REPORT OF THE COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

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The Committee met on Sunday, October 15, 2006 at the Minneapolis Hilton Hotel, Minneapolis, Minnesota from 12:30-5:30 p.m. The meeting was called to order by Chair Dr. Bob Cook. There were approximately 120 people in attendance, 46 were committee members. In his opening remarks Dr. Cook welcomed attendees and requested a show of hands to ensure that a quorum was present.

Dr. Chester Gipson, Deputy Administrator, Animal Care (AC), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), presented an Update on Animal Care, USDA. Information on several of these issues are available on the website www.aphis.usda.gov/ac).

In FY06, there were 10,445 licensed facilities and a total of 14,067 total inspections. Electronic Freedom of Information Act (E-FOIA) update – This became functional in October 2001. Inspection report narratives after this date were being posted but because of security concerns, this was suspended February 28, 2002. Currently the most frequently requested inspection reports are posted on the web site. In addition, the web site contains current issues and notices, Animal Welfare Act (AWA), regulations, policies, lists of licensees and registrants, order forms, fact sheets, and annual report submission. There are a number of regulatory activities of interest. Animal Care revised their policy to adopt the position statements of the American Veterinary Medical Association (AVMA) on declawing of wild and exotic carnivore and removal or reduction of canine teeth in nonhuman primates and wild/exotic carnivores. Additional policies include requirements for annual reports for research facilities and qualifications for Institutional Animal Care and Use Committee (IACUC) members that assess the research facility. The Pets Evacuation and Transportation Standards Act (PETSA) of 2006 was signed into law in October. This ensures that State and local emergency preparedness operational plans address the needs of individuals with household pets and service animals following a major disaster or emergency. Pending legislation includes Haley's Act, which would allow USDA to draft public safety regulations for facilities falling under the AWA, with

exemptions for Association of Zoos and Aquariums (AZA)-accredited zoos, that USDA believes are operating with public safety in mind. This bill defines “big cat” and “direct contact”, and would prohibit USDA from granting new licenses for facilities with big cats until the public safety regulations are finalized. The Captive Primate Safety Act (CPSA) passed the Senate in July 2006. The bill would amend Lacey Act Amendments (LAA) to treatment nonhuman primates as prohibited species under the Act, making it illegal to import, export, sell, acquire or purchase nonhuman primates. This is similar to the Captive Wildlife Safety Act (CWSA) that applies to exotic cats but has an exemption for individuals and facilities regulated under the AWA. The CPSA does not contain such an exemption. Legislation regarding marine mammals welfare began revision in 1993. Sections that will be amended include indoor and outdoor facilities, space requirements, water quality, and interactive programs. Proposed rule expected to be published in early FY 2007. A petition has been prepared by In Defense of Animals regarding space requirements for captive elephants; closing date for comments is December 11, 2006. International Fund for Animals has prepared a report critical of big cat care in 42 USDA licensed facilities. Report contains recommendations for changes in Federal and State policy; available at www.ifaw.org. The Farm Security and Investment Act (FSIA) of 2002 mandates that the AWA covers rats, mice and birds not being used for research. A notice of proposed rulemaking will solicit comments prior to proposed standards to help determine how to regulate these species and potential economic impact. The maintenance of medical records is not specifically listed in the AWA as one of the elements of adequate veterinary care but is clarified by AC policy. Proposed amendment to the regulations to require that records be maintained as part of a program of adequate veterinary care at all regulated entities. This regulation would clarify minimum standards for medical records. The Microchips Conference Committee directed APHIS to develop the appropriate regulations that allow for universal reading ability and best serve the interests of pet owners. APHIS will solicit comments from the public on proposed changes to the AWA regulations, and work collaboratively with stakeholders to encourage adoption of the International Standards Organization (ISO) standard for all pet identification. USDA attends about 10% of all horse events to ensure horse protection. Tools such as the horse and stable vapor instrument, equine limb thermography, and pressure algometer are being used to help detect sored horses.

