

## REPORT OF THE COMMITTEE ON WILDLIFE DISEASES

Chair: Dr. John R. Fischer, Athens, GA

Vice Chair: Dr. Stephen M. Schmitt, Lansing, MI

Dr. Wilbur B. Amand, PA; Dr. Robert D. Angus, ID; Mr. Keith E. Aune, MT; Dr. Daniel R. Baca, TX; Mr. John R. Behrmann, PA; Mr. Charles S. Brown, NC; Mr. Alan G. Clark, UT; Dr. Robert A. Cook, NY; Dr. Walter E. Cook, WY; Dr. Todd Cornish, WY; Dr. Thomas J. DeLiberto, CO; Dr. Leslie A. Dierauf, WI; Dr. Mark L. Drew, ID; Mr. Tim J. Feldner, MT; Mr. Bob Frost, CA; Dr. Bob Gerlach, AK; Dr. Colin M. Gillin, OR; Dr. Donald E. Hoenig, ME; Dr. Sam D. Holland, SD; Dr. David L. Hunter, MT; Dr. Dave Jessup, CA; Ms. Holly C. Johnson, MN; Dr. Susan J. Keller, ND; Dr. Patrice N. Klein, MD; Dr. Terry Klick, OH; Dr. Terry Kreeger, WY; Dr. Thomas F. Linfield, MT; Dr. Jim Logan, WY; Dr. Phillip M. Mamer, ID; Dr. Kristin Mansfield, WA; Dr. Charles E. Massengill, MO; Dr. Robert G. McLean, CO; Dr. Daniel G. Mead, GA; Ms. Phyllis Menden, WI; Dr. Robert M. Meyer, CO; Dr. Michael W. Miller, CO; Dr. Bruce L. Morrison, NE; Dr. Mitchell V. Palmer, IA; Dr. Glenn Plumb, WY; Ms. Laurie S. Prasnicky, WI; Dr. Kelly R. Preston, TX; Mr. Shawn P. Schafer, ND; Dr. Sarah B. S. Shapiro Hurley, WI; Dr. Clarence J. Siroky, Id; Dr. David E. Stallknecht, GA; Dr. Joe Starcher, WV; Dr. Pamela K. Swift, CA; Dr. Scott R. Syska, MO; Mr. Cleve Tedford, TN; Dr. John B. Thurston, In; Dr. Samuel J. Vainisi, WI; Dr. Johna K. Veatch, KY; Dr. Kenneth Waldrup, TX; Ms. Diana L. Whipple, IA; Mr. Dave Whittlesey, CO; Dr. Margaret A. Wild, CO; Dr. Richard D. Willer, AZ; Mr. Steve Wolcott, CO; Ms. Jill Bryar Wood, TX; Dr. Taylor Woods, MO; Dr. Glen L. Zebarth, MN.

The Committee met on Monday, November 7, 2005. At least 115 people, including 35 committee members, attended the meeting. Reports were provided concerning ongoing and emerging wildlife health issues

### **United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) Wildlife Policy**

Dr. Michael Gilsdorf, USDA-APHIS-VS reported on the new VS animal health policy in relation to wildlife.

The mission of VS is to prevent, control, or eliminate infectious agents/diseases in animal agriculture/livestock. When diseases, that impact animal agriculture/livestock, are also found in wildlife species, VS will collaborate with Federal, Tribal, and State wildlife agencies to protect animal agriculture/livestock from possible exposure and infection. VS will assist in controlling and/or eliminating these diseases from wildlife.

In cases where VS has programs in place to eradicate existing infectious agent/disease in animal agriculture/livestock, VS will seek measures, collaboratively with wildlife agencies, to:

- 1) conduct surveillance and define the distribution of the disease in wildlife populations;
- 2) create appropriate separation between wildlife and livestock to limit disease transmission;
- 3) eradicate the disease from all potential wildlife reservoirs when eradication is deemed technically feasible
- 4) reduce or limit the occurrence of the disease in wildlife populations in situations where eradication is not feasible.

Not only does the presence of an infectious agent/disease from animal agriculture/livestock pose risk to wildlife, the converse is also true: the presence of an infectious agent in wildlife poses risk exposure to animal agriculture/livestock. The presence of an infectious disease in wildlife, depending on how it is managed may have an impact on

animal agriculture/livestock as it pertains to a States' disease classification status for movement and trade.

When VS has programs to eliminate or control existing infectious agent/disease programs in animal agriculture/livestock, VS will seek collaborative measures with wildlife agencies to

- 1) conduct surveillance and define the distribution of the disease in wildlife populations;
- 2) create appropriate separation between wildlife and livestock to limit disease transmission; and
- 3) seek to reduce or limit the occurrence of the particular causative agent in wildlife populations through mitigation measures, and/or movement controls.
- 4) Finally, for infectious agents/diseases for which VS has no formal program, VS will cooperate, when requested by wildlife agencies, in surveillance and/or other efforts within wildlife populations and when resources permit, on a case-by-case basis.

### **Highly Pathogenic Avian Influenza and Wild Birds**

Dr. David Stallknecht, Southeastern Cooperative Wildlife Disease Study reported on highly pathogenic avian influenza (HPAI) virus (H5N1) infection and mortality in wild birds in Asia that first was recognized in 2002/2003 and has continued through 2005. It appears that this virus may have been transported across Asia via migrating wild birds, and more recently it has occurred in eastern Europe. These events have raised numerous questions related to the possible role of wild birds in the maintenance or transmission of this virus and the epidemiology of the HPAI H5N1 virus in wild bird populations remains unclear.

It is well established that wild birds represent the reservoir for avian influenza viruses (AIV) worldwide; however, there are no reports of direct transmission of any AIV from wild birds to humans. A wide variety of AIV has been isolated from numerous species in the orders Anseriformes (ducks, geese, and swans) and Charadriiformes (shorebirds, gulls, and terns). These isolates have included all of the currently known AIV hemagglutinin (H) and neuraminidase (N) subtypes that are used to classify these viruses. AIV is transmitted within these wild populations through a fecal/oral route via cloacal shedding of virus and contaminated water. Infection rates in wild birds are dependent on season, location, age, and species. In North American ducks, for example, high infection rates (which can exceed 30%) are primarily associated with juvenile mallards during pre-migration staging in late summer, when birds are migrating from northern breeding areas. With shorebirds, consistent isolations of AIV have been reported only from ruddy turnstones during spring migration stopovers at Delaware Bay. In short, the epidemiology of these viruses in wild birds is complex and dependent on behavior as well as species susceptibility to infection.

