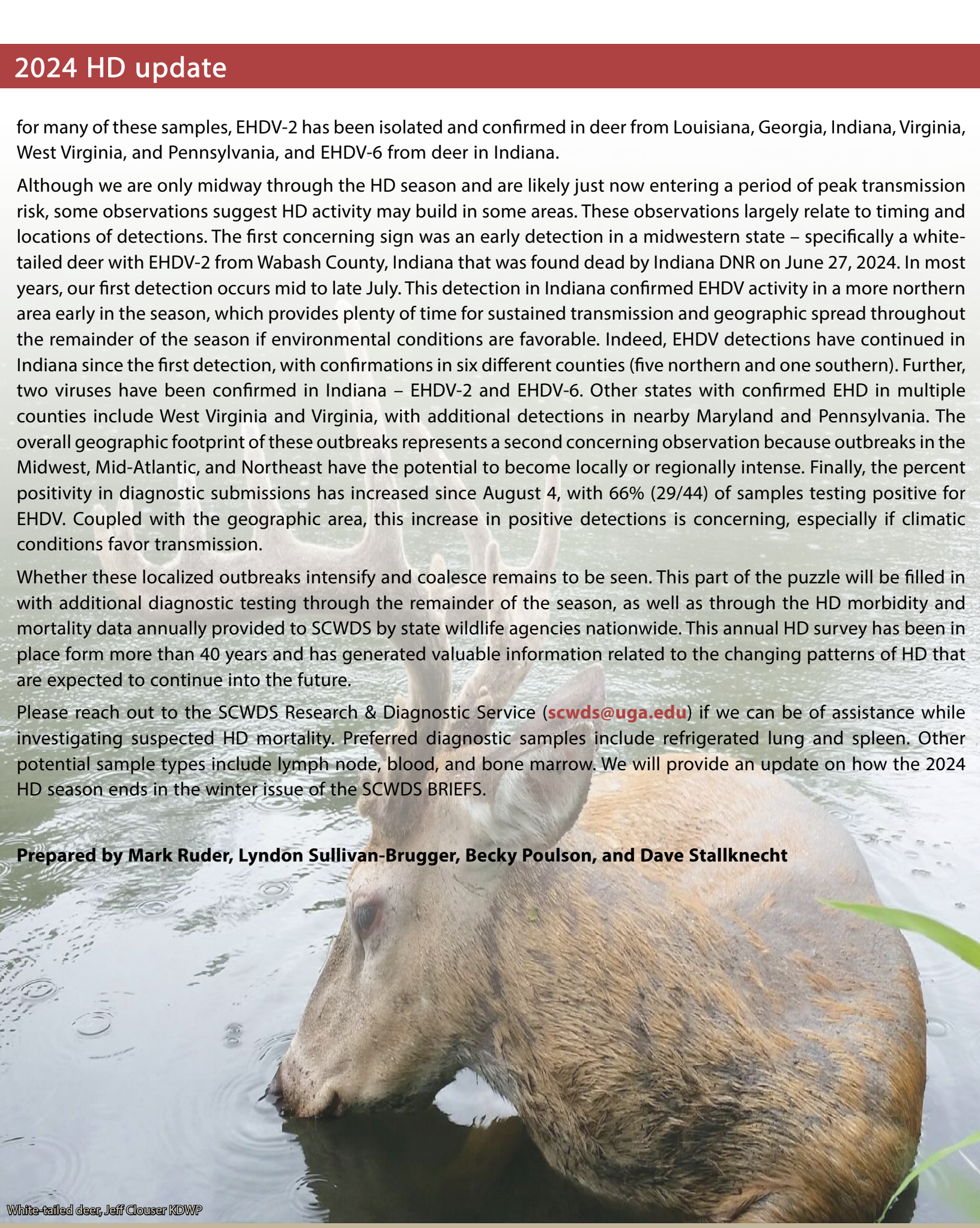
for many of these samples, EHDV-2 has been isolated and confirmed in deer from Louisiana, Georgia, Indiana, Virginia, West Virginia, and Pennsylvania, and EHDV-6 from deer in Indiana.

Although we are only midway through the HD season and are likely just now entering a period of peak transmission risk, some observations suggest HD activity may build in some areas. These observations largely relate to timing and locations of detections. The first concerning sign was an early detection in a midwestern state – specifically a white-tailed deer with EHDV-2 from Wabash County, Indiana that was found dead by Indiana DNR on June 27, 2024. In most years, our first detection occurs mid to late July. This detection in Indiana confirmed EHDV activity in a more northern area early in the season, which provides plenty of time for sustained transmission and geographic spread throughout the remainder of the season if environmental conditions are favorable. Indeed, EHDV detections have continued in Indiana since the first detection, with confirmations in six different counties (five northern and one southern). Further, two viruses have been confirmed in Indiana – EHDV-2 and EHDV-6. Other states with confirmed EHD in multiple counties include West Virginia and Virginia, with additional detections in nearby Maryland and Pennsylvania. The overall geographic footprint of these outbreaks represents a second concerning observation because outbreaks in the Midwest, Mid-Atlantic, and Northeast have the potential to become locally or regionally intense. Finally, the percent positivity in diagnostic submissions has increased since August 4, with 66% (29/44) of samples testing positive for EHDV. Coupled with the geographic area, this increase in positive detections is concerning, especially if climatic conditions favor transmission.