Drs. Dean Goeldner and Tom Gidlewski, VS, APHIS, USDA, presented the APHIS-VS chronic wasting disease (CWD) program update. CWD has been discovered in free-ranging cervids in 11 states and 41 captive cervid herds in nine states. There are currently four infected elk herds and one infected white-tailed deer herd that have chosen to remain under quarantine instead of depopulate. In 2006, the CWD program depopulated one elk herd in the endemic area which turned out to be infected as well as a chronically infected white-tailed deer herd and a mixed elk and white-tailed deer herd for a total of approximately 110 animals. For the last three years, the program has paid for testing about 15,000 captive cervids per year. Demand for testing is expected to increase with the implementation of the program. The first infected free-ranging white-tailed deer was found in northwest Kansas in 2006. On the positive side, New York found no additional positive free-ranging cervids in 2006 but West Virginia found four additional animals in Hampshire County. Wisconsin continues to aggressively battle CWD with over 100,000 animals submitted for testing since 2000 and over 650 positive deer identified. The infected area appears to be largely limited to the original counties. Interestingly, the number of deer in the Wisconsin endemic area does not appear to be decreasing despite the large number of animals that have been removed. Colorado has stopped culling deer in “hot spots” as they believe that it was not very successful. Alberta,

Canada continues to find more positive white-tailed deer adjacent to the infected Saskatchewan areas.

Appropriate tissue collection and submission for CWD diagnosis includes obex, medial retropharygeal lymph nodes and palatine tonsils. Submission of an ear with the official eartag attached or submission of fresh tissue accompanied by an appropriately executed chain of evidence document will allow DNA comparison in the event of a positive diagnosis. Archiving herd blood samples on special collection cards is also a way to compare DNA in the event of a positive diagnosis in the future. All positive cases are verified by two pathologists and the presumptive positive tissues are completely retested at the National Veterinary Services Laboratory (NVSL). Rectal biopsy continues to be examined as a tool for CWD ante-mortem diagnosis. Hundreds of animals have been examined and the results look promising. Larger numbers need to be examined in order to make final conclusions. Retrospective epidemiologic analysis and transgenic mouse research in 2006 still support the theory that CWD does not appear to affect people or non-cervids animals.

APHIS received approximately $18.5 million in appropriated CWD funding in FY 2006 including $2.44 million in congressional earmarks. The FY 2007 appropriations have not been passed by Congress; the president's budget requests $15.4 million for CWD. On July 21, 2006, APHIS published its final CWD rule. The final rule added moose and all *Cervus* species to the previously announced deer and elk species covered in the herd certification program. It expanded the term "captive" to "farmed and captive", maintained a five-year surveillance standard for surveillance, clarified that two positive official tests are needed for a CWD diagnosis, reduced the minimum testing age to 12 months, adjusted commingling buffers, eliminated the 48-hour exemption for short-term commingling, changed the identification (ID) requirement to one official ID and one ID unique within the herd, and added the reporting of escapes and disappearances. Grandfathering of state programs will be accomplished through Memorandum of Understanding (MOUs) with the states followed by reviews of state programs for consistency with federal requirements. The interstate movement requirements maintained a "ramping up" process to reach the five year surveillance standard. An exemption was created for direct movement to slaughter. A permit will be required for interstate movement of research animals and two IDs will be required for wild cervids captured for translocation and release. Subsequent to publication of the rule, three petitions were received from organizations representing state agencies and officials challenging the interstate movement provisions in the rule and requesting a stay in the rule's implementation. The petitions challenged the scientific basis for initially allowing the interstate movement of animals with only one or two years of surveillance. They also took issue with the federal preemption language in the rule. According to USDA legal counsel, federal preemption on interstate movement is implicit in all APHIS regulations; it was made explicit in this case in response to a comment on the proposed rule. Nevertheless, APHIS believes the petitions merit further consideration. On September 8, 2006, APHIS published a notice of delay of implementation for the rule. The petitions will be published soon for public comment. APHIS intends to resolve the issues quickly so that a final rule can be implemented as the state-federal-industry program it is intended to be.