The current H5N1 HPAI outbreaks in domestic poultry in Southeast Asia, the zoonotic potential of this virus, and continued reports of wild and zoo bird mortality associated with this virus, certainly deserve attention. It is currently known that the HPAI H5N1 Asian viruses may be pathogenic to some wild bird species. Based on observations during 2005, it is evident that this virus is being transported within Asia by migratory birds and there is circumstantial evidence of HPAI transmission to domestic flocks. However, these results provide little insight into either transmission or maintenance of HPAI H5N1 in wild bird populations and do not indicate that wild birds represent the only or most important route for potential HPAI H5N1 spread within or outside of Asia. These unfolding events dramatically underscore the need to better understand the epidemiology of AIV in our wild bird populations and to identify mechanisms for both

interspecies transmission and the emergence of HPAI viruses that potentially impact domestic animal, human, and wildlife health.

### **Canada's National CWD Control Strategy and Wild Bird Influenza Survey**

Dr. Ted Leighton, Canadian Cooperative Wildlife Health Centre, Western College of Veterinary Medicine, University of Saskatchewan, reported on Canada's Chronic Wasting Disease Control Strategy and Wild Bird Influenza Survey. Chronic Wasting Disease (CWD) was first recognized in Canada in farmed elk in 1996 and then in wildlife, in a mule deer, in the winter of 2000, both in the Province of Saskatchewan. The disease spread widely among cervid farms, and Canada spent over \$40M to eradicate CWD from farmed cervids in Saskatchewan and Alberta at the end of 2002. Since 2000, the disease in wild cervids has been detected over ever-larger areas in Saskatchewan, and in 2005 it was found for the first time in Alberta.

In 2004, Canada assembled an international panel of scientific experts on CWD, prion diseases, disease ecology and cervid biology to review what was known about CWD in wildlife in Canada and elsewhere, and to recommend to Canada how best to respond to this disease. The panel's report was released in August 2004. The report predicted severe socio-economic consequences and coast-to-coast spread of the disease over time if it were not contained, and it urged Canada to take immediate and vigorous action to halt its spread. The report received wide media coverage and public interest, and a wide range of government agencies and non-government organizations concurred with its major findings and recommendations. In September 2004, the Ministers of Canada's federal, provincial and territorial wildlife departments declared that a national program to control the CWD would be developed, and would be ready for implementation in the fall of 2005. The Ministers directed their departments to develop a national CWD control plan and, specifically, to use Canada's *National Wildlife Disease Strategy* ([http://www.cws-scf.ec.gc.ca/cnwds/index\\_e.cfm](http://www.cws-scf.ec.gc.ca/cnwds/index_e.cfm)) as the model for doing so.

Accordingly, a *National Chronic Wasting Disease Control Strategy* was written by a team of scientists (Technical Working Group) under the direction of an Inter-agency Oversight Committee with members representing wildlife, agriculture and public health agencies at federal and provincial-territorial (state) levels. The work was coordinated by the Canadian Cooperative Wildlife Health Centre. The National CWD Control Strategy was completed in Spring 2005 and was approved by the Ministers Councils on 5 October 2005. The CWD Strategy identifies six goals to be achieved: prevention of spread of CWD, early detection of CWD, response plans for existing and new occurrences of CWD in Canada, effective management of CWD through science, education of personnel required to implement the strategy, and communications systems to manage the program internally, to provide accurate information externally, and to receive and respond to feedback from sources external to the program itself. In addition to the Strategy, the Technical Working Group also developed action plans for the step-by-step achievement of each of the Strategy's goals, over a 10 year time frame. Endorsement of the CWD Strategy by the Ministers Council is a signal to proceed with its implementation.

A plan to conduct a survey of influenza viruses in wild birds in Canada was initiated late in 2004 by the Canadian Cooperative Wildlife Health Centre in consultation with a wide range of federal and provincial government agencies with wildlife, domestic animal health and public health responsibilities. The purpose of the survey was to obtain Canada-wide information of the range of influenza virus strains present in wild birds to furnish information important to all of these domains. Cloacal swabs were collected from wild ducks caught at banding stations in August-October 2005 by the Canadian Wildlife Service, Ontario Ministry of Natural Resources and Ducks Unlimited Canada. A target of 800 samples was set for each of 6 general regions representing different migration corridors, in British Columbia, Alberta, Manitoba, Ontario, Quebec, and the Atlantic Region. Five hundred samples were to be from mallards and 300 from other duck species, with hatch year birds preferred whenever possible. Initial analysis of the samples is being carried out at a regional laboratory in each of the 6 regions as an in-kind contribution to the survey by provincial governments. These laboratories are doing PCR analysis for influenza A matrix protein. Samples positive by this test are then tested by PCR for presence of H5 and H7 protein classes and virus is being isolated from each Matrix Protein PCR-positive sample in embryonated hens eggs. Isolated virus will be sent to the National Centre for Foreign Animal Diseases of

the Canadian Food Inspection Agency and the National Microbiology Laboratory of the Public Health Agency of Canada, both in Winnipeg, for H and N sero-typing, pathogenicity tests where warranted, genetic sequence analysis and placement in a national archive of virus strains.

As of November 1, 2005, approximately 4,400 samples had been collected. Initial virology had been completed on 2046 samples. Of these, 44% contained influenza A virus(es), 2 - 8+ % contained viruses of the H5 group, and none contained viruses of the H7 group. It is anticipated that initial virus assessment by PCR will be completed on all samples by approximately 15 November 2005.

### **New Approaches for Healthier People, Livestock, and the Environment**

Dr. William B. Karesh, Wildlife Conservation Society's Field Veterinary Program reported on current opportunities for global leadership in new approaches for healthier people, livestock, and the environment. Over half of the 1,700 infectious diseases known to modern medicine are shared between humans and animals. Unfortunately, many of these diseases fall between the cracks of interest or responsibility of modern health care authorities. Wildlife health professionals around the world work in this crevasse, in which approximately 3/4 of the world's populations reside. These diseases threaten local people and their livelihoods, they threaten wildlife and livestock, and with modern travel and transport, they can even pose a threat to the U.S. Two opportunities are immediately apparent: 1) we can take global leadership in a new approach to health – one that is a great leap forward from the traditional segregation of medical disciplines, and 2) we can better protect our human, livestock and wildlife health interests by gathering critically needed information on emerging infectious diseases overseas, before they reach this continent.

