Report of the USAHA Committee on Wildlife Diseases

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The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:30-5:00 p.m. There were 47 members and 25 guests present. Chairperson Colin Gillin welcomed the membership and guests and covered housekeeping items. He also asked for recommendations, resolutions and for any new business, of which, there was none forwarded. There were no resolutions from 2015 and two proposed resolutions for 2016. The resolutions were emailed to the listed membership five days prior to the committee meeting for review. One of the resolutions was pulled by the submitter prior to the meeting.

Overview

There were 13 presentations in this year's committee focused on the interface between wildlife and livestock health. These talks were given by state, federal, and university presenters from management and research disciplines. Topics included case descriptions of emerging diseases, disease spillover between livestock and wildlife, cutting-edge technologies, presentations of federal regulatory programs, and discussions of epidemiological trace-outs of complex disease cases and outbreaks. The following is an agenda summary of presentations given during the 2015 committee on Wildlife Diseases:

USAHA/AAWV Student Travel Award Presentation - Grace Vahey
HPAI National Surveillance and Wild Bird Detections – Tom Deliberto
Disease and Risk Management of Feral Swine in North America – Dana Cole
Screwworm Outbreak at the National Key Deer Refuge – Samantha Gibbs
Mycoplasma Pneumonia/Nasal Tumors in Bighorn Sheep – Peregrine Wolff
Elk Hoof Disease in Washington and Oregon - Jennifer Wilson-Wilder
Bovine TB in Indiana Deer - Surveillance, Events, and Updates – Brett Marsh
Update on 2015-16 Hemorrhagic Disease Activity in Wild Ruminants – Mark Ruder
Revisiting Brucellosis in the Greater Yellowstone Area – Mark Drew and Jennifer Ramsey
Population effects of CWD on White-tailed Deer – Dave Edmunds
Chronic Wasting Disease in Elk in Rocky Mountain and Wind Cave National Parks: Research Updates – Margaret Wild

Chronic Wasting Disease Events in Arkansas – Margaret Wild
USDA-APHIS-VS CWD Program Standards and Updates – Randy Prichard/Alecia Naugle

The first presentation given was by the USAHA Student Travel Scholarship award winner, Ms. Grace Vahey, a veterinary student attending University of Georgia School of Veterinary Medicine. This travel scholarship is given to students of allied organizations through a competitive selection. The American Association of Wildlife Veterinarians was asked to canvas their membership for students interested in the attending USAHA and the current issues of wildlife disease related to the livestock and agriculture. Ms. Vahey discussed her background and research evaluating contaminate levels in fish species consumed by bottlenose dolphins and Gullah/Geechee anglers in the Charleston South Carolina Harbor estuarine area.

Presentations and Reports

Highly Pathogenic Avian Influenza Surveillance in Wild Birds Across the United States
Thomas Deliberto[1], Jonathan Sleeman[2], Patricia Bright[3], Ronald Anglin[4], Samantha Gibbs [5,] Darrel Styles[6], Susan Trock [7], Dale Garner[8], Thomas Gidlewski[1], Mia Torchetti[9]
[1]United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center, Thom-as.J.DeLiberto@aphis.usda.gov
[2]United States Geological Survey, National Wildlife Health Center
[3]United States Geological Survey, Environmental Health Program, Contaminant Biology Program
[4]Oregon Department of Fish and Wildlife
[5]United States Fish and Wildlife Service, National Wildlife Refuge System, Natural Resources Program Center, Wildlife Health Office
[6]United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Animal Health Emergency Management
[7]Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, Influenza Branch
[8]Iowa Department of Natural Resources, Wildlife Bureau
[9]United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, National Veterinary Services Laboratory

A unique A(H5Nx) clade 2.3.4.4 highly pathogenic avian influenza virus (HPAIV) was detected in North America in late 2014. Motivated by both the alarming spread of new H5 reassortant viruses in Asia and Europe as well as by the detection of HPAIV in both domestic poultry in Canada and in wild and captive birds in Washington State, initial HPAIV surveillance was conducted among wild birds in the Pacific Flyway of the United States. This effort was later expanded to include the Central and Mississippi Flyways. Positive HPAI H5 findings from wild waterfowl samples suggested that while some of these species exhibit no detectable morbidity or mortality, clinical disease was documented for other wild bird species similarly infected. Also, losses in U.S. domestic poultry were unprecedented. In July 2015, state and federal agencies initiated a national surveillance effort to provide information to guide management actions to address some of the issues associated with HPAIVs in birds. This includes risks to commercial poultry, backyard poultry, game bird farms, wild birds, wild bird rehabilitation facilities, falconry birds, and captive bird collections in zoos/aviaries. Specific objectives of the plan were to: 1) determine the distribution of influenza viruses of interest in the U.S.; 2) detect spread of influenzas of interest to new areas of concern; and 3) provide a flexible surveillance framework that can be modified to monitor wild waterfowl populations for avian influenza, detect reassortant avian influenza viruses, and estimate apparent prevalence of important influenzas once detected in an area of concern.

Since the last confirmation of Eurasian reassortment H5N2 during the 2015 U.S. outbreak from Canada geese in Michigan June 17th, there were only two PCR-only detections (no viable virus, sequencing unsuccessful): July 2015 from a mallard during a bird banding effort in Utah, and a hunter harvested mallard from Oregon in November 2015. However, during a live-bird banding effort from August 6-14, near Fairbanks, Alaska, 188 dabbling ducks were sampled at the Creamer's Field State Migratory Waterfowl Refuge. Influenza A was detected in 48 of the 188 samples, and a single H5 from an adult mallard was confirmed as the HPAIV reassortant clade 2.3.4.4 H5N2 (full eight gene constellation). The detection of H5N2 HPAIV in a migratory species in Alaska confirms low frequency persistence in

North America and the potential for re-dissemination of the virus during the 2016 fall migration. There have been no detections in poultry since June 2015.

Risk Identification: Pathogens shared between wild swine, livestock, poultry, wildlife, and humans
Ryan Miller, Steve Sweeney, Dan Grear, Dana Cole; USDA-APHIS-VS, Center for Epidemiology and Animal Health

Cross-species diseases transmission between wildlife, domestic animals and humans are increasingly challenging for veterinary and public health systems. Consequently, diseases that may be between wildlife and livestock are of paramount importance. Recently, wild swine in North America have become of increasing concern as a potential veterinary and public health threat. However, there are no studies assessing the potential transmission of pathogens between wild swine, livestock, and humans. We used a networks approach to identify pathogens and host species most at risk for transmission of pathogens from wild swine. To assess the risk to United States agricultural and human health, we also evaluated the current status of these pathogens in North America, and investigated the potential impact on agricultural exports. We identified 34 World Organization for Animal Health (OIE) listed swine pathogens (bacterial, viral, and parasitic) that cause clinical disease in livestock, poultry, farmed wildlife species, and humans. Of these 34 pathogens, an average 73% of bacterial, 39% of viral, and 63% of parasitic pathogens caused clinical disease in other species. Non-porcine livestock in the family Bovidae (cattle, sheep, goats) shared the most pathogens with swine (82%). Only 45% of currently reportable domestic swine diseases had published surveillance studies of wild swine in North America. Investigation of economic impacts in countries experiencing an OIE-listed disease outbreak found a median export decline of 18% in the 12 months immediately following a reported outbreak. The co-occurrence of wild swine and farms increased at an annual mean rate of 1.2% with as much as 57% of all farms and 77% of all agricultural animals residing in counties with wild swine. The increasing co-occurrence of wild swine with livestock and humans, as well as the large number of pathogens shared, present a growing risk for cross-species transmission in North America.