Dr. Robert Kunkle, National Animal Disease Center (NADC), Agricultural Research Center (ARS), USDA, presented a time-specific Committee paper entitled "Experimental Transmission of Chronic Wasting Disease (CWD) of Elk (*Cervus elapus nelsoni*), White-tailed Deer

(*Odocoileus virginianus*), and Mule Deer (*Odocoileus hemionus hemionus*) to White-tailed Deer by Intracerebral Route. This paper is included in its entirety in these proceedings.

Dr. Michael Miller, Senior Wildlife Veterinarian, Colorado Division of Wildlife, provided an overview of recent progress in understanding various aspects of chronic wasting disease (CWD) epidemiology, diagnosis, and control. Dr. Miller used the occurrence of CWD in a moose to hypothesize that the potential natural host range of CWD may be predicted based on similarities between the native prion protein of known hosts (deer, wapiti, and moose) and other cervid species. He also reviewed findings related to CWD transmission and showed that simulation models of epidemic dynamics based on relatively simple transmission assumptions suggest that CWD is likely to persist in wild deer populations and depress population performance over time. Dr. Miller next described highlights of a new study on PrP^{CWD} distribution in experimentally-infected mule deer that demonstrated marked genetic effects on CWD progression but not susceptibility in this species, and discussed the potential implications for CWD epidemiology. He then shared preliminary data on use of rectal mucosa biopsy to detect CWD infections in live white-tailed and mule deer, which suggest that rectal biopsy likely will be a useful herd screening test and surveillance tool provided PrP genotype data are available for sampled individuals. Dr. Miller concluded his presentation with a brief summary of unsuccessful attempts to control CWD in north central Colorado, emphasizing the challenges and obstacles that likely make eradication of CWD from the wild infeasible given present technology.

Dr. Darrell Styles, AC-APHIS-USDA presented the USDA-APHIS-AC and the AZA avian influenza management program. The components of the cooperative program between AC and AZA include surveillance, vaccination, and outbreak management. Out of the current licensed facilities, it is assumed that approximately 215 AZA-accredited facilities will participate in active surveillance, 110 non-AZA facilities will have passive surveillance, and the private aviculture facilities will be monitored by outreach programs. AZA will administer the program through the Lincoln Park Zoo and use Cornell University, University of Minnesota, and University of California-Davis laboratories for testing. Sample kits will be supplied to the facilities and AC field inspectors. Live bird surveillance will be performed on waterfowl and shorebirds held in non-enclosed ponds that have access to wild birds. Any suspect dead or sick birds will provide passive surveillance. Samples will be collected from oropharynx, cloaca, and intermittent serum from live birds. The same samples plus trachea will be tested in dead birds in addition to select tissues if the birds are necropsied in the labs. Birds that are listed on the Endangered Species Act (ESA) have been approved to receive vaccination in AZA zoos preemptively with regulatory approval. However, there will be a number of restrictions placed on vaccinated birds. Outbreak management plans are pending. AC is working with VS to develop this part of the program. If low pathogenic avian influenza (LPAI) is detected, there will be no action taken except for ongoing monitoring. If high pathogenic avian influenza (HPAI) is detected in a zoo, it is likely that a partial quarantine will be instituted, ongoing monitoring and evaluation of the collection, possible targeted depopulation and verification of disease-free status. The probability of finding HPAI in a zoo is considered very low due to current biosecurity measures.