Hundreds of scientists in the field of wildlife health have been dismayed for years that government agencies and multi-government organizations have avoided responsibility for robustly pursuing the simplest of concepts: the health of people, animals, and the environment in which we all live are inextricably linked. Ironically, the fields of human health, public health, livestock health, and wildlife health are suffering from too much specialization and a lack of willingness to engage across disciplines. It is much more appropriate to view the combined and inter-related health of all of these different entities as "one health." Outbreaks of avian influenza, Serous Acute Respiratory System (SARS), Ebola virus, bovine spongiform encephalopathy and other emerging diseases are surprising the public, disrupting globalization, resulting in massive economic losses, and jeopardizing business and diplomatic relations.

No single agency is responsible for surveillance of the myriad of diseases residing around the world. The U.S. is mandated to protect the U.S. livestock industry. Radar screens are set to blink only when livestock is threatened here. Similarly, the United Nations (U.N.) Food and Agriculture Organization's priorities are the production of livestock and crops. The World Health Organization is directed at human health, but can only respond upon official invitation from a country that may or may not know about, or want to reveal, the presence of a disease. The U.S. Centers for Disease Control and Prevention (CDC) has the responsibility to prevent human diseases in the U.S., and they do an exemplary job here as well as helping overseas when invited.

Currently, it appears that those living and working in the gaps between the above efforts are assuming the un-authorized responsibility by establishing knowledge networks to help those in need of information. Diseases such as Anthrax, Avian Influenza, Monkey Pox and Ebola are regularly encountered where they naturally occur. If someone would have asked wildlife health professionals for an opinion about importing African rodents for the U.S. pet trade a year ago, they would have stated that this practice is a very bad idea. A few months later, those rodents carried monkey pox to the U.S., infected Americans and American prairie dogs and cost citizens millions of dollars in government response efforts. Importers of the disease did not bear the costs. SARS resulted in hundreds of needless deaths in Asia and economic losses approaching fifty billion dollars because no one in authority thought to ask people with the knowledge of wildlife diseases for an opinion. Mixing millions of live wild and domestic animals and the infectious diseases they routinely carry from around the world in crowded,

unsanitary markets was a disaster waiting to happen. Market owners did not compensate families or make up for lost revenues globally.

Several billion people still live in a world where they buy their food in live animal markets. There is no system of inspection, and there is no access to basic health care, common vaccinations or antibiotics. However, there very well may be access to air transportation, and it is quite possible for infected individuals to fly anywhere in the world within a day or two.

In South America it has been shown that, contrary to common opinion, livestock diseases may pose more threats to wildlife than the other way around. Improving the health of livestock would benefit the industry and people, as well as protect wild animals from livestock diseases. In Central Africa, it has been found that gorillas and chimpanzees have no immunity to common human diseases. Local people and tourists threaten wild populations with these illnesses, which could be simply avoided by implementation of good preventive health programs and practices in villages. People and wildlife would benefit. Work with Ebola Hemorrhagic Fever in gorillas and chimpanzees has shown that working with wild primates in the forests, the disease can be detected months before the first human cases – providing the lead time to warn villagers not to hunt or handle the animals that are the source of the infection. This broader, one health approach is much more effective than the traditional “quarantine and stamping out” approach after an outbreak has already begun.

Unfortunately, models of modern health advanced faster than the real world. The best-funded health programs in existence today have inadvertently left a dangerous void. It was not supposed to happen, diseases were supposed to be cured and then society was to move forward. Having eradicated smallpox, modern health care moved to take on more pressing, non-infectious diseases such as cancer, aging, and more recently, obesity. But much of the world is still dealing with outbreaks of infectious diseases and there are numerous opportunities to assist the world in dealing effectively with these problems.

Individuals in the fields of health and global governance need to find better ways to use their skills to make the world safer from disease. There is an obvious and urgent need to break down barriers among health disciplines and build bridges among the well-funded government agencies and the privately operating individuals and organizations around the world currently taking responsibility with only scarce resources. The inter-agency gaps in disease surveillance, prevention, and response must be filled with safety nets of people from other sectors of society working on these issues around the world. There is a great need for something akin to faith-based organizations, more networks devoted to a belief in “one health”

### **Pathogen Surveillance in Animals**

Dr. Thijs Kuiken, Virology Department at Erasmus Medical Center in Rotterdam, The Netherlands reported on pathogen surveillance in animals. Emerging infections have an enormous impact on public health, food supply, economies, and the environment. Animals, and particularly wild animals, are thought to be the source of more than 70% of all emerging infections. Therefore, surveillance in animals for zoonotic pathogens is critical for managing these infections.

At the national level, animal pathogen surveillance usually is the responsibility of government departments of agriculture. Internationally, a list of pathogens that affect international trade, including many important zoonoses, is reported to the World Organisation for Animal Health (OIE) by its member countries. Other international organizations involved in pathogen surveillance in animals include the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO), while the International Society for Infectious Diseases maintains the internet-based Program for Monitoring Emerging Diseases (Promed-mail).

The current system does not provide a sufficient level of vigilance because surveillance in domestic animals is generally confined to pathogens with known economic impacts, surveillance in

wildlife is less intensive to nonexistent, and surveillance systems for humans, domestic and wild animals are poorly integrated. It is therefore recommended that a joint working group be created under the auspices of or with representation from the WHO, FAO, OIE and other key stakeholders such as the World Conservation Union (IUCN) and the Wildlife Conservation Society. The mission of this working group should be to design and implement a global animal surveillance system for zoonotic pathogens that gives early warning of pathogen emergence, is closely integrated with public health surveillance, and provides opportunities to control such pathogens before they can affect human health, food supply, economies, or biodiversity. Linking comprehensive pathogen surveillance of wild and domestic animals with public health surveillance at the national and international levels, and improving the quality and coverage of these surveillance programs will make an important contribution to the detection and control of emerging infections. The entire publication on this subject may be found in *Science* (2005) Volume 309, pages 1680-1681.

### **National West Nile Virus Update: 2005**

Dr. Daniel Mead, Southeastern Cooperative Wildlife Disease study briefly updated the committee on the status of West Nile virus (WNV) in the United States. First identified in the U.S. in 1999, the mosquito-borne virus has been detected in every state except for Alaska and Hawaii. Since 1999, the virus has been detected in over 294 avian, 22 mammalian, and 1 reptilian species.