New World Screwworm infestation on the National Key Deer Refuge
Samantha Gibbs, National Wildlife Refuge System, U.S. Fish and Wildlife Service

Smallest subspecies of the North American white-tailed deer, Key deer inhabit 20-25 islands in the lower Florida Keys, ranging from No Name and Big Pine Key westward to the Sugarloaf Keys.The largest males typically stand only about one meter at the shoulder and weigh a maximum of around 85 lbs. Females are smaller, weighing on average 65 pounds. Poaching and habitat loss reduced the number of Key deer to only a few dozen animals by the 1950's. The establishment of the National Key Deer Refuge and subsequent listing of the deer as endangered in 1967 allowed for protection and a dramatic recovery of the species. Total population now estimated at approximately 1,000 animals.

New World Screwworm, (*Cochliomyia hominivorax*), Female screwworm flies lay their eggs in or at the edges of open wounds, Screwworm larvae eat the living tissue of warm-blooded animals.

Twenty-nine Key deer were found dead or euthanized due to severe myiasis beginning July 4, 2016. A veterinarian located in Marathon, FL (approximately 25 miles east of Big Pine Key) confirmed reports that at least three domestic animals with severe myiasis had been examined since July 22, 2016. Larvae collected from deer were submitted September 29, 2016 simultaneously to the University of Florida (UF) and the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for identification. UF and NVSL both keyed the larvae out to Cochliomyia hominivorax (New World Screwworm) on September 30, 2016. The Florida Department of Agriculture and Consumer Services, Division of Animal Industry (FDACS-DAI) immediately initiated a Foreign Animal Disease Investigation in coordination with the U.S. Department of Agriculture (USDA). An animal check station was set up in Key Largo. October 6, 2016, a dog was confirmed positive for screwworm (first examined September 19). October 12, 2016 a pet pig was confirmed positive for screwworm. Since then, there have been presumptive positives in two more dogs, a domestic pig, and 86 Key deer.

Continuing morbidity and mortality in Key deer: determining the triggers for action, thermal imaging, and increased frequency of ground counts. Other actions: options for treatment and prevention, both prevents and treats new world screwworm, long lasting effectiveness with one dose, wide margin of safety, doesn't impact invertebrates on the refuge (endangered Bartram's Hairstreak butterfly), doesn't impact other animals on the refuge (Key Largo woodrat, Lower Keys marsh rabbit and silver rice rat all

federally listed species), doesn't require capturing, re-capturing, or holding the animal for any length of time, and available in the U.S.

Update of Pneumonia in Bighorn Sheep

Peregrine Wolff, Nevada Department of Wildlife

Dr. Wolff reviewed bighorn sheep health during 2016 including topics concerning lack of cross strain immunity to *Mycoplasama ovipneumoniae* (M. ovi) in bighorn sheep, nasal sinus tumors and the Western Association of Fish and Wildlife Agencies (WAFWA), Wild Sheep Working Group (WSWG) West Wide Disease Management Venture.

Strain Specific Immunity to *Mycoplasma ovipneumoniae*

Following an all age pneumonia die-off where M. ovi was identified as a causative agent, surviving ewes appear to possess a level of immunity to the infecting strain of M. ovipneumoniae. However, this immunity does not appear to be conveyed to their lambs and annual lamb mortality is often high. Spillover of a novel strain of M. ovi sometime in the future, has been documented to lead to morbidity and mortality in adults similar to the original disease event.

This lack of cross protective immunity between strains emphasizes the need for continued effective separation between wild sheep and domestic sheep and goats as well as other wild sheep herds infected with M. ovi. There is preliminary work also being conducted through Washington State University on the feasibility of developing, an M. ovi free domestic sheep or goat.

Reference

Cassirer, F.E. et al. Evidence for Strain-Specific Immunity to Pneumonia in Bighorn Sheep. 2016. The Journal of Wildlife Management; DOI: 10.1002/jwmg.21172

Bighorn Sheep Sinus Tumors, An Update

In 2009, bighorn sheep sinus tumors were discovered within a herd of seven Rocky Mountain bighorn ewes in Colorado that were culled due to a history of at least ten years of failed lamb recruitment. Since discovery, at least 38 cases of sinus tumors have been identified in at least ten free ranging bighorn herds in Colorado. Additional cases have been identified in Rocky Mountain bighorns from Wyoming, Nevada, and Nebraska, as well as one herd of desert bighorn sheep in California, and one herd of California bighorn sheep in Nevada. The disease has been shown to be infectious experimentally and likely has moved across the landscape through natural and artificial movements of bighorn sheep. While sinus tumors alone do not appear to affect adult survival or lamb recruitment, sinus tumors in combination with other typical respiratory pathogens have been consistently identified in Colorado bighorn herds that are struggling with dismal lamb recruitment. Theoretically, sinus tumors may affect the susceptibility of adult bighorns to pneumonia through interference with normal clearance mechanisms of the upper respiratory tract. For more information on this emerging syndrome contact Dr. Karen Fox (karen.fox@state.co.us).

Reference

Fox, K.A., S. K. Wootton, S. L. Quackenbush, L. L. Wolfe, I. K. LeVan, Mi. W. Miller and T. R. Spraker. 2010.Paranasal Sinus Masses of Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*). *Vet Pathol* published online 6 October 2010. DOI: 10.1177/0300985810383873.

Western Association of Wildlife Agencies, Wild Sheep Working Group West Wide Disease Management Venture

Respiratory disease-associated all-age die-offs and perennial lamb recruitment failure are the most critical threats to wild sheep in 19 of 23 Western Association of Fish and Wildlife Agency (WAFWA) jurisdictions. Despite decades of research and financial effort, there are no consistently effective methods to manage or recover affected wild sheep herds.

Traditional approaches to bighorn respiratory disease have focused mainly on the role that pathogens and other factors play in the respiratory disease complex. However, we also need to understand how management actions affect disease processes. This Venture proposes to assist jurisdictions to evaluate, validate and implement adaptive management actions that may prevent infection, clear pathogens and improve herd performance. Such actions are vital for ensuring long-term viability of wild sheep populations on historic landscapes. In response to this challenge, the collaborative "*West-Wide Adaptive Wild Sheep Disease Management Venture*" (DMV) was created by the WAFWA Wild Sheep Working Group and Wildlife Health Committee (WHC) to achieve this purpose.

GOAL: Develop, implement and evaluate novel epidemiology-based management approaches to control wild sheep respiratory disease.

OBJECTIVES:

1. Identify, develop, and evaluate disease management actions through standardized data collection and assessments of cost/benefit, logistics, and practicality of each action.
2. Improve understanding of the variation in herd response following exposure to important respiratory pathogens and identify factors that contribute to variation in herd responses.

CHARGES:

1. Identify attributes that potentially impact herd performance in healthy and unhealthy herds (e.g., WAFWA WHC, *2014 Bighorn Sheep Health Monitoring Recommendations*).
2. Develop criteria for experimental management actions and monitoring protocols, to include non-outbreak (healthy) herds and timing of actions in relation to outbreaks (during or after die-offs).
3. Provide criteria to jurisdictions so that herds can be identified for participation.
4. Encourage, coordinate, and assist jurisdictions with standardization and/or funding for enhanced monitoring of herds and management experiments, including the cost/benefit of each identified management action.
5. Foster and sustain active support and participation among WAFWA leadership, wild sheep managers and wildlife health professionals.
6. Acquire long-term funding support.