Whether these localized outbreaks intensify and coalesce remains to be seen. This part of the puzzle will be filled in with additional diagnostic testing through the remainder of the season, as well as through the HD morbidity and mortality data annually provided to SCWDS by state wildlife agencies nationwide. This annual HD survey has been in place form more than 40 years and has generated valuable information related to the changing patterns of HD that are expected to continue into the future.

Please reach out to the SCWDS Research & Diagnostic Service (**scwds@uga.edu**) if we can be of assistance while investigating suspected HD mortality. Preferred diagnostic samples include refrigerated lung and spleen. Other potential sample types include lymph node, blood, and bone marrow. We will provide an update on how the 2024 HD season ends in the winter issue of the SCWDS BRIEFS.

Prepared by Mark Ruder, Lyndon Sullivan-Brugger, Becky Poulson, and Dave Stallknecht

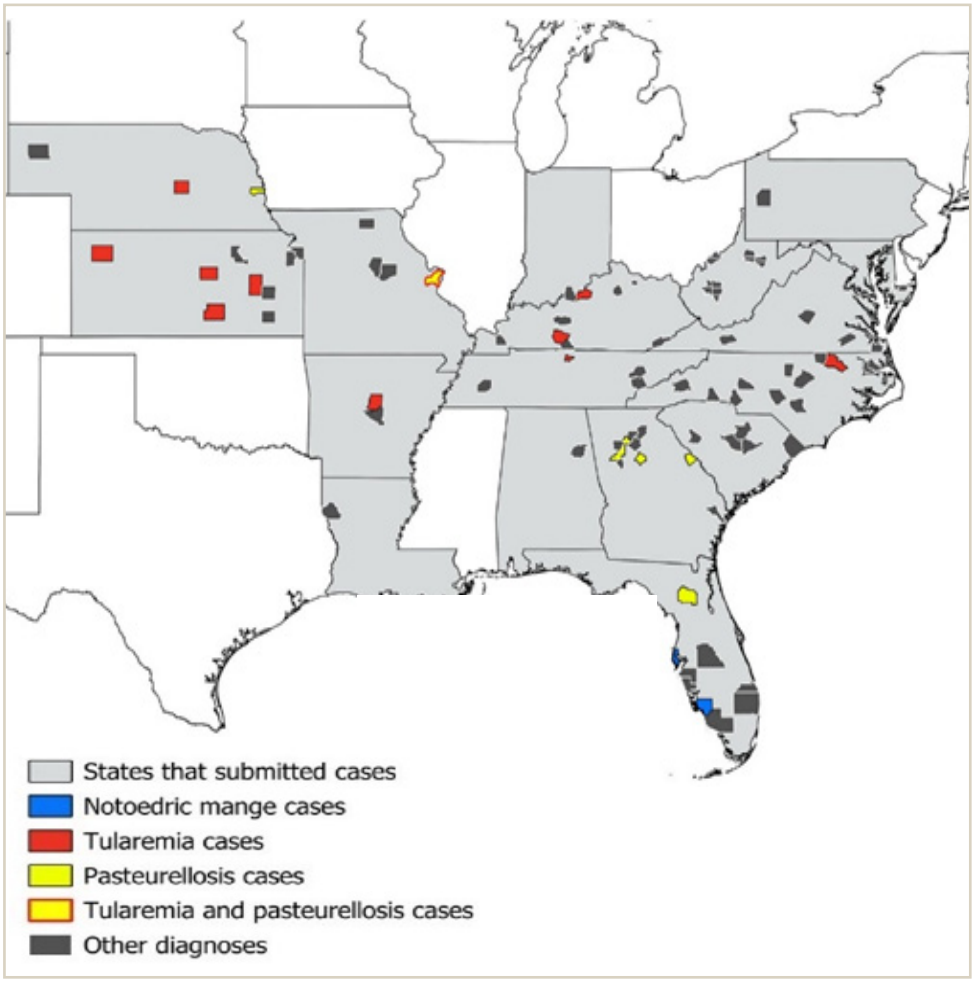


White-tailed deer, Jeff Clouser KDWP

Causes of morbidity & mortality in cottontails

Occasionally, targeted surveillance efforts for a specific disease in a wildlife population can have unintended benefits and shed light on other diseases affecting a species or species group. Such a scenario recently occurred with cottontail rabbits (*Sylvilagus* spp.). With the emergence of rabbit hemorrhagic disease virus 2 (RHDV2) in wild lagomorph populations during the spring of 2020, detection of wild lagomorph mortalities became a centerpiece to RHDV2 surveillance efforts by many wildlife management agencies in the U.S. Accordingly, cottontail rabbit submissions to the **SCWDS Research and Diagnostic Service** increased dramatically compared with years prior. Despite being common and abundant throughout the eastern U.S., cottontails have not historically comprised a major portion of the SCWDS diagnostic caseload. Therefore, to best utilize this surge in interest in a culturally and ecologically important species group, we recently completed a project to look beyond RHDV2 and review causes of mortality among cottontails submitted to SCWDS. The goal was to retrospectively review the diagnostic database from 2013 through 2022 to determine causes of morbidity and mortality of cottontails submitted from throughout the Cooperative. We provide a summary of our approach and findings below, with the full article available **here**.