Nationwide 2004 and 2005 surveillance results were reported for humans, horses, and birds. surveillance results. During 2004, 2,499 human cases were reported from 40 states; while 2,316 human cases from 42 states have been reported to date for 2005. Among horses, 1,386 equine cases were reported in 2004, and 988 equine cases have been documented in 2005. In 2004, 31,992 dead wild birds were reported to official with WNV detected in 12,379 of them. So far in 2005, WNV has been detected in 4,716 wild birds.

Mead also briefly discussed other arboviral surveillance in wildlife including the diagnosis of eastern equine encephalitis virus in a white-tailed deer in Georgia in 2001.

### **Eastern Equine Encephalitis in Free-ranging White-tailed Deer in Michigan**

Dr. Stephen M. Schmitt, Michigan Department of Natural Resources, reported on the occurrence of Eastern Equine Encephalitis (EEE) in white-tailed deer in 2005 in Michigan. The Michigan Department of Natural Resources, collaborating with Michigan State University, confirmed seven cases of EEE in free-ranging white-tailed deer in southwestern Michigan. A variety of tests including immunohistochemistry (IHC), polymerase chain reaction (PCR) and virus isolation were used to make the diagnoses. All of the positive deer came from an approximately 25-mile-wide area in Kent, Montcalm and Ionia Counties. The deer specimens were submitted for testing by the public after some deer in the area were observed behaving abnormally (unafraid of people, excess salivation, lethargic). A media report speculated that the deer had chronic wasting disease (CWD), but all tested negative for CWD. Michigan becomes only the second state in the country to document EEE in free-ranging white-tailed deer. The first case was documented in 2001 in Georgia.

The virus that causes EEE is transmitted by mosquitoes that usually frequent hardwood swamps. The virus is maintained in areas by wild bird reservoirs and mosquito vectors, especially *Culiseta melanura*. Mosquitoes that have fed on birds carrying EEE virus can transmit the disease to horses, humans and deer. Michigan has documented cases of EEE in horses in southern Michigan for at least 40 years. The Michigan Department of Agriculture recently confirmed three cases of EEE in horses in the same area as the infected deer. The last recorded human case in Michigan was in 2002. Although far more likely to be exposed to EEE virus by mosquito bites, deer hunters, because of their possible contact with brain and spinal cord matter during processing, were urged to take common-sense precautions. These included refraining from handling or eating animals that appear sick or act abnormally, wearing rubber gloves when field dressing deer, avoiding contact with brain and spinal tissues, and thoroughly washing and sanitizing their hands and processing equipment.

A serological survey of deer harvested by hunters this fall is planned to determine the extent of the disease in Michigan. Lastly, EEE should be included in the differential diagnosis of neurologic disease in white-tailed deer in the eastern United States.

### **Management of Bovine Tuberculosis in Michigan Deer**

Dr. Schmitt also reported on surveillance and management activities for *Mycobacterium (M.) bovis* in Michigan wildlife. Since 1994, the state of Michigan has recognized a problem with *M. bovis* in wild white-tailed deer from a thirteen county area in northeastern Lower Michigan. In 2004, surveillance activities for *M. bovis* continued statewide, with an emphasis on the northern half of Lower Peninsula. In white-tailed deer, 28 animals cultured positive from 15,129 deer submitted for testing.

Since the index cases were first identified, 138,567 free-ranging deer have been tested for bovine tuberculosis; 509 infected animals have been found. Increasingly, the spatial epidemiology of the disease is revealing a highly focal, clustered pattern. Approximately 97% percent of all positive deer identified to date originated from a five county area. Moreover, within that area, the vast majority of positive deer were from Deer Management Unit (DMU) 452. Even within DMU 452, the spatial arrangement of cases is highly clustered, in spite of the fact that sampling effort has been relatively uniform geographically.

Strategies for eradication of TB from Michigan wildlife continue to focus on 1) reducing deer population densities to biological carrying capacity and 2) reducing artificial congregation of deer by restriction or elimination of baiting and feeding. These strategies have been implemented through provision of extra rifle seasons and unlimited antlerless deer permits and by prohibition or restriction of deer baiting and feeding. In the five county area most affected by TB, deer numbers have declined approximately 38% since 1995. The achievement of this substantial population reduction highlights the critical role that hunters have played in the control of TB in Michigan. Nonetheless, persistent focal areas of high density on private land remain problematic. Since 2002, baiting and feeding have been prohibited in the seven counties from which ~98% of all TB positive deer have originated. Policy makers have committed to keeping these regulations consistent for a five-year period in order to improve compliance and enforcement. The overall scope of baiting and feeding has declined dramatically since 1997, with large scale feeding largely a thing of the past. While some illegal baiting and feeding continues to occur, the size of these sites is substantially reduced, and heightened enforcement is expected to reduce the practice further over the next several years.

While much work remains, substantial progress has been made towards eradication of TB from Michigan wildlife. Apparent prevalence in the core area of the outbreak DMU 452 was 1.7% in 2004, a decrease of 64% since 1995. Trend analysis of prevalence data from 1995 to 2004 indicate a statistically significant decreasing trend, and two methods of estimating TB transmission rate in the deer herd in DMU 452 are showing statistically significant decreasing trends.

Michigan's TB intervention strategies are working; however, it is too early to claim victory in eradicating the disease. The need to stay the course is important, but will be difficult, due to ever increasing pressure from a variety of sources to lessen these intervention strategies. With that in mind, the State of Michigan is evaluating a new intervention strategy that may be more acceptable to many hunters and landowners. The new strategy is based on live-trapping and TB-testing of wild deer, with removal of positive animals. This strategy is not intended to replace initial strategies, but may assist them in eliminating TB from the deer herd.

The Michigan Department of Natural Resources conducted a pilot trial of the new strategy in a township with relatively high TB prevalence within DMU 452 during the winter of 2003. The results of the pilot are cause for optimism on a number of fronts. The project was well received and supported by the public. Appreciable numbers of deer were captured with reasonable efficiency and low mortality. Tracking and removal techniques worked well. The one facet of the project that failed was the blood test. The blood test that was used proved not to be accurate in detecting TB positive deer. While the blood test did not perform as expected, the capture, handling and tracking techniques nevertheless provided a

field-tested protocol for obtaining deer for other diagnostic tests and future control projects. For example, should a suitable TB vaccine ever be developed, it could be delivered by this protocol.