Elk Hoof Disease in Washington and Oregon

Jennifer Wilson-Welder, Research Microbiologist, Bacterial Diseases of Livestock Research Unit, National Animal Disease Center, Agriculture Research Service, USDA

In early 2000s, limping free-ranging elk (Cervus elaphus) with abnormal hooves were reported in south-western Washington State. Numbers of cases steadily increased in the Cowlitz River Basin reaching epidemic proportions in 2008. Several targeted collections were conducted by Washington Department of Fish and Wildlife (WDFW) in 2009, 2013 and 2014, targeting animals in a variety of age classes. The results of these collections revealed no systemic cause of hoof abnormalities; viscera, virus isolation, mineral levels and parasitology were in all cases unremarkable, similar between affected and unaffected animals and failed to identify an underlying cause of hoof disease. Animals as young as nine months of age had evidence of hoof abnormalities. Disease was limited to the hoof structure or surrounding skin (Han and Mansfield, 2014). Histopathology of the hoof lesions revealed changes to the keratinocytes (hyperkeratosis), lamellar perivasculitis, areas of necrotic ulceration and neutrophilic inflammatory infiltrates. Most importantly, sliver stained sections showed multiple morphologies of bacteria invading deep into the tissues, predominated by spirochetes. Samples were sent to several laboratories, and multiple confirmations were made that the lesions contained spirochetes belonging to the family Treponema, and were genetically similar to those found in digital dermatitis, a hoof disease of domestic livestock (Clegg et al., 2014).

Digital dermatitis (DD)-like diseases has been described in several domestic species, including dairy and beef cattle, sheep and goats (Wilson-Welder et al., 2015). The clinical presentation in bovine digital dermatitis (BDD) is that of a circular to oval distinct region of ulcerative or granular tissue, usually occurring in or near the interdigital cleft, adjacent to the heel-blub or coronary band. Multiple studies have confirmed that DD is a multifactorial, polymicrobial and poly treponemal disease. Contagious Ovine Digital Dermatitis (CODD) presents clinically as ulcerations along the coronary band, underrunning the hoof horn, presence of profuse granular tissue and results often in the loss of the hoof capsule (Angell et al., 2015). In many ways, the elk hoof disease grossly presents more like CODD. Regardless of the gross presentation, the underlying histopathology and associated bacterial consortium, especially the treponemes, is nearly identical. Genetic analysis of Treponema isolated from elk lesions were highly similar to those isolated from cattle and sheep on different continents (Clegg et al., 2016). Thus the elk hoof disease has been given the name Treponeme Associated Hoof Disease (TAHD).

TAHD is also being described in Oregon. Most of the cases seem to have been concentrated on the ‘wet’ side of the Cascade Range, however sporadic cases have also been described extending southward along the coastal valleys and in the north eastern corner of the state. These cases on the ‘dry’ side of the Cascades seem to affect fewer numbers of individual animals within a herd. While diagnostic tests confirm the involvement of DD-associated treponemes, it is unclear at this point if this represents a new stage of TAHD evolution.

To address long term effects of TAHD on the southwestern Washington elk population, WDFW initiated a five year Survival Study. Female elk in the Mount Saint Helens region were fitted with radio collars to monitor survival and calf production. In addition, other heath metrics were collected at time of capture including swabs of the feet to confirm presence of TAHD and blood for immunological assays. In the first year (February 2015), a total of 75 animals were captured, 76% had visible hoof abnormalities consistent with TAHD. Swabs were sent to a USDA-research laboratory for culture and PCR testing, 17 of 30 samples sent were culture positive, 41% were PCR positive, and the PCR was positive for Treponema associated with DD (T. phagedenis, T. medium and T. pedis) (Evans et al., 2008). In the second year (December 2015), 45 elk cows were captured, including 29 from the previous capture in February. Sixty six percent had visible hoof lesions in the field consistent with TAHD, 46% were culture positive and 75% were PCR positive for DD-associated treponemes. Elk with disease had significantly higher serum antibody titers to mixed Treponema antigens than animals outside the endemic area, or animals not showing disease in the endemic area. Most of the captured animals had lesions similar to grades 3 or 4 following a similar scoring system published for CODD (partial or complete ulceration of coronary band or sole, sloughing of the hoof horn) and many had more than one foot with some stage of disease (Angell et al., 2015).

With the results of just the first few captures undergoing analysis, some preliminary conclusions are being considered. The disease can progress rapidly. Several recaptured animals went from grades 0 (healthy) to 4 (loss of hoof capsule) in eight months. Rarely does the disease regress as little to no resolution was seen. The research teams are working on better non-lethal diagnostic tools. Culture and PCR were confirming many of the visually obvious cases, but not detecting all. Due to natural antibody present in the elk and cross-reactivity to environmental bacteria, the serology to other organisms involved in hoof diseases such as Fusobacterium, are hard to differentiate. The USDA-research laboratory has recently developed an experimental model for DD that will help elucidate bacterial pathogenesis and mechanisms of disease pathology that will contribute to improvements in diagnostics. Work will continue in diagnostics and case definition of TAHD, which at this time, relies heavily on histopathology for confirmation of cases. Both Washington and Oregon Departments of Fish and Wildlife will continue increased surveillance for TAHD in elk herds. There are currently planned public and hunter education campaigns, participation of citizen science reporting surveys and efforts to restrict movement of affected feet in endemic areas.

References

Angell, J. W., R. Blundell, D. H. Grove-White, and J. S. Duncan. 2015. Clinical and radiographic features of contagious ovine digital dermatitis and a novel lesion grading system. The Veterinary record 176(21):544.

Clegg, S. R., S. D. Carter, R. J. Birtles, J. M. Brown, C. A. Hart, and N. J. Evans. 2016. Multilocus Sequence Typing of Pathogenic Treponemes Isolated from Cloven-Hoofed Animals and Comparison to Treponemes Isolated from Humans. Applied and environmental microbiology 82(15):4523-4536.

Clegg, S. R., K. G. Mansfield, K. Newbrook, L. E. Sullivan, R. W. Blowey, S. D. Carter, and N. J. Evans. 2014. Isolation of digital dermatitis treponemes from hoof lesions in wild North American elk (Cervus elaphus) in Washington State, USA. Journal of clinical microbiology.

Evans, N. J., J. M. Brown, I. Demirkan, R. D. Murray, W. D. Vink, R. W. Blowey, C. A. Hart, and S. D. Carter. 2008. Three unique groups of spirochetes isolated from digital dermatitis lesions in U.K. cattle. Veterinary microbiology 130(1-2):141-150.

Han, S. and K. G. Mansfield. 2014. Severe hoof disease in free-ranging Roosevelt elk (Cervus elaphus roosevelti) in southwestern Washington, USA. Journal of wildlife diseases 50(2):259-270.

Wilson-Welder, J. H., D. P. Alt, and J. E. Nally. 2015. Digital Dermatitis in Cattle: Current Bacterial and Immunological Findings. Animals: an open access journal from MDPI 5(4):1114-1135.

Bovine Tuberculosis Surveillance and Management in Indiana

Bret D. Marsh, Indiana State Board of Animal Health

(Content of this report prepared primarily by The Indiana Department of Natural Resources, Specifically Dr. Joe Caudell.)

History of Bovine Tuberculosis (TB) in Indiana

Bovine tuberculosis was eradicated from Indiana in 1984. Bovine tuberculosis was identified in Indiana in a single cow in November 2008 and farmed deer in 2009 in a nearby Franklin County farm