From 2013 through 2022, SCWDS received 119 cottontail cases from the central and eastern U.S., comprising 147 animals. The overwhelming majority (86%; n=102) of these cottontail submissions occurred after initial detection of RHDV2 in the U.S. in 2020 map, right. Necropsy records were retrospectively evaluated for major causes of death, contributors to mortality, and pathogen detections. Full postmortem evaluation including gross and histologic examination was performed for 112 rabbits. Cottontails were routinely tested for two important pathogens: RHDV2 (beginning in 2020) and *Francisella tularensis* (2013-2022). Of the 147 rabbits evaluated, 111 (76%) were screened for *F. tularensis*, a zoonotic bacterium and cause of tularemia in animals and humans. From 2020-2022, 123 cottontails were tested for RHDV2. Additional ancillary diagnostic tests were performed based on field signs and pathology findings in attempt to arrive at a diagnosis.

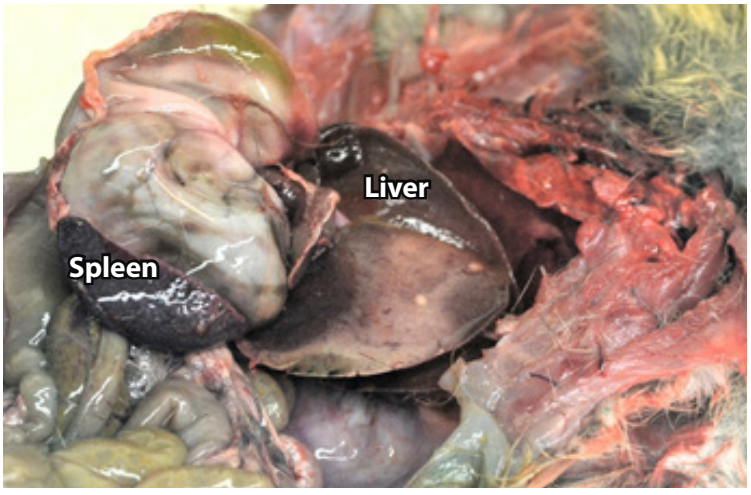


County locations of 112 cottontails submitted to SCWDS for necropsy, 2011-2022, Weyna et al. Journal of Veterinary Diagnostic Investigation 2024.

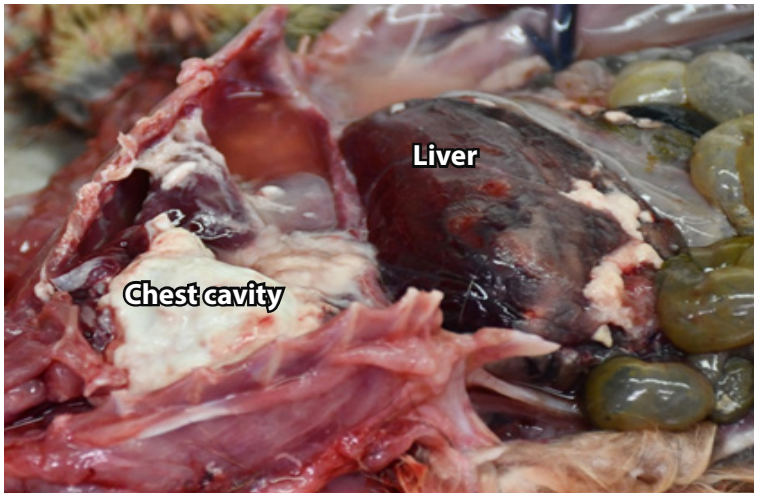
Categorically, the two most common primary causes of death included trauma (n=49) and bacterial disease (n=31), followed by undetermined (n=14), emaciation (n=6), parasitism (n=6), and other

(n=5). Although the cause of traumatic injuries could not be definitively determined in all instances, injuries consistent with predation, gunshot, and impact trauma were commonly encountered. There was frequent overlap between contributing causes of morbidity and mortality, such as lesions suggestive of both traumatic injury and bacterial infection. Viral diseases were rarely diagnosed and despite the concern, RHDV2 was not detected in the 123 rabbits tested, which were primarily from southeastern states. However, the risk to cottontails in the Southeast is well-recognized, as evidenced by numerous wild rabbit and hare mortality events in Texas caused by RHDV2 and the detections of RHDV2 in domestic rabbits from numerous eastern states. Further, SCWDS did detect RHDV2 in desert cottontails from Arizona in 2021, a mountain cottontail from Colorado in 2023, and in a jackrabbit from Kansas in 2023. These events emphasize the need for continued RHDV2 surveillance in the Southeast.