An effort to develop a more accurate blood testing procedure was the focus of the pilot during the 2004 hunting season. Hunters were asked to collect blood from deer harvested in DMU 452, and to submit the blood and deer head to a deer check station. The lymph nodes from the deer heads were cultured for TB and culture results were compared with results from four TB blood tests. One blood test (Rapid Test) that can be done in 10-15 minutes in the field with whole blood looks promising.

Further trials with the Rapid Test (RT) may show it to be acceptably accurate for the purposes of the new strategy. If so, the RT's ability to use small quantities of whole blood and provide near instant results (which could obviate the need to collar, release and track down suspect deer, resulting in substantial cost and labor savings), would justify a more rigorous evaluation of its potential application in a test-and-cull strategy.

### **Greater Yellowstone Area Brucellosis**

Dr. Thomas Linfield, Montana Department of Livestock updated the committee on activities of the The Greater Yellowstone Interagency Brucellosis Committee (GYIBC) and the Interagency Bison Management Plan for Montana and Yellowstone National Park.

The GYIBC was formally established in 1995, when a Memorandum of Understanding (MOU) was signed by the Secretaries of the Interior and Agriculture and the Governors of Montana, Wyoming, and Idaho, in an effort to collectively address the problems caused by brucellosis in elk and bison in the Greater Yellowstone Area (GYA). Member agencies represented in GYIBC include the State and Federal agencies responsible for management of wildlife, livestock, and lands in the GYA. The Goal of the GYIBC is to protect and sustain the existing free-ranging elk and bison populations in the GYA and protect the public interests and economic viability of the livestock industries of the States of Idaho, Wyoming, and Montana. A major focal point of the GYIBC is to facilitate the development and implementation of brucellosis management plans to control and eventually eliminate brucellosis from the wildlife in the GYA. The GYIBC produced the *2004 GYIBC Annual Report*, its second annual report. The Report highlights GYIBC activities from January 1, 2004 thru June 30, 2005. Future GYIBC reports will be published for annual GYIBC activities from July through June.

The 1995 enabling Memorandum of Understanding (MOU) established the framework for the state and federal agencies to address the issues relevant to brucellosis in the GYA. The MOU was intended to be a dynamic agreement among the member agencies, with a term of five years, and subject to review and renewal. Review and proposed revisions to the MOU began in September 2003. The most significant proposed revisions included: (1) Native American Tribal representation on the GYIBC, appointing the President of the Board of Directors of the InterTribal Bison Cooperative (ITBC) as the Tribal representative on the Executive Committee; and (2) stronger and more explicit commitment to elimination of brucellosis in the GYA, including the development of Cooperative Brucellosis Elimination Plans by the Technical Subcommittee. In May 2005, the U.S. Departments of the Interior and Agriculture agreed upon a "federal" draft MOU for the States of Idaho, Montana, and Wyoming to consider. The "federal" draft MOU included additional provisions focusing on efforts to eliminate brucellosis from bison and elk in the GYA, including: (1) necessary agency development of adaptive management disease elimination plans for each affected bison or elk herd unit or population; (2) establishment of measures to evaluate incremental progress in disease elimination efforts; and (3) timelines for plan development and progress evaluation. The states of Idaho, Montana, and Wyoming are in the process of reviewing and analyzing the "federal" draft MOU, and at this time, agreement on a "state" draft MOU, if different than the "federal" draft MOU, has not been reached. If the "state" draft MOU differs from the "federal" draft MOU, additional review by the federal agencies and negotiations between the state and federal agencies to resolve any differences will be necessary before a final revised MOU can be signed.

A study is being conducted by Montana Fish, Wildlife and Parks to determine the spatial dynamics of elk in the Upper Madison. About 5,000 elk winter on private and public lands east of the



upper Madison River near Ennis, Montana. Most of these wintering elk occupy private lands that support domestic livestock, primarily cattle. Since the mid 1960s, numbers of elk wintering in the upper Madison Valley increased about 400%. Much of that increase is associated with changes in private land ownership and subsequent changes in tolerance for wintering elk and restricted hunter access to private lands. Hunter harvested elk were collected (n=142) from various locations in the Madison Valley in the 2002-03 elk seasons. Sero-prevalence to *Brucella abortus* occurred in 4.9% of those samples. And, in the 2004-05 elk seasons, the sero-prevalence in hunter-harvested elk, along with elk captured during research activities was 6.9% (n=174). Montana's Elk-Brucellosis Management Plan calls for assembling an Epidemiological Review Team when serologic surveys in one or more Elk Management Units (EMUs) indicate a sero-prevalence of 5% or greater in any one year. The brucellosis sero-prevalence in the Madison EMU underscores the need to collect additional information regarding the movement of these wintering elk to and from the valley. Also important is the dynamics of elk movement within the Madison Valley during late fall to early spring. Much of this movement occurs on private lands that support cattle. In February 2005, thirty-seven elk were captured and radio-collared, twenty of which were fitted with Lotek GPS collars, as part of the spatial dynamics of elk study. The study objectives include:

1. Define the various elk herd subunits in the upper Madison River.
2. Define movements toward, on and away from winter ranges, including locations of calving areas.
3. Identify variation, if any, in sero-prevalence relating to elk summer range, age, sex or wintering habitats.
4. Further understand elk movements on the winter range as they relate to private lands and publicly owned wildlife management areas.
5. Further understand movements and distribution of elk on public lands grazing allotments.
6. Identify critical wintering areas on the east side of the upper Madison Valley in an effort to understand how elk distribution relates to domestic livestock operations in the valley.
7. Gather site-specific information about livestock grazing patterns from landowners in the Madison study area.

Initial data regarding the movement and distribution of these collared elk are currently being analyzed. And, additional elk will be captured and collared in the winter of 2006 as this study continues to seek explicit temporal and spatial information about these elk. The data will contribute to mapping the elk winter/spring distribution to enhance agency planning and to identify areas critical for livestock management and wintering elk habitat.