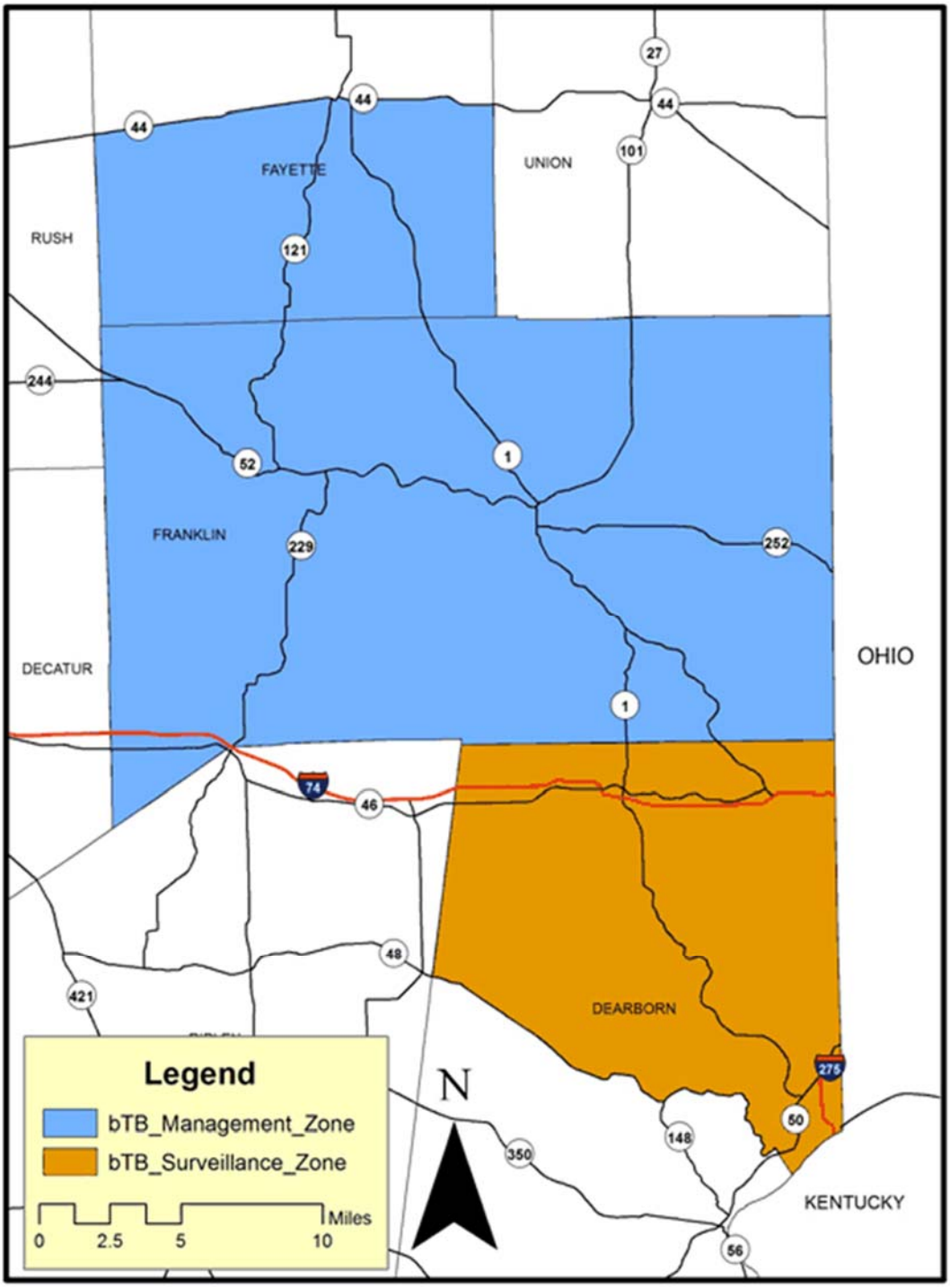
consisting of red deer, elk, and fallow deer. As a result, Indiana Department of Natural Resources (IDNR), the Indiana State Board of Animal Health (BOAH), and USDA-APHIS, Wildlife Services (WS) and Veterinary Services (VS) began a surveillance program to determine if bovine tuberculosis had spilled over into wild white-tailed deer. In 2011, bovine tuberculosis was detected in a Dearborn County cattle farm. Later that year, surveillance of white-tailed deer was expanded to this area. From 2008-2015, more than 1,400 deer from this area were tested and all wild white-tailed deer were negative for bovine tuberculosis.

In April 2016, bovine tuberculosis was detected by BOAH and USDA on a cattle farm consisting of two premises in Franklin County. As part of the response to that event, wildlife was removed and tested from the affected areas. In August 2016, a wild white-tailed deer removed from the affected premise tested positive for bovine tuberculosis. Results from the other wildlife taken from the farm are pending. The USDA-APHIS National Veterinary Services Laboratory (NVSL) has been conducting research on bovine tuberculosis strains from throughout the United States. The results from Indiana indicate that all of the deer species and cattle affected by bovine tuberculosis have been affected by the same strain. The data indicate that all of the bovine tuberculosis found in Indiana is closely related and that these events are likely connected. Current data suggest that bovine tuberculosis has possibly been circulating at extremely low levels in the deer herd since at least late 2008 when the first case was detected. Based on these findings, IDNR will establish a Bovine Tuberculosis Management Zone in south Fayette and Franklin counties, and a Bovine Tuberculosis Surveillance Zone in northern Dearborn County.

Indiana Bovine Tuberculosis Management Zone

For 2016, the area south of State Road 44 in Fayette County and all of Franklin County has been designated a Bovine Tuberculosis Management Zone and the primary activity in this area will focus on reducing the prevalence of the disease and reducing the population of wild white-tailed deer to reduce the spread of the disease. Surveillance for the disease in the Bovine Tuberculosis Management Zone is considered a secondary objective.

2016 bTB Management and Surveillance Zones



MANAGEMENT ACTIVITIES WILL CONSIST OF:

- The removing of additional deer from the bovine- tuberculosis-affected property and/or the surrounding properties will occur as soon as possible. If hunters have access to surrounding properties, IDNR will partner with them to collect targeted samples.
- Additional opportunities to harvest deer will be provided to allow hunters to assist in the reduction of the deer population.

    - A second buck tag will be issued to anyone submitting a buck that meets the established requirements (see below).
    - Landowner permits will be available to landowners desiring to reduce the deer population on their property for the purposes of disease management.
- Surveillance
    - Hunters will check in their deer online within 12 hours of harvest and obtain their registration number.
    - Voluntary surveillance for hunters in Franklin and south Fayette counties who are concerned about bovine tuberculosis in their harvested deer can either use the two to three established drop-off and/or staffed locations, or they can contact a biologist using the toll-free number to arrange a time and location for heads to be sampled.
    - A collectable Deer Cooperator Patch will be issued to all cooperating youth and adult hunters who submit deer for bovine tuberculosis surveillance.
- A ban on feeding deer and other mammalian wildlife in the Bovine Tuberculosis Management Zone will be implemented.
- The IDNR will work to establish a baseline population size/density for the area using spotlight counts and/or other methods.
- Active white-tailed deer population reduction will begin in January and continue until early April using a combination of landowner permits and sharpshooting with the goal of reducing the number of infected individuals in the area and the density of deer to reduce the spread of the disease among wild white-tailed deer.

Indiana Bovine Tuberculosis Surveillance Zone

For 2016, sampling protocols were redesigned in an attempt to detect bovine tuberculosis at lower prevalence rates by conducting bovine tuberculosis surveillance in Dearborn County north of State Road 48 during the 2016 deer hunting season. The IDNR will need to collect samples from between 350 and 1,100 deer, depending on sex and age class of the animal. While any age and sex of white-tailed deer can become infected with bovine tuberculosis, surveillance from other states has demonstrated that sampling bucks older than two years of age is more likely to detect the disease. Therefore, obtaining samples from older-age bucks will result in fewer total deer that need to be tested (approximately 350). If most samples come from does or bucks younger than two years old, then more deer will need to be sampled. In general, a buck older than two years old equals about ten yearling bucks from a bovine tuberculosis surveillance perspective. Therefore, our objective is to sample as many hunter-harvested bucks that are older than two years as possible and obtain the remaining samples with hunter-harvested does and younger bucks.