Among the 31 rabbits with bacterial disease, 12 (11% of tested rabbits) were diagnosed with tularemia and seven with pasteurellosis (bacterial disease caused by *Pasteurella multocida*; see **Fall 2022 Issue of SCWDS BRIEFS**). The 12 rabbits with tularemia were from seven states and all were either found dead or severely moribund, as this disease often is rapidly fatal. Nearly half of our tularemia cases came from Kansas, the state with the fourth largest number of human cases in the U.S. 2011 through 2019. The majority (n=10) of rabbits with tularemia had gross necropsy lesions (most commonly pinpoint foci in the liver and/or spleen) that raised suspicion of tularemia, although two animals lacked evident gross lesions, which may have become obscured by decomposition figure, bottom left. Furthermore, three cottontails with tularemia had concurrent lesions consistent with trauma. Among the 19 cottontails with bacterial infections designated as the primary cause of mortality, pasteurellosis was the most common, although a variety of bacterial organisms were identified. These animals often had evidence of a systemic (i.e., widespread throughout the body) bacterial infection, and involvement of multiple organs was not uncommon figures above and next page. The similar gross (necropsy) presentations among cottontails with bacterial disease, and in some cases the lack of gross lesions in these cases, underscore the need for caution and diagnostic support when conducting necropsies of cottontails found sick or dead. Further, continued routine surveillance for *F. tularensis* informs occupational and public health risk.



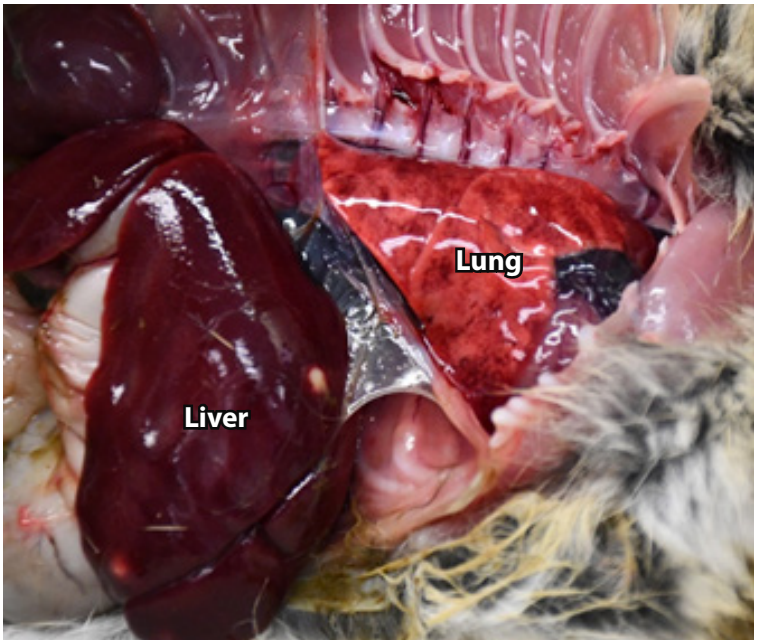
Necropsy image of an eastern cottontail with tularemia. Notice white-to-tan foci of necrosis on the liver and spleen, SCWDS.



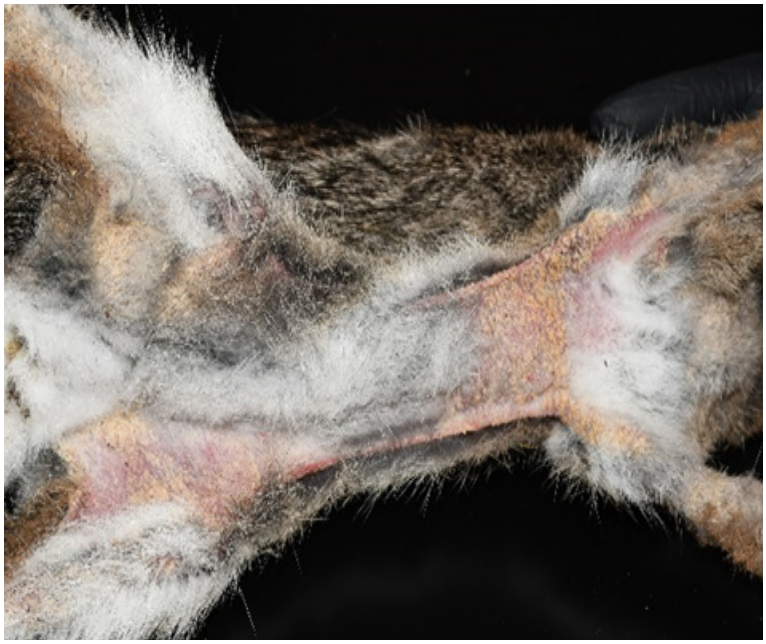
Necropsy image of a cottontail with pasteurellosis showing accumulation of white-to-tan fibrin covering the heart and lungs in the chest cavity, as well as the liver, SCWDS.