### **Interagency Bison Management Plan (IBMP)**

A partnership of state and federal agencies (National Park Service, USDA Forest Service, USDA Animal and Plant Health Inspection Service, Montana Department of Livestock, and Montana Fish, Wildlife and Parks) that manage bison in and around Yellowstone National Park recently completed a five-year status review of the Interagency Bison Management Plan (IBMP), implemented in December 2000. The review looked at the accomplishments to date and evaluated them against the adaptive management procedures outlined in the IBMP. Under the IBMP's adaptive management strategy, future management actions can be adjusted based on feedback from implementation of the proposed risk management actions. This allows the agencies to gain experience and knowledge before proceeding to subsequent management steps. The review was done to determine if the goals of the IBMP are being met, evaluate the status of the objectives outlined in Step 1 of the plan over the first five years of operations, determine if those tasks have been completed, and assess whether the agencies can progress to the next step as outlined in the IBMP. Step 1 encompasses a set of fourteen tasks, including cooperation among the five agencies, maintenance of spatial and temporal separation between cattle and bison, protection of private property, and conservation of wild, free-ranging bison. The report determined that the agencies are not yet ready to move to Step 2 of the IBMP. All 14 tasks in Step 1 must be completed before moving to Step 2. In addition, Step 2 in the West Special Management Area (SMA) will begin when a safe and effective remote delivery mechanism is available and the state of Montana is in a position to implement a remote vaccination program there. Step 2 in the northern SMA begins when cattle no longer graze private lands outside Yellowstone National Park on portions of lands known as the Royal Teton Ranch (RTR) in Zone 2 during the winter and when a bison management plan has been developed

by the agencies in cooperation with RTR. Several Step 1 tasks that are required before moving to Step 2 have been initiated, but not yet completed. The development of a remote vaccination program for bison inside Yellowstone is underway, with an Environmental Impact Statement issued and a Record of Decision expected in late 2006. In addition, a bison management plan for the RTR property adjacent to the northern boundary of the park has not been completed. The five state and federal agencies will continue to work together to accomplish the remaining Step 1 objectives, implement the basic goals of the IBMP, and focus on key adaptive management elements that will improve the agencies' ability to meet those goals. One hundred thirteen calf and yearling bison were vaccinated at the Northern SMA during February and March 2004 and another 9 yearling animals were vaccinated at the Western SMA in spring 2005.

### **Proposal to Conduct Bison Quarantine Feasibility Study (BQFS)**

The IBMP did not include specific provisions to establish a bison quarantine facility. However, it did consider whether a quarantine facility would be an appropriate component of the plan and concluded that bison removed from the population could be used for approved research or sent to quarantine. It also indicated that further environmental review would be completed to determine the design, location and operation parameters for a bison quarantine facility. Montana Fish, Wildlife and Parks and USDA/APHIS jointly developed a quarantine feasibility research proposal. The project was designed to be an adaptive research effort with several phases associated with the step-wise development of appropriate temporary quarantine facilities and progressive hypothesis testing. The goals of the BQFS are: (1) Development of scientific procedures that could lead to successful quarantine, (2) Species and genetic conservation in North America-Prevent listing under ESA, and (3) To develop a new tool for population management in the GYA. Developmental objectives of the BQFS include: (1) Implement a 3-phased study under an adaptive framework, (2) Carefully measure uncertainty-data will be critical for risk assessment, (3) Attempt to keep initial investment temporary and minimal, (4) Remain consistent with IBMP, (5) Include conservation education as a component, and (6) Provide opportunities for Native American participation in restoration efforts.

Implementation of phase I of the study was initiated the winter of 2005. Seventeen sero-negative bison calves captured through the winter-spring by the agencies while implementing the IBPM were introduced into the study. Of these, three sero-converted on subsequent testing and were removed from the study. *Brucella abortus* biovar 1 was subsequently isolated from all three of these bison calves that sero-converted. Capture will occur during the 2005-06 winter to assemble the first test group of 100 animals (including these first 14) and assembly of a second test group of 100 animals is anticipated during the 2006-07 winter.

To continue this feasibility study into Phase II and III it is necessary to complete an additional joint NEPA/MEPA compliance document and to conduct an appropriate public review and decision process. The environmental assessment (EA) will evaluate impacts to the human environment associated with several alternatives and any decision to proceed to Phase II and III. Work is progressing on a draft EA, which will include at least four alternatives. The anticipated date for a decision is December 16, 2005. A decision to advance this feasibility research will incorporate the findings from the Phase I study and construction associated with Phase II and III will be dependent upon the evaluation of results from Phase I. Construction may start on a Phase II site in the summer of 2006, after a decision notice is released and a land lease obtained. Several potential private partners remain interested in lease arrangements and public lands are being further examined for a Phase III site if it becomes necessary.

A draft bison and elk management plan and environmental impact statement for the National Elk Refuge and Grand Teton National Park was published in July 2005 by the U.S. Fish and Wildlife Service and National Park Service, as the lead agencies, in cooperation with Wyoming Game and Fish Department, U.S. Forest Service, Animal and Plant Health Inspection Service, and Bureau of Land Management. The agencies developed four goals for the plan to address the many legal and policy directives of the U.S. Fish and Wildlife Service and National Park Service, as well as the significant issues identified during the extensive public input that has been received during the process. These goals address: 1) habitat conservation for elk and bison as well as other native species; 2) sustaining a healthy population of bison and elk on the National Elk Refuge and Grand Teton National Park while minimizing

the risks of irreversible or long-term adverse impacts to the herd or other species; 3) contributing to Wyoming Game and Fish Department's herd objectives for the Jackson bison and elk herd to the extent it is compatible with the other goals; and 4) addressing the risk of brucellosis and other non-endemic infectious diseases to protect the economic interests of the livestock industry within the State of Wyoming and the long-term viability of the Jackson bison and elk herds. While supplemental winter feeding of elk and bison on the National Elk Refuge has been the focal point of many of the significant issues raised in the planning process, the core problem is that there is an insufficient amount of winter range for the numbers of elk that have been sustained in the Jackson Hole area and the growing bison population.

Six alternatives or actions for management are identified in the plan including a proposed action. The alternatives examine different approaches to managing the habitat and the bison and elk herds in order to meet the four management goals of the project. The following summarizes the six alternatives:

**Alternative 1:** No Action

**Alternative 2:** Minimal Management of Habitat and Populations, with Support for Migrations

**Alternative 3:** Restore Habitat, Support Migration, and Phase Back Supplemental Feeding

**Alternative 4:** Restore Habitat, Improve Forage, and Phase Back Supplemental Feeding (Proposed Action)

**Alternative 5:** Restore Habitat, Improve Forage, and Continue Supplemental Feeding

**Alternative 6:** Restore Habitat, Adaptively Manage Populations, and Phase Out Supplemental Feeding.

The deadline for public comment on the Draft Plan/EIS is November 7, 2005. A final plan/EIS is expected to be completed by October 30, 2006, with publication in the Federal Register anticipated by November 30, 2006.