TO MEET THIS OBJECTIVE, THE FOLLOWING STRATEGIES WILL BE EMPLOYED:

- The Surveillance Area is Dearborn County north of State Road 48 and will consist of a period of mandatory and voluntary check in at Biological Check Stations.
    - Mandatory check-in of deer will be required at IDNR Biological Check Stations on September 24-25, 2016, and from November 4-27, 2016. During the mandatory check-in period, hunters must check in their deer online and obtain their registration number within 12 hours of harvest and then bring the deer to a Biological Check Station within 12 hours of harvest.
    - Voluntary sample submission will occur October 1 through November 3, 2016, and December 3-11, 2016. Hunters who harvest deer in Dearborn County will check in their deer online and obtain their registration number within 12 hours of harvest. During the check-in process, hunters will be instructed to contact the IDNR using a toll-free number to facilitate participation in the bovine tuberculosis surveillance effort.
        - A sample collection team based in Dearborn County will be on call to meet with hunters to sample their deer or hunters can visit Biological Check Stations.
        - The samples needed are found in the head and neck of the deer, so these areas should be preserved if deer are processed in the field.
        - Hunters who wish to have their deer mounted or processed can provide the name of the taxidermists or processor so that arrangements can be made to collect the samples from that location.
- A second buck tag will be issued to anyone submitting a buck that meets the established requirements (see below).

- A collectable Deer Cooperator Patch will be issued to all cooperating youth and adult hunters who submit deer for bovine tuberculosis surveillance.

Check Stations

DEARBORN COUNTY: DEER HARVESTED NORTH OF STATE ROAD 48
Mandatory: September 24-25, November 5-27
Voluntary: October 1 - November 4, December 3-11

- 3-D Mart at BP Gas Station, 27968 State Road 1, West Harrison
- Gravel lot behind FCN Bank, 226 North Meridian Street, Sunman, Ripley County
- Orscheln Farm and Home, 181 South Tanners Creek Drive, Lawrenceburg

FAYETTE COUNTY: DEER HARVESTED SOUTH OF STATE ROAD 44
Voluntary: September 24-25, November 12-13

- Mustins Taxidermy, 1600 West County Road 350-S, Connersville

FRANKLIN COUNTY: DEER HARVESTED ANYWHERE IN THE COUNTY
Voluntary: September 24-25, November 12-13

- 52 Pik-Up, 11183 U.S. 52, Brookville

UNION COUNTY
Voluntary: September 24-25, November 12-13

- Frame's Outdoors, 855 State Road 101, Liberty

Additional Buck Tag for Hunters

During 2016, hunters who harvest a buck two years old or older from the bovine tuberculosis surveillance and management areas and allow a sample to be collected (either by IDNR staff, taxidermist, or at a processor) will qualify for an additional free buck tag that can be used to harvest a second older-aged buck from the bovine tuberculosis surveillance or management area. A buck older than two years old can typically be estimated in the field by the spread of the antlers and the number of antler points. The age will be confirmed by tooth wear replacement by a biologist. To judge a deer in the field, hunters can look for:

- An antler spread that is equal to or greater than the width of the ears when the ears are in the alert or outstretched position.

Deer that are presented to a biologist that meet this criterion will qualify for an additional buck tag. Deer that do not meet these criteria, but are judged to be older than two years old by tooth wear by a biologist will also qualify for an additional buck tag.

The second buck that is harvested must meet the same criteria as the first buck and must also be presented for sampling before hunters can obtain their registration number. Hunters will be allowed to keep antlers and the deer from both the first and second buck.

Additional buck tags will be available at Biological Check Stations or by arrangement with biologists by calling the toll-free number listed on the CheckINGame System.

Time Frame

Hunter-harvested samples will be collected starting during youth weekend and continue through early December. Active management in the Bovine Tuberculosis Management Zone will begin immediately on the affected properties.

Agency Sharpshooting for Surveillance

If an adequate number of samples to meet the surveillance goal are not collected through hunter-harvested deer, personnel from IDNR and USDA-APHIS, Wildlife Services (WS) will be used to remove deer from the bTB Surveillance Area (northern Dearborn County) in early 2017. There are typically enough deer harvested by hunters in the surveillance area to meet the surveillance objective; however, we estimate that the vast majority of the deer older than two years old will need to be sampled. It is critical that hunters participate in the surveillance to eliminate the need for sharpshooting. It is also important that hunters encourage each other to participate in the surveillance. IDNR considers sharpshooting for surveillance purposes an undesirable option; however, it may be necessary if successful hunter participation in the surveillance effort is low.

Update on 2015-16 Hemorrhagic Disease Activity in Wild Ruminants

Mark G. Ruder, Clara Kienzle, Rebecca L. Poulson, and David E. Stallknecht, SCWDS, University of Georgia

Annually, the Southeastern Cooperative Wildlife Disease Study (SCWDS) receives tissue samples from throughout the United States from wild ruminants suspected to have orbiviral hemorrhagic disease. Virus isolation and identification is performed and findings from the 2015 and 2016 transmission seasons are reported here. During 2015, 56 viruses were isolated from 172 tissue samples, representing six species of wild ruminant (159 white-tailed deer, 6 mule deer, 3 elk, 2 Key deer, 1 moose, and 1 bison) from 19 states. Isolations of epizootic hemorrhagic disease virus (EHDV-1) (3), EHDV-2 (42), EHDV-6 (3), and bluetongue virus (BTV-17) (8) were made from white-tailed deer (see Table). As of October 1, 2016, there have been 36 viruses isolated from 99 tissue samples, representing 21 states and 6 species (84 white-tailed deer, 6 mule deer, 4 pronghorn, 3 bighorn sheep, 1 elk, and 1 nilgai). Isolations of EHDV-1 (1), EHDV-2 (21), EHDV-6 (3), BTV-2 (1), BTV-3 (9), BTV serotype pending (1) were made from white-tailed deer or mule deer (see Table).

2015 SCWDS Hemorrhagic Disease Diagnostics
Virus Isolations

STATE	SPECIES	VIRUS
Alabama	white-tailed deer	EHDV-1
		EHDV-2
Florida	white-tailed deer	EHDV-1
		EHDV-6
Idaho	white-tailed deer	BTV-17
Indiana	white-tailed deer	EHDV-2
Kansas	white-tailed deer	EHDV-2
Kentucky	white-tailed deer	EHDV-2
Louisiana	white-tailed deer	EHDV-2
Mississippi	white-tailed deer	EHDV-2
Missouri	white-tailed deer	EHDV-2
		EHDV-6
Montana	white-tailed deer	BTV-17
North Carolina	white-tailed deer	EHDV-6

2016 SCWDS Hemorrhagic Disease Diagnostics
Virus Isolations
Thru October 1, 2016

STATE	SPECIES	VIRUS
Arkansas	white-tailed deer	EHDV-2
Florida	white-tailed deer	EHDV-6
Georgia	white-tailed deer	EHDV-2
Illinois	white-tailed deer	EHDV-6
Kansas	white-tailed deer	EHDV-2
Louisiana	white-tailed deer	BTV-2
Nebraska	white-tailed deer	EHDV-2
	mule deer	
New Mexico	mule deer	EHDV-2
		EHDV-6
North Carolina	white-tailed deer	EHDV-2
South Carolina	white-tailed deer	EHDV-2
Virginia	white-tailed deer	BTV-3
		EHDV-2
West Virginia	white-tailed deer	BTV-3
		EHDV-1
		EHDV-2

The 2016 BTV-3 outbreak in West Virginia and Virginia is noteworthy because this serotype of BTV is not historically endemic to the U.S. Furthermore, this outbreak represents the northeastern most detection of BTV-3 in the U.S. and there is concern over the northern expansion of bluetongue and EHD

viruses into northern states. During early- to mid-August 2016, the Virginia Department of Game and Inland Fisheries (VDGIF) and the West Virginia Division of Natural Resources (WVDNR) received numerous reports of sick and dead white-tailed deer in bordering counties of the northern part of each state. Prompt field investigation and diagnostic sample submission by agency personnel lead to the isolation of BTV at SCWDS, which was confirmed as BTV-3 by NVSL. Reporting of sick and dead deer by the public continued through mid- to late-September. Based on these reports and field investigation by WVDNR and VDGIF, the outbreak was intense in the deer population but appears to have been fairly localized to a mountainous region in extreme eastern Hardy County, West Virginia, western Shenandoah County, Virginia, and northern Rockingham County, Virginia. However, follow-up investigation will aim to better evaluate the geographic extent of the outbreak. In total, BTV-3 was detected in tissues sampled from 9 of 14 deer from the region. BTV-3 was first confirmed in Florida in 1999 by the National Veterinary Services Laboratory (NVSL). However, since that time, BTV-3 has been detected in domestic and wild ruminants over a broad geographic region, including Florida (1999-2003, 2013), Mississippi (2006, 2009), Arkansas (2008), Oklahoma (2008), South Dakota (2012), and Texas (2015). A large portion of these BTV-3 detections have been made from white-tailed deer, highlighting the importance of monitoring wild ruminants for orbivirus activity. In many regions of the U.S., this species can serve as an important sentinel for EHDV and BTV activity.