Other less common but interesting diagnoses included cutaneous fibroma (n = 2), which were presumably viral-induced Shope's fibromas. Notoedric mange, presenting as severe skin disease across much of the body, was

Causes of morbidity and mortality in cottontails



Necropsy image of a cottontail with a systemic bacterial infection caused by *Fusobacterium necrophorum*. Notice the white-to-tan foci on the liver, SCWDS.



Necropsy image of a cottontail with notoedric mange showing extensive hair loss and thickened skin with yellow-to-brown crusts, SCWDS.

diagnosed in two rabbits from Florida as highlighted in a previous publication, figure, above right; **Grunert et al. 2022**. Encephalitozoonosis, caused by microsporidian parasite *Encephalitozoon cuniculi*, was diagnosed in two cottontails with encephalitis (brain inflammation). A round cell sarcoma (neoplasia) was diagnosed in a single cottontail. As expected, neoplasia (cancer) was rarely observed, possibly due to the relatively short average lifespan and low annual survival rates of many wild cottontails/rabbits. Overall, the increase in wild rabbit submissions to SCWDS in the wake of RHDV2 emergence provided a unique opportunity to investigate cottontail mortality factors more thoroughly. These findings further our understanding of diseases affecting these important prey and game species. We thank biologists in SCWDS member state agencies for submitting these cases. This work was recently published in the **Journal of Veterinary Diagnostic Investigation**.

Prepared by Mark Ruder, Tori Andreasen, and Nicole Nemeth

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SCWDS annual publications July 1, 2023 - June 30, 2024

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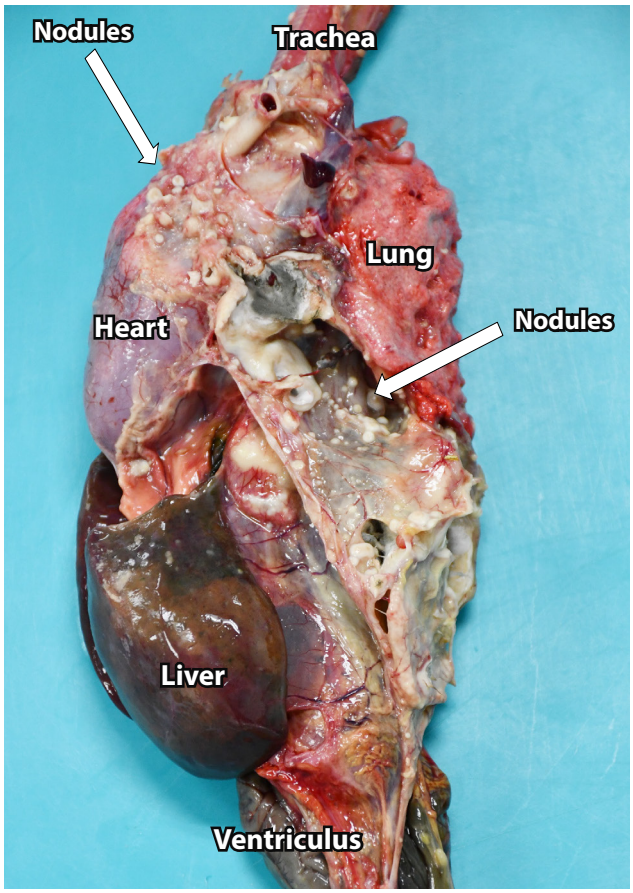
Eastern copperhead, Seth Lattner

Diagnostic Case Highlight

Severe aspergillosis in a bald eagle

Aspergillosis is caused by *Aspergillus* spp., an extremely common environmental fungus found on all continents except Antarctica. Disease can occur in any avian species, as well as humans and many other wild and domestic animal species.

The carcass of an adult (>4 years) female bald eagle from Beaufort County, South Carolina was submitted for postmortem examination by the Wildlife Health Office of the U.S. Fish and Wildlife Service in conjunction with the South Carolina Department of Natural Resources (SCDNR). The eagle was alive when found and captured on August 19, 2022, but died while being transported to a wildlife rehabilitation clinic. Radiographs revealed metal opacities consistent with shotgun pellets in four locations of the body. Gross examination revealed numerous tan, firm plaques disseminated throughout multiple air sacs (which are mostly paired, air-filled spaces distributed throughout the body cavity of birds) and in the lungs, liver, skeletal muscle under the wings, and body cavity wall figure, left. Additionally, larger, firm, tan nodules lined by gray-green mold were adhered to the air sacs closest to the lungs (i.e., thoracic air sacs) and one kidney, and were in the neck and upper chest, notably surrounding the trachea figure, next page.