Dr. Jane A. Rooney, Emergency Management and Diagnostics (EM&D)-APHIS-VS-USDA, presented an overview of avian influenza (AI) preparedness and response. APHIS has worked with Federal, State partners, and industry to safeguard the health of U.S. animals against AI for many years. AI viruses can be classified into low pathogenicity and high pathogenicity

forms based on the severity of the illness they cause in poultry or based on the World Organization for Animal Health (OIE) definition. Most AI strains are classified as LPAI and cause few or no clinical signs in infected birds. LPAI has been identified in the United States and around the world since the early 1900s. It is relatively common to detect low path viruses in wild waterfowl or shorebirds, which serve as the natural reservoir for this group of viruses. In contrast, HPAI causes a severe and extremely contagious illness and death among infected birds. However, it is important to note that most avian influenza viruses found in birds do not represent a public health concern. USDA interventions for avian influenza include: (1) targeted surveillance; (2) border protection; (3) trade restrictions and OIE guidelines; (4) outreach and education; and (5) preparedness and response.

National surveillance for AI is accomplished through several means: (1) the National Poultry Improvement Plan (NPIP) has a program for breeder flocks (in place since 1998); (2) State and University Laboratories test suspect cases; (3) industry working with states conduct export testing at slaughter and (4) states conduct surveillance in areas where AI has historically been a concern (e.g., live bird marketing system). The proposed change that will add a program to 9 CFR 146 to award a H5/H7 Avian Influenza Monitored status to participating flocks of Raised for Release Upland Game Birds was approved by NPIP Biennial Conference, September 2006. Thirty seven States accepted cooperative funding in FY 2006 to work with commercial upland game bird producers and their respective breeding flocks to increase the level of surveillance for avian influenza in these two avian sectors.

USDA-APHIS is prepared for an outbreak and systems are in place to use the National Incident Management System and Incident Command Structure to respond in partnership with local, State, and Federal organizations. The key is early detection and rapid response. In the event of an HPAI outbreak, APHIS has the Foreign Animal Disease (FAD) management infrastructure to conduct an emergency response that would occur at the local level in accordance with the National Animal Health Emergency Management System's (NAHEEMS) guidelines for highly contagious diseases. Should the disease be detected in commercial flocks or in back yard flocks, affected flocks would be quickly quarantined to prevent spread. Sick and exposed birds would be euthanized and the premises cleaned and disinfected to stamp out the disease. USDA would conduct epidemiology investigations to determine the source of the virus, and to track the movement of birds to contain spread.

Dr. Ray Waters, NADC-ARS-USDA, presented an Update on the Cervigam assay for tuberculosis surveillance of captive cervids. Mitogen and antigen induced interferon-gamma (IFN-gamma) responses of peripheral blood leukocytes from cervids were evaluated using a commercial, whole blood assay for the cytokine (Cervigam™, Prionics AG). Whole blood was from *Mycobacterium bovis*-infected white-tailed deer and reindeer, *M. bovis* BCG-vaccinated white-tailed deer and elk, and non-vaccinated/non-infected white-tailed deer, fallow deer, elk, and reindeer. When evaluating samples from *M. bovis*-infected white-tailed deer, responses to pokeweed mitogen (PWM) varied with time and between individuals. The magnitude of responses to PWM and *M. bovis* purified protein derivative (PPD) were positively associated, justifying use of PWM induced IFN-gamma secretion as a means for discriminating mycobacterial response capacity. Numerous samples from tuberculosis-free captive herds at varying locales within the US also were evaluated. Four percent of fallow deer, 20% of elk, 44% of white-tailed deer, and 91% of reindeer had responses to PWM exceeding 0.25 Δ optical density (i.e., PWM stimulation minus no stimulation), indicating an unacceptable level of detection in each of the species except reindeer. Specificity of responses to mycobacterial antigens (i.e., *M. bovis* PPD and rESAT-6:CFP10), excluding animals not responding to PWM,

ranged from 78% to 100% and was dependent upon cervid species and method of data interpretation (i.e., positive response cut-off value). These findings demonstrate the validity of the Cervigam™ assay for detection of TB in reindeer; however, further development of the assay will be required before using in surveillance programs for white-tailed deer, fallow deer, and elk.