#### **Current Brucellosis Situation in Idaho**

Dr. Phil Mamer, Idaho Department of Fish and Game (IDFG) reported that the Idaho State Department of Agriculture (ISDA) has quarantined a ranch in Bonneville County's Swan Valley after the department's Veterinary Medical Officers identified a possible case of brucellosis in cattle. A cow that reacted positively to a Brucellosis test through the Market Cattle Inspection Program under the Cooperative State-Federal Brucellosis Eradication Program was traced to the Swan Valley ranch. ISDA Veterinary Medical Officers tested the entire herd for brucellosis and additional cows reacted positively to these tests. Further tests are being conducted in accordance with the USDA's Uniform Methods and Rules for the Eradication of Brucellosis. These tests will confirm whether the animals are infected with or exposed to brucellosis. This is a herd of 39 cows, 2 bulls, and about 25 suckling calves. The cattle were tested on October 7, 2005. On October 14, 2005 the serologically positive cattle were bled again and quarter milk samples were obtained for brucellosis culture. The cattle are run year around on the deeded ground of the owner, who claims limited exposure to elk populations. The ranch is about 1000 acres, of which about 800 acres may be pastured at various times of the year. No females have been purchased for at least ten years. The last bulls were purchased in December 2003. There is no fenceline contact with any other cattle.

This ranch is situated in an area through which numerous elk migrate in spring and fall. There are also elk that are winter residents in this area. Additionally, this ranch is located near the Idaho Fish and Game Rainey Creek feedground. This feedground has been in existence since the late 70's to keep elk from depredating on haystacks and cattle feedlines. IDFG and ISDA have a trap, test and removal program on this feedground for seropositive elk. The apparent seropositive rate on this feedground has ranged from a high of 45% to a low of 6%. Up to 500 elk are fed at this site depending on temperature, snow depth and risk to cattle near the mouth of Rainey Creek Canyon. Brucellosis Biovar 4 has been isolated from elk on this feedground.

It has been three years since the last case of brucellosis was identified in Idaho. Prior to the case in 2002, the most recent case in Idaho was in 1989. Pending conclusion of the investigation into this most recent case Idaho retains its Brucellosis Class Free status held since 1991.

The ISDA and USDA are conducting an epidemiological investigation, which includes identification and testing of all herds that had contact with the quarantined herd.

### **Status of Brucellosis in Elk and Bison in Wyoming**

Dr. Terry J. Kreeger, Wyoming Game and Fish Department reported that in December 2003, brucellosis in cattle was confirmed and 31 reactors were identified on a ranch near Pinedale, Wyoming. In June 2004, a second brucellosis positive case was identified in a Teton County herd. Brucellosis in both of these cattle herds were thought to have been caused by exposure to either infected elk or bison. These findings resulted in Wyoming losing its b Brucellosis Class Free status. Subsequent to this, the governor of Wyoming formed a Wyoming Brucellosis Coordination Team, which was charged with identification of issues, describing best management practices, and developing recommendations related to brucellosis in wildlife and livestock in the state. Two major projects were undertaken by the Wyoming Game and Fish Department (WGFD) as a result of the Coordination Team's recommendations. First, the WGFD was asked to develop Brucellosis Management Action Plans (BMAPs) for each elk herd unit that has winter elk feed grounds in conjunction with federal land managers, local producers, and state and federal veterinarians. As part of this process, potential modifications to each winter elk feed ground will be considered. Second, the WGFD will initiate a pilot test and slaughter project on an elk feedground adjacent to one of the affected cattle herds. The goal of this project is to significantly reduce elk seroprevalence within 5 years.

### **Oral Transmission of Chronic Wasting Disease in Captive Shira's Moose**

Dr. Terry Kreeger, Wyoming Game and Fish Department (WGFD) reported on the results of a study conducted collaboratively by WGFD and the University of Wyoming. Three captive Shira's moose (*Alces alces shirasi*) were orally inoculated with a single dose (5 g) of whole brain homogenate prepared from CWD-affected mule deer (*Odocoileus hemionus*). All moose died of causes thought to be other than CWD, but 1 male and 1 female were too autolyzed when found to allow meaningful analyses of tissues. Histologic examination of a female moose dying 465 days post inoculation revealed spongiform change in the neuropil, typical of transmissible spongiform encephalopathy. Immunohistologic staining, supported by enzyme-linked immunosorbent assay for the proteinase-resistant isoform (PrP<sup>CWD</sup>) of the prion protein, was observed in multiple lymphoid and nervous tissues. Western blot analyses and DNA sequencing supported the source of the moose PrP<sup>CWD</sup> coming from the experimental inoculum. This experiment documented that 1) moose can become orally infected with mule deer-derived PrP<sup>CWD</sup>; 2) PrP<sup>CWD</sup> was taken up in multiple lymphoid and nervous tissues similar to deer and elk; and 3) PrP<sup>CWD</sup> caused spongiform changes in the central nervous system considered pathognomonic for CWD in cervids. Thus, this is the first report of CWD in moose.

### **Prion Distribution in Cardiac Tissue of CWD-affected deer and elk**

Dr. Jean Jewell, University of Wyoming Department of Veterinary Sciences, reported the results of collaborative research that examined muscle tissue from CWD-infected cervids for evidence of disease-associated prion proteins (PrP<sup>d</sup>). During CWD infection, prions accumulate primarily in germinal centers of lymph nodes of the alimentary tract and in brain and spinal cord. However in the past three years researchers working with other TSEs have detected prions in muscle tissue of TSE-infected laboratory mice and hamsters, sheep, and human cases of sporadic Creutzfeldt-Jakob disease.

To investigate the possible presence of PrP<sup>d</sup> in cervid muscle, samples of tongue, diaphragm, heart and three skeletal muscles from all four natural host species of CWD were assayed by ELISA (BioRad), Western blot, and immunohistochemistry. ELISA results for both CWD-positive and negative white-tailed deer, elk and mule deer (222 muscle samples total) were negative for PrP<sup>d</sup> in all but two white-tailed deer and seven elk which were positive in tissue taken from the left ventricle of the heart. The results were confirmed by western blot analysis for protease-resistant PrP. No PrP<sup>d</sup> was detected by western blot in any muscle samples except heart left ventricle of the same two white-tailed deer and seven elk.