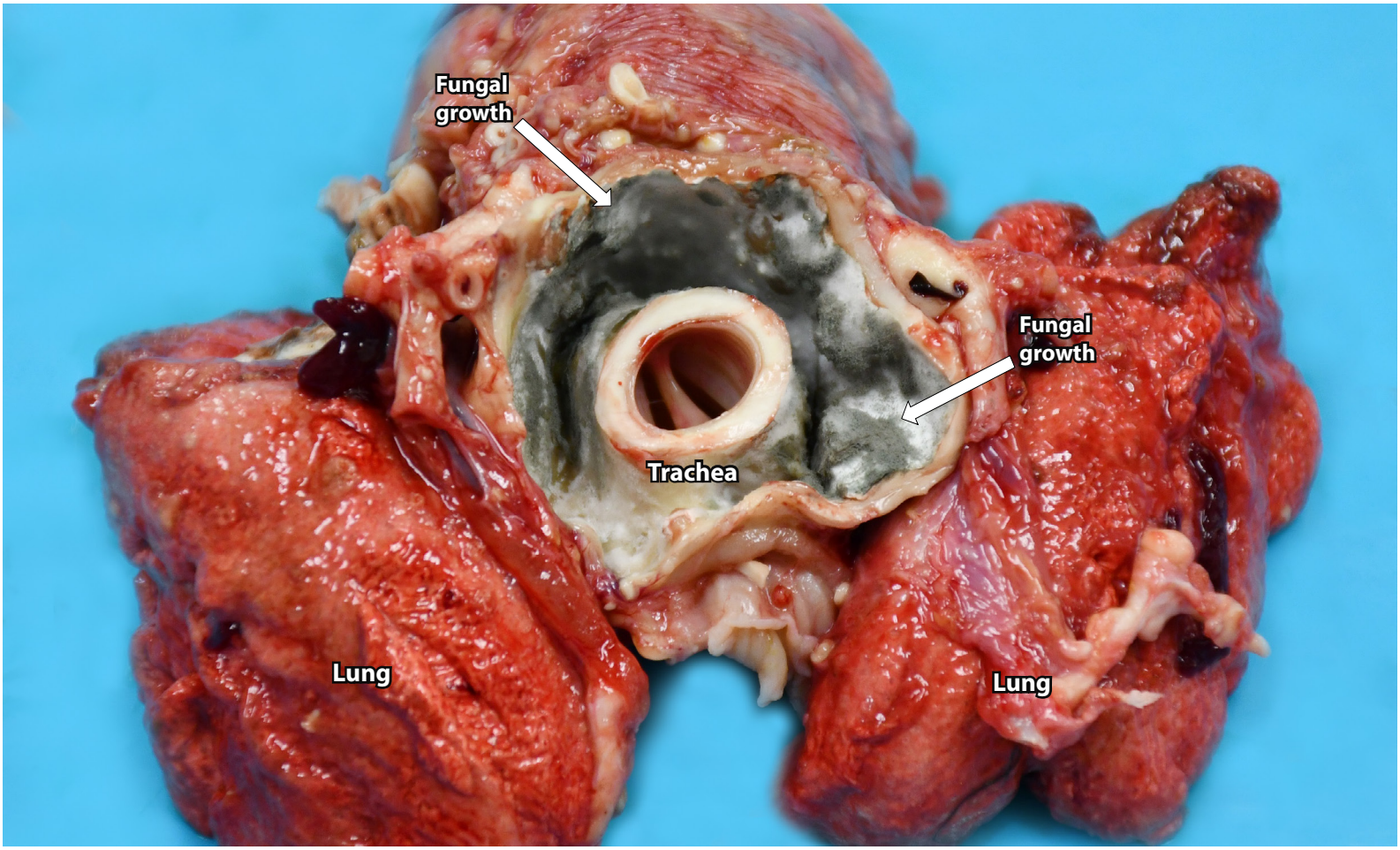


The pluck (trachea, heart, lungs, with liver) removed from the eagle, showing numerous, widely scattered fungal nodules, SCWDS.

This gross presentation is consistent with aspergillosis, a common, often opportunistic, and potentially deadly fungal disease of avian species.

Generally, it occurs secondary to other conditions that suppress immune system function, such as trauma, starvation, other infections, some