An additional noteworthy observation from 2016 is the isolation of EHDV-6 from a mule deer in New Mexico. This represents the western most detection of EHDV-6 by SCWDS and indicates that this virus continues to circulate over a very broad geographic region in the United States.

Revisiting Brucellosis in the GYA – Montana

Jennifer Ramsey, Montana Fish, Wildlife, and Parks

Background information regarding brucellosis in Montana as well as an overview of the objectives and results Montana's Targeted Surveillance Program for elk was presented. Included was reporting by Montana Fish, Wildlife, and Parks' for planned future efforts for brucellosis surveillance and research.

Mark Drew, Idaho Fish and Game Department

Brucellosis in elk is a well-established disease in the Greater Yellowstone area. Surveillance efforts in elk have been used to define disease distribution and prevalence. In addition, these data have been used to inform the establishment of a Designated Surveillance Area (DSA) for cattle in the three states (MT, ID and WY). Typically, samples from adult female elk that are captured or harvested by hunters are tested using a variety of antibody tests to determine serologic status of a given population or area (hunting district, game management unit, zone). The three states have different approaches to the disease in elk and different disease prevalence, some of which may be associated with elk population levels, movements, density, or winter range characteristics. Interactions between cattle and elk in winter, primarily January to June, are the high-risk period for exposing cattle to the disease. Management efforts to minimize the exposure of cattle during this period differ between states and include fencing of cattle and haystacks, vaccination of elk, hazing or depredation hunts for elk, and habitat improvement to keep elk winter ranges separate from cattle wintering areas.

Population Effects of Chronic Wasting Disease on White-tailed Deer

David Edmunds, Natural Resource Ecology Laboratory, Colorado State University/U.S. Geological Survey
Matthew Kauffman, Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming (UW)
Brant Schumaker, Department of Veterinary Sciences, UW
Frederick Lindzey, Wyoming Cooperative Fish and Wildlife Research Unit, UW
Walter Cook, Department of Veterinary Pathobiology, Texas A&M University
Terry J. Kreeger, Wyoming Game and Fish Department
Ronald Grogan, Department of Veterinary Sciences, UW
Todd Cornish, Department of Veterinary Sciences, UW

Chronic wasting disease (CWD) is an invariably fatal transmissible spongiform encephalopathy, or prion disease, of white-tailed deer, mule deer, elk, moose, and reindeer. Current distribution of CWD in free-ranging North American cervids includes 21 U.S. states and two Canadian provinces; recently CWD also was discovered in free-ranging reindeer and moose in Norway. Despite a 100% fatality rate, areas of high prevalence (~45% in some deer populations), and an ever-expanding geographic distribution, little is known about potential population-level effects of CWD in deer.

To investigate these effects, we tested the null hypothesis that CWD found at high prevalence would not negatively impact white-tailed deer population sustainability. The specific objectives of the study were to monitor CWD-positive and CWD-negative white-tailed deer in a high-prevalence CWD area in southeast Wyoming longitudinally via radio-telemetry and global positioning system (GPS) collars. We captured deer as fawns on winter range to CWD-test by tonsil biopsy, mark with radio-collars, and pregnancy test all females. We recaptured all deer annually to retest for CWD and pregnancy status. We tracked deer throughout the year by radio telemetry and GPS collars and annual vital rates were determined for four cohorts of deer from 2003-2010. For the two populations (CWD-negative and CWD-positive), we determined the following: a) demographic and disease indices, b) annual survival, and c) finite rate of population growth (λ).

The CWD prevalence was higher in females (42%) than males (28.8%) and hunter harvest and clinical CWD were the most frequent causes of mortality, with CWD-positive deer over-represented in harvest and total mortalities. Survival was significantly lower for CWD-positive deer and separately by sex; CWD-positive deer were 4.5 times more likely to die annually than CWD-negative deer while bucks were 1.7 times more likely to die than does. Population λ was 0.896 (0.859-0.980), which indicated a 10.4% annual decline.

This is the first conclusive evidence that CWD found at high prevalence leads directly to population declines in free-ranging deer populations. This population highlights the potential long-term negative outcome of endemic CWD to population sustainability and stresses the importance of preventing CWD from becoming endemic in a population, rather than attempting to manage if after the fact. Therefore, the best management strategy remains minimizing movement of CWD to new areas.

Chronic Wasting Disease in Elk: Research Updates from National Parks

Margaret A. Wild, Ryan J. Monello, Jenny G. Powers, and Nathan L. Galloway; National Park Service

Chronic wasting disease (CWD), a fatal, contagious prion disease of cervids, can cause long-term population declines in deer (Odocoileus spp.); however, little data exist on the effects of CWD on free-ranging elk (Cervus elaphus nelsoni). Where CWD exists in elk, prevalence is frequently estimated to be <1% leading some to surmise that its population impact is minimal. In some geographically isolated areas of Colorado, Wyoming, and South Dakota however CWD prevalence in elk surpasses that in deer. To investigate the population impacts of CWD, we studied an elk herd residing in and around Rocky Mountain National Park, Colorado, where CWD was first detected in 1981. Using immunohistochemical staining of rectal biopsies, we estimated CWD prevalence to be 12.9% (CL 8.0 - 19.1) in 2008-2009, although additional analyses using the highly sensitive serial protein misfolding cyclic amplification (sPMCA) assay predict prion infection to be higher (18.9%, CI 15.5 – 32.7%). We used survival rates of susceptible and infected elk to develop a projection matrix for a discrete time, female only model that estimated the intrinsic population growth rate (λ) of this elk herd to be 1.00 (BCI 0.93 - 1.05). Results of the projection matrix predict that even in the absence of hunting or other sources of mortality, CWD alone could induce population declines once prevalence exceeds 13% (BCI = 0, 35); however, this estimate was contingent on calf:cow ratios and harvest. To refine these estimates, we initiated a longer term survival study on this population in 2011. Using rectal biopsies, we estimate CWD prevalence at 8.5% (CL 4.6-13.3%). Preliminary results suggest survival rates remain low and CWD continues to be a leading cause of mortality. Clearly the population impacts of CWD on elk should not be dismissed without further investigation. At Wind Cave National Park, South Dakota, CWD contributed to decreased population growth rates in elk. Upcoming research will investigate the effect of reducing density on CWD prevalence and vital rates in the park.

Chronic Wasting Disease in Arkansas

Cory Gray, Arkansas game and Fish Commission
Margaret A. Wild, National Park Service

Chronic wasting disease (CWD), a neurodegenerative disease of cervids, was detected in Arkansas for the first time in February 2016 in a 2.5-year female elk legally harvested in October 2015 near Pruitt in Newton County. During that same period, a CWD-positive 2.5-year female white-tailed deer was found dead in Ponca in Newton County. To date, a total of 109 cervids have been confirmed positive for CWD in Arkansas; 5 elk and 104 white-tailed deer.