Dr. Konstantin Lyashchenko, Chembio Diagnostic Systems, Inc., presented an update on serological assays for tuberculosis in nondomestic species. A number of host species are susceptible to tuberculosis (TB) that has serious zoonotic and regulatory concerns. As the current testing methodologies are inadequate for many wildlife and zoo animals, new diagnostic tools that would be simple, rapid, accurate, inexpensive, and host species-independent are urgently needed. Chembio developed two novel serological assays, VetTB STAT-PAK™ based on the lateral-flow technology and multiantigen print immunoassay (MAPIA), to detect specific antibodies in infected animals. The results of continuing evaluation of these immunoassays in bison, wild boar, tapir, camel, and llama are presented. The data supported the potential for rapid serological detection of TB in multiple host species. The proposed immunoassays are most suitable for surveillance in wildlife and zoos, especially where an instant test result is needed.

Dr. Keith Rohr presented a resolution on "The use of the ELISA test to diagnose Chronic Wasting Disease in Captive Wildlife". After discussion and modification to the original submission, the resolution was passed by the Committee and will be referred to the Committee on Nominations and Resolutions. Resolution passed by the Committee and referred to the Committee on Nominations and Resolution.

Experimental Transmission of Chronic Wasting Disease (CWD) of Elk (*Cervus elaphus nelsoni*), White-tailed Deer (*Odocoileus virginianus*), and Mule Deer (*Odocoileus hemionus hemionus*) to White-tailed Deer by Intracerebral Route

R.A. Kunkle, A.N. Hamir, J.M. Miller, J.A. Richt, J.J. Greenlee
National Animal Disease Center
Agriculture Research Center
United States Department of Agriculture

S.M. Hall
National Veterinary Services Laboratories, USDA-VS-APHIS
Animal and Plant Health Inspection Service
Veterinary Services
United States Department of Agriculture

E.S. Williams
Wyoming Veterinary Laboratory
University of Wyoming

Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) affecting elk, white-tailed deer, and mule deer. Intra-species transmission of CWD is readily accomplished via oral administration of CWD-affected brain, and while the exact mode of natural transmission is unclear, horizontal transmission within species has been demonstrated.

The TSE's are prion-associated diseases. Different prion strains are associated with variations in clinical course and pathology in susceptible animal hosts. To determine the potential existence of CWD pathotype strain differences, groups of five white-tailed deer were inoculated by intracerebral route (IC) with 1 ml of 10% (wt/vol) brain homogenates derived from CWD-affected elk, white-tailed deer, or mule deer. Two non-inoculated deer served as negative controls. All deer were homozygous at PrP gene polymorphic sites 95 (glutamine) and 138 (serine). Deer homozygous (glycine/glycine) or heterozygous (glycine/serine) at codon 96 were approximately equally divided between treatment groups. One deer from each treatment group was euthanized 10 months post-inoculation (PI); findings for these three deer were similar and included limited or mild spongiform encephalopathy (SE) and immunohistochemical (IHC) detection of prion in lymphoid tissue follicles and in the CNS, especially in subependymal areas. All remaining deer were euthanized at the terminal stage of disease. The clinical course of CWD appeared similar between groups. The survival period did not differ between groups, ranging from 14 to 26 months, with an average mean of 20 months. The severity of SE and magnitude of IHC staining appeared proportional to incubation period. Microscopic lesions in the CNS were typical of previously reported CWD SE, including the presence of cerebral florid plaques. IHC staining was multifocally extensive to diffuse, and was perineuronal, subependymal, and neuropil associated. Staining was pronounced in the midbrain, but relatively sparse in the hippocampus. Differences in histopathologic and IHC findings between groups were not noted. Negative control deer sacrificed at 26 months PI did not have SE and were IHC negative. The composite findings indicate the clinical course and pathology of CWD in IC challenged white-tailed deer was not influenced by species of the inoculum source or by PrP gene polymorphism at codon 96 in recipients.