Aspergillosis in a bald eagle



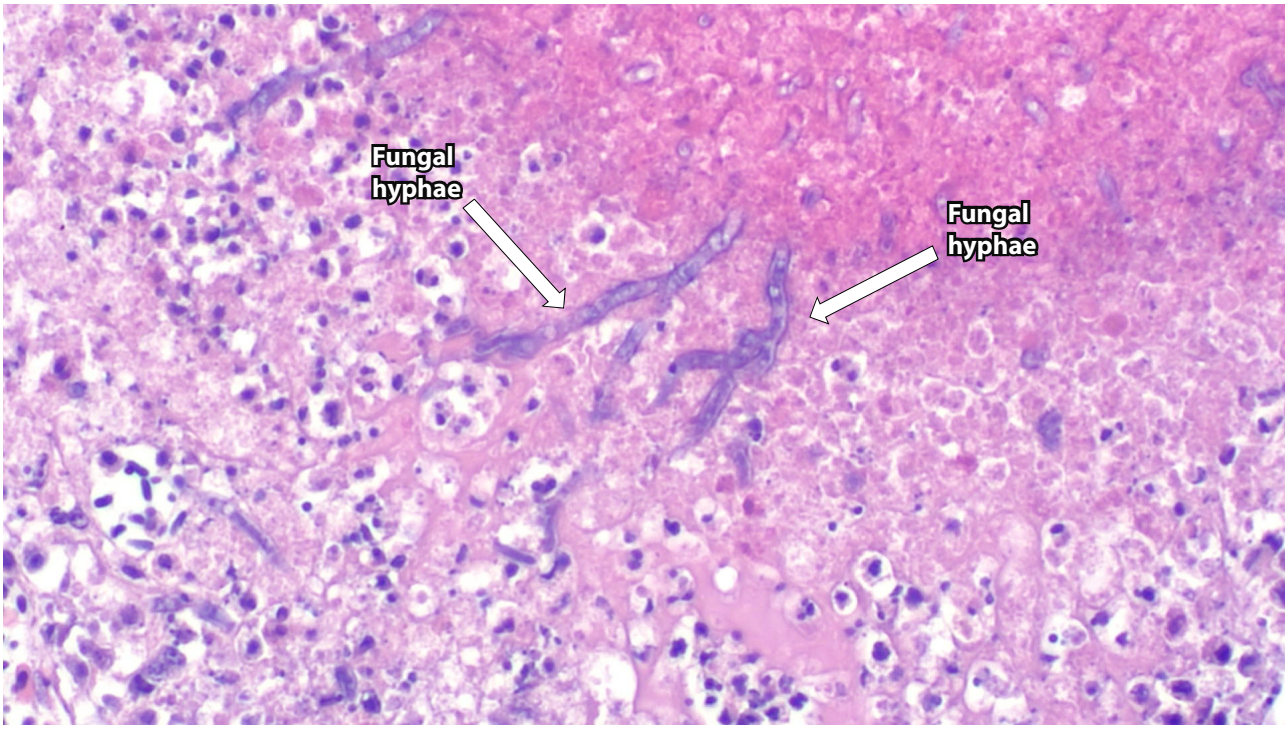
The area immediately surrounding the trachea (mediastinum) is filled with fungal growth with a "bread-mold" like appearance, SCWDS.

toxicoses, or physiologic exhaustion (such as can occur during migration, breeding season, or prolonged weather extremes). Thus, infection is not limited by species, age, or geographic location. However, aspergillosis is more commonly reported in young birds and certain taxonomic groups, such as waterfowl and raptors, which are generally considered more susceptible to developing disease following infection. Likewise, many reports of aspergillosis are in birds in captivity, including at wildlife rehabilitation centers, but years of diagnostic evaluation of birds submitted to SCWDS shows that aspergillosis also is a common diagnosis in some free-ranging native North American avian species.

Diagnosing aspergillosis prior to death can be challenging. Because the fungus is ubiquitous in nature, many birds (as well as humans and other animal species) are exposed throughout their lifetime without consequence to their health. Thus, testing for antibodies to the fungus can lead to misleading results due to these previous environmental exposures. In addition, available blood tests that target specific portions of the fungal cell wall (i.e., beta glucan and galactomannan) are considered unreliable. Therefore, postmortem diagnosis including microscopic tissue evaluation is more reliable, especially if invasion of blood vessel walls by fungi of typical size and shape for *Aspergillus* spp. are visible. Concurrent PCR and/or fungal culture is ideal. In the present diagnostic case, affected tissue samples underwent histology and fungal culture. This case exhibited classic lesions of aspergillosis, as affected organs and tissues were effaced by inflammation comprised of phagocytic cells (heterophils and macrophages) with numerous fungal structures (hyphae; figure, next page). Microscopic

morphology of the hyphae was consistent with *Aspergillus* spp. and *A. fumigatus* was cultured from a lung sample.

Importantly, radiographs revealed that this eagle also had a history of being shot, an illegal action in this protected migratory species. Lack of associated tissue damage associated with the shot suggests it caused nonfatal injury that eventually healed, although it is possible that it caused some level of debilitation that required adaptations to survive. No lead was detected in a postmortem liver sample. Collectively, findings in this case support aspergillosis as the cause of death, but contributors to stress and health decline may have facilitated the development of its severe and widespread fungal disease.



Typical microscopic appearance of *Aspergillus* spp. hyphae within damaged lung tissue, SCWDS.

In a captive setting, diagnosis and treatment of aspergillosis is challenging, therefore it is best to recognize and mitigate factors that may facilitate progressive infections that lead to disease.