During March 14-24, 2016, biologists from the Arkansas Game and Fish Commission (AGFC) and other agencies randomly collected 266 white-tailed deer from a 125,000-acre CWD Focal Area in Newton

County, Arkansas. CWD was detected in 62 (23%) of these animals. CWD prevalence rate in female and male deer was 20% and 32%, respectively. Concurrent with the collection of the obex and retropharyngeal lymph nodes used for CWD testing, a 1-inch2 section of ear tissue was obtained from each deer and frozen for future genetic analysis.

To explore spatial distribution, additional sampling of road-killed (i.e., deer struck and killed by vehicles) and target animals (i.e., cervids exhibiting any illness or unusual activity) was implemented, statewide, in March 2016. Interestingly, a 2.5-year male, road-killed in Pope County, was found to be CWD-positive. This individual deer was identified 45 miles south of the CWD Focal Area in Newton County near the Arkansas River.

The AGFC implemented a series of regulations during the summer of 2016 with two goals in mind: 1) Minimize disease introduction into new areas, and 2) minimize disease amplification in already established areas. These regulations went into effect for the 2016 hunting season.

AGFC staff and partners are currently coordinating surveillance activities for the 2016 elk and deer seasons. Surveillance goal is to increase knowledge of disease distribution, monitor prevalence inside the focal areas, and collect higher-probability samples (i.e., road kills, target animals, and mature bucks) statewide to serve as a disease detection strategy.

USDA-APHIS-VS CWD Program Standards and Updates

Alecia Naugle, Randy Pritchard, USDA-APHIS-VS, Cervid Health Team

Fiscal Year (FY) 2016

Voluntary Chronic Wasting Disease (CWD) Herd Certification Program

The APHIS National CWD Herd Certification Program (HCP) was implemented in 2014. It is a voluntary Federal-State-industry cooperative program administered by APHIS and implemented by participating States. The program provides uniform national herd certification standards that minimize the risk of spreading CWD in farmed cervid populations. Participating States and herd owners must comply with requirements for animal identification, fencing, recordkeeping, inspections/inventories, as well as animal mortality testing and response to any CWD-exposed, suspect, and positive herds. APHIS monitors the Approved State HCPs to ensure consistency with Federal standards through annual reporting by the States.

With each year of successful surveillance, herds participating in the HCP will advance in status until reaching five years with no evidence of CWD, at which time herds are certified as being low risk for CWD. Only captive cervids from enrolled herds certified as low risk for CWD may move interstate. Currently, 29 States participate in the voluntary CWD Herd Certification Program and have Approved HCPs. FY 2016 marks the fourth year that Approved States have submitted their CWD HCP annual reports to APHIS. In FY2016 there were 2,704 enrolled cervidae herds: 2,129 deer, 447 elk and 128 mixed species herds. Of those, there were 2,331 certified cervidae herds: 1789 deer, 421 elk and 121 mixed species herds.

VS PCEP Evaluation

Veterinary Services (VS) conducted an internal evaluation of its Cervid Health Program in 2016 at the request of VS leaders. The evaluation used VS' Program Continuous Evaluation Process (PCEP), a standardized process designed to help VS leaders improve programs and services by examining (1) the program goals with respect to alignment with VS goals, stakeholder needs, program status and allocated resources; (2) the program strategies with respect to suitability for achieving program goals effectively and efficiently; and (3) the program value to stakeholders. A total of 49 stakeholders, including 40 stakeholders external to VS, were asked to provide input to the PCEP evaluation. Seven VS veterinary medical officers and one Wildlife Services veterinary medical officer met from May through June 2016 to complete the evaluation and to provide recommendations for the program. Recommendations and stakeholder input regarding the CWD Herd Certification Program (HCP) from the review were provided to the CWD Program Standards Working Group.

CWD in Farmed and Wild Cervids

Summary of CWD detections. As of September 30, 2016, CWD has been confirmed in wild deer and elk in 22 U.S. States, and in farmed cervids in 16 States. In total, 24 States have identified CWD in wild and/or farmed cervids. CWD has been reported in 77 farmed cervid herds in the United States.

Confirmation of the disease in free-ranging elk and white-tailed deer in Arkansas in 2016 marked the first reports of CWD in the wild cervid population in this State.

FY2016 CWD Detections in Farmed Cervids: Seven new positive captive cervid herds were identified in FY2016 (5 white-tailed deer and 2 elk). None of the seven positive herds were certified herds in the Herd Certification Program.

Texas: Two new herds

In February 2016, National Veterinary Services Laboratories (NVSL) confirmed CWD in a 3½-year-old, natural addition whitetail buck that was hunter-harvested from a release site on a ranch in Medina and Uvalde counties. The deer originated from a breeding facility on the ranch. Based on the possible exposures, both the breeder pen and the release site were considered positive premises. The buck was genotype GG at codon 96 and tested positive on both lymph node and obex. Two more positive deer have been identified out of 349 animals in the herd that have been tested since February using post-mortem and/or ante-mortem samples. The breeding facility and the associated hunting facility tested at least 130 white-tailed deer for CWD as part of routine post-mortem surveillance within the five years prior to the first positive case. The positive herd was within 50 miles of another known positive farmed cervid herd at the time of diagnosis. The herd currently has approximately 780 whitetail deer under State quarantine.

In April 2016, NVSL confirmed CWD in a 3 ½-year-old, natural addition white-tailed doe in Medina County. The doe was genotype GG at codon 96 and tested positive on both lymph node and obex. Subsequently, an additional 13 positive deer were identified by post-mortem and ante-mortem testing, including five 96GG, six 96GS, and two 96SS genotypes. The herd tested a total of 181 deer for CWD as part of routine post-mortem surveillance in the five years prior to the positive diagnosis. This positive herd is within ten miles of the positive herd identified in Medina/Uvalde Counties in February 2016.

Approximately 1,000 white-tailed deer currently reside on the premises that remains under State quarantine. Federal indemnity was used to remove and test select animals to inform the epidemiological investigation and evaluate the performance of ante-mortem tests.

Wisconsin: Three new herds

NVSL confirmed CWD in a 3-year-old, natural addition buck on a white-tailed deer breeding/hunting facility in Three Lakes, Wisconsin in November 2015. The facility is located in Oneida County. The buck was positive on both obex and lymph node, but was not tested for genotype. One additional positive hunter-harvested 5-year-old buck was positive on both lymph node and obex (untested genotype). No CWD positive cervids have been found in wild or farmed cervids within 50 miles of the positive premises. The herd tested at least 129 deer for CWD as part of routine post-mortem surveillance were reported within the five years prior to the positive diagnosis. The herd consists of approximately 450 white-tailed deer and is under State quarantine. Federal indemnity was not provided for this herd.

In January 2016, NVSL confirmed CWD in a 2½-year-old, natural addition white-tailed buck in Iowa County, Wisconsin. The farm had been under quarantine since 2002 because it is located within five miles of CWD-detection in wildlife. Only a few deer are kept on the farm for exhibition. The buck was positive on both obex and lymph node, with an untested genotype. The herd was enrolled in an HCP program in 2002, but was not compliant at the time of diagnosis. Twelve valid CWD test results had been reported in the five years prior to the positive animal diagnosis. The herd's owner currently has an inventory of less than 10 CWD-susceptible species. Federal indemnity was not provided for this herd. NVSL confirmed CWD in a white-tailed deer in Oconto County, Wisconsin in September 2016. The deer was a female, one-year-old natural addition that was found dead. The lymph node was CWD-positive but prion was not detected in the obex sample tested. The facility includes a separate breeding farm at the same location, with approximately 850 deer in the breeding farm and an estimated 1,500 deer in the hunting preserve. This preserve is not on a Herd Certification Program. There have been 1,078 deer tested from this preserve since 2010. A quarantine was issued. It will require 100% testing of all deer that die or are killed and are 12 months of age, in both operations. There are no plans to depopulate this farm at this time.