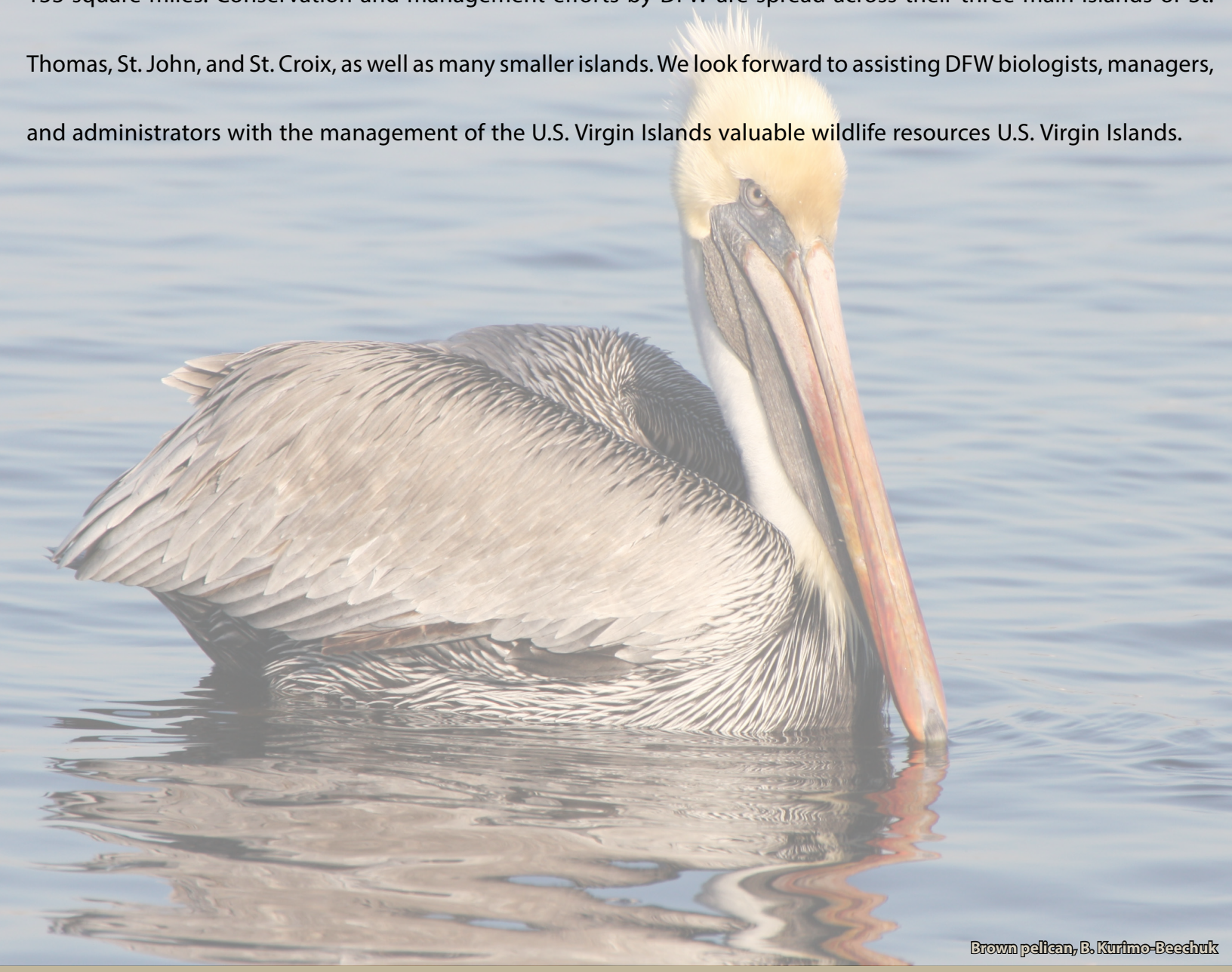
While the development of aspergillosis in wild birds generally is limited to individuals rather than populations, it is still important to recognize that some species may be more vulnerable to certain triggering stressors, such as substandard habitat, depletion of other needed resources (e.g., nutritional food sources), and climate change. For example, snowy owls are considered highly susceptible to development of severe aspergillosis, which could in part be due to their dependence on boom and bust prey populations and sensitivity to climate change.

SCWDS would like to thank the **U.S. Fish and Wildlife Service** and **SCDNR** for submitting this case and for all of our member states for their continued and critical role in the SCWDS Research and Diagnostic Service.

Prepared by Robert Stilz, Melanie Kunkel, and Nicole Nemeth

SCWDS announcements: new member agency

We are pleased to announce that an additional wildlife management agency joined SCWDS on July 1, 2024. The **U.S. Virgin Islands Department of Planning and Natural Resources (DPNR) Division of Fish and Wildlife (DFW)** is the newest SCWDS member agency, bringing the total to 18 state/territorial members. The Virgin Islands DPNR is one of two Territorial members of the Southeastern Association of Fish and Wildlife Agencies, with the other being the Puerto Rico Department of Natural and Environmental Resources. The total landmass of the U.S. Virgin Islands is approximately 133 square miles. Conservation and management efforts by DFW are spread across their three main islands of St. Thomas, St. John, and St. Croix, as well as many smaller islands. We look forward to assisting DFW biologists, managers, and administrators with the management of the U.S. Virgin Islands valuable wildlife resources U.S. Virgin Islands.



Brown pelican, B. Kurimo-Beechuk

SCWDS BRIEFS

A Quarterly Newsletter
Southeastern Cooperative Wildlife Disease Study
College of Veterinary Medicine
The University of Georgia
Athens, Georgia 30602

78th Annual Conference

Southeastern Association of Fish & Wildlife Agencies

October 12-16, 2024

Augusta, GA

Parting views from the Southeast

Purple gallinule, B. Kurimo-Beechuk