Iowa: One new herd

NVSL confirmed CWD in an elk from a hunting preserve in Pottawattamie County, Iowa, in January 2016. An adjacent breeding facility owned by the same producer was depopulated for CWD in 2012. The breeding facility received exposed deer from another positive herd in Iowa. The hunting preserve tested seven animals for CWD in 2012 (no other testing known). The hunt facility currently consists of white-tailed deer and elk and the plan is to hunt out the remaining animals. Federal indemnity was not provided for this herd.

Colorado: One new herd

In June 2016, NVSL confirmed CWD in an elk from a facility in Eagle County, Colorado. The 9-year-old cow elk was born on another premises in Colorado, but had been at this Eagle County facility for the past 8 years. This facility consisted of a small herd used for personal meat production. Communication with state animal health officials indicated that only one other elk resided on the premises at the time of CWD detection. That animal was euthanized and tested "not detected" for CWD. The herd owner has no plans to raise elk in the future.

Retrospective Epidemiology of CWD in Farmed and Wild Cervids: VS initiated a retrospective CWD epidemiology assessment in partnership with State animal health and wildlife agencies in 2015, but the evaluation was postponed due to VS' highly pathogenic avian influenza response. As part of the Herd Certification Program annual reporting process, VS asked States to complete an epidemiology summary for all previously identified CWD-infected herds. Nine States responded to the request for data and completed positive herd summaries for a total of 25 herds.

VS also cooperated with the Association of Fish and Wildlife Agencies and the Southeastern Cooperative Wildlife Disease Study to request similar data on CWD surveillance and epidemiology in wild cervid populations. Fourteen States responded to the request for data. VS is summarizing the information we received.

Review of CWD Program Standards

VS convened a working group composed of State, Federal, and industry representatives in the summer of 2016 to review the CWD Program Standards. This working group met for a 3-day face-to-face meeting and several follow-up conference calls to identify sections of the CWD Program Standards that need revision and to provide options for how VS could revise those sections. VS also asked a group of CWD scientific experts to provide their opinions on several key scientific questions. The working group discussed the following topics: goals and outcomes for the CWD Program; purpose/use of the Program Standards; susceptible species; definitions of terms; ante-mortem testing; epidemiologic investigations; reporting; indemnity; surveillance in certified herd; fencing requirements; biosecurity requirements; and carcass disposal. A summary of the working group's discussions and VS' recommended changes to the CWD Program Standards will be distributed for comment at the 2016 USAHA meeting.

Guidance Document for Interstate Movement of Wild Caught Cervids

VS issued a guidance document, VSG 8000.1 Surveillance and Testing Requirements for Interstate Transport of Wild Caught Cervids in September 2016. This document clarifies the process for approval, establishes a recommended minimum standard for testing and a uniform process of disease risk assessment to help prevent the spread of cervid diseases such as CWD, bovine tuberculosis (TB), and brucellosis when wild cervids are captured for interstate movement and release. Prior to its finalization, we shared a draft with State Animal Health Officials and Wildlife Officials in States that have conducted these movements in the recent past for review and comment.

Live Animal Testing For CWD

VS cooperated with animal health officials in Wisconsin, representatives from VERGE, and the herd owner to perform ante-mortem collection of medial retropharyngeal lymph node (MRPLN) biopsies during a depopulation of a white-tailed deer herd in November 2015 as a proof-of-concept pilot project. Additionally, VS' National Veterinary Services Laboratories (NVSL) evaluated historical post-mortem MRPLN samples and used this data to develop laboratory protocols to test and interpret ante-mortem MRPLN samples. VS will collaborate with States and industry to develop a policy concerning the use of ante-mortem MRPLN biopsies using the protocols developed by NVSL.

In addition, VS continues to support research to develop and validate other live animal tests for CWD. A pilot project is in process in Ohio to evaluate the use of whole-herd rectal biopsy as an ante-mortem test in CWD-exposed white-tailed deer herds. The first whole-herd test was performed on 231 exposed white-tailed deer in six herds from February through March. The second whole-herd testing was completed in September and final results are pending. Genotyping was used to determine the timing of the second whole-herd test. To date, all biopsy results have been "not detected."

Cervid Tuberculosis

The CervidTB Stat-Pak and Dual Path Platform (DPP) VetTB Assay serologic tests were approved for use in captive and free-ranging North American elk, white-tailed deer, red deer, fallow deer, and reindeer effective February 4, 2013. In July 2014, the DPP test became both a primary and secondary test for TB in cervids. Animals that have two consecutive positive tests at least 30 days apart are classified as TB reactors, and APHIS provides indemnity to euthanize these animals for further diagnostic testing.

In FY 2016, 10,750 cervids were tested serologically for bovine TB. A total of 42,612 cervids have been tested since the introduction of the serological tests in 2013. In FY2016, primary DPP serological testing identified 18 TB suspects; ten of these animals had negative tests when retested at least 30 days after the primary test and three animals have yet to be retested. Five were identified as TB reactors when they tested positive to the secondary DPP test. All five reactors were necropsied. Four mycobacterial culture results were negative and one culture result is pending.

In February 2016, the Scientific Advisory Subcommittee (SAS) of the USAHA Committee on Tuberculosis (TB) considered a proposal from VS to raise the DPP optical density (OD) cut-off value for reindeer from 200 to 500. Since the DPP was approved for use in the diagnosis of Mycobacterium bovis infection in reindeer in 2013, 179 animals were tested. Two animals were positive based on a cut-off of 200. Infection with *M. bovis* was not demonstrated in either animal. The TB SAS did not object to raising the DPP cut-off for reindeer from 200 to 500 in a low prevalence population. However, they recommended that if M. bovis were detected in reindeer, VS should evaluate DPP test performance in naturally infected reindeer. In March 2016, VS raised the OD cut-off value for reindeer from 200 to 500 making it consistent with the cut-off for elk, red deer and white-tailed deer.

National Animal Health Monitoring System Cervid Industry Study

Beginning early September 2014, VS, in cooperation with the National Agricultural Statistics Service (NASS), conducted the first national study of the U.S. farmed cervid industry. The study surveyed 3,000 producers from all States that have farmed cervids. The survey response rate was 42.5%, which is exceptional for a mail survey. The study provides baseline industry statistics, a description of current production practices and challenges, producer-reported disease occurrences, and an overview of health management and biosecurity practices. A report from the study is now available in electronic and printed formats at: http://www.aphis.usda.gov/nahms

Cervid Health Program Budget

The Cervid Health Program includes the CWD herd certification program and the cervid TB program. It is funded through the Equine, Cervid, and Small Ruminant Line Item. In FY2016, the Cervid Health Program was appropriated $3.0 million by Congress for cervid health activities. This funding was generally allocated as follows: $800,000 for indemnity for CWD and cervid TB; $200,000 for USDA Wildlife Services research and $150,000 for pilot projects to evaluate live animal diagnostic tests for CWD, and the remaining funding primarily supported Cervid Health Team and VS field activities.

Committee Business:

The committee discussed one member resolution to amend VS Guidance Document 8000.1 “Surveillance and Testing Requirements for Interstate Transport of Wild Caught Cervids” and the CFR § 81.3, (b) Animals captured for interstate movement and release, to ensure any wild cervid of a CWD susceptible species captured and transported interstate for release shall follow the same protocol set forth in CFR 55 and 81 for farmed cervidae. After 50 minutes of spirited debate but no agreement or resolve among committee members concerning more specific or appropriate language, a motion was made by the submitter to table the resolution and revisit it in the Subcommittee on Farmed Cervidae and Committee on Captive Wildlife and Alternative Livestock.

No further resolutions were forwarded so the committee was adjourned at 5:50 p.m.