Additional samples were analyzed by western blot and, combined with the two previous cases, produced a total of seven CWD-positive heart samples from 17 CWD-affected white-tailed deer assayed. This included one free-ranging white-tailed deer which was positive for PrP<sup>d</sup> in heart muscle. The

shortest incubation time among experimental cases for which it was known was 22 months. All heart-positive animals also had depositions of PrP<sup>d</sup> in brain or spinal cord (CNS+). PrP<sup>d</sup> was present at multiple sites throughout the heart, but not always in left ventricle, which was most often the tissue available to assay. Thus, a higher proportion of CNS+ white tails may actually be heart-positive than reported. Five additional heart-positive elk were found, making a total of 12 out of the 17 CWD-positive elk tested. The shortest incubation time for elk was 18 months, and all 12 were also CNS+. None of the 13 CWD-positive mule deer tested had detectable PrP<sup>d</sup> present in heart; incubation times were 19 to 25 months, and samples included several deer in late clinical stages of the disease. All mule deer were CNS+.

Positive immunohistochemical staining for PrP<sup>d</sup> was observed in CWD-positive heart samples; staining was in myocardium of left ventricle, but not in specialized cells of the cardiac conduction system. Based only on relative band intensity in western blots, a rough estimate of the amount of PrP<sup>d</sup> in cardiac muscle compared to brain was 1% to 10%. No tests for infectivity of cardiac PrP<sup>d</sup> have been done.

### **CWD Surveillance in the Southeast**

Dr. Kevin Keel, Southeastern Cooperative Wildlife Disease Study reported that the majority of the member states of the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) began statewide chronic wasting disease (CWD) surveillance in 2002. Surveillance methods were determined by the individual state agencies and include, among other testing schemes, uniform surveillance of hunter-killed deer and elk, widespread sampling of road-killed cervids or testing of target animals only. Numerical goals vary by state as well. The estimated total numbers of free-ranging cervids sampled in each state are: Alabama (2,260), Arkansas (2,022), Florida (1,802), Georgia (1,631), Kentucky (7,112), Louisiana (3,273), Maryland (1,735), Missouri (22,869), Mississippi (2,456), North Carolina (1,740), Oklahoma (3,705), South Carolina (1,187), Tennessee (6,639), Texas (7,326), Virginia (1,255) and West Virginia (1,437). At this time, 68,449 samples have been examined from SEAFWA member states.

No SEAFWA member states detected CWD among their samples until 2005, when a single, 2.5-year-old, white-tailed deer from Hampshire County, West Virginia tested positive for the CWD agent. The CWD prion was detected at the Southeastern Cooperative Wildlife Disease Study (SCWDS) and confirmed by the National Veterinary Services Laboratory (NVSL). The positive deer was killed by a vehicle and was sampled during the state's routine surveillance of road-killed cervids.

Soon after confirmation from NVSL, West Virginia initiated the assessment phase of their CWD response plan. Active sampling of deer was initiated within a 5-mile radius of the index case. Teams of sharpshooters and collection personnel sampled 216 deer in that region. All were tested by ELISA and 3 additional positive deer were identified. Assessment will continue with increased surveillance of hunter-killed deer in the 2005 deer season. Statewide surveillance goals are to sample 2295 deer statewide.

### **Update on CWD Epidemiology Research**

Dr. Michael Miller of the Colorado Division of Wildlife provided a brief update on findings from ongoing laboratory and field research on chronic wasting disease (CWD) in Colorado. From studies of captive deer, preliminary analyses have revealed that: the "best" models explaining CWD epidemic dynamics in captive mule deer include an indirect, animal-animal transmission mechanism; modeling results suggest the CWD agent turns over relatively rapidly in the environment; there appear to be genetic influences on CWD pathogenesis in both mule deer (at prion protein gene codon 225) and white-tailed deer (at codon 96) and; that thus far candidate therapies have proven ineffective in preventing CWD infections in deer.

Dr. Miller also reported that preliminary analyses of field data have shown that: local, small-scale dynamics appear particularly important in driving CWD epidemics; there appears to be variable exposure risk within infected herds; CWD-infected mule deer appear to be more vulnerable to vehicle collisions than uninfected deer; selective culling may be working to lower CWD prevalence in one study area and; moose are naturally susceptible to CWD. Based on collective observations to date, Dr. Miller went on to suggest recommendations for refining CWD surveillance programs designed to detect new CWD foci, including the need to prioritize populations of concern (with an emphasis on deer), to promote targeted

surveillance and set sample quotas for “suspect” submissions by population, and to emphasize other more selective or biased sampling approaches (e.g., vehicle-kill surveys, primitive weapons hunts, late-fall hunting seasons, and high-risk areas). Additionally, methods for integrating data from various surveillance methods need to be developed.

Dr. Miller closed by offering his recommendations for the most critical short-term information and technical needs for CWD management, which were 1) development of comprehensive risk assessments that include better understanding of CWD-scrapie interrelationships; 2) development of more efficient, risk-based surveillance approaches; 3) empirical assessment of the impacts of CWD on infected wildlife populations, 4) development of alternative intervention tools; and 5) rigorous assessment of CWD control strategies in an adaptive management framework.

### **Wolves as a Possible Tool to Control Chronic Wasting Disease**

Dr. Margaret A. Wild, National Park Service’s Biological Resource Management Division reported that recent theoretical studies have suggested that alterations to predator abundance can strongly influence disease prevalence. She and her collaborators suggested that restoring top predator-prey-scavenger food webs is a promising management alternative for chronic wasting disease (CWD) that warrants investigation. The effect of CWD on deer and elk populations can be significant, both from the infection and from collateral impacts of management actions. Current approaches to managing CWD are intensive, costly (often both economically and environmentally), and will require a long-term commitment to reduce prevalence or eliminate the disease in free-ranging populations. Wolves could influence CWD prevalence through several mechanisms including: increasing mortality rates, particularly selective removal of CWD positive deer and elk, redistributing deer and elk from areas of high concentration, and removing infected carcasses from the environment. Using a simple mathematical model, it was forecast that predation by wolves could have potent effects on CWD prevalence in elk. Results from preliminary simulations suggest that predation by wolves has the potential to eliminate CWD from an infected elk population in the absence of reinfection from outside sources. Although model experiments revealed that uncertainties in estimates of parameters resulted in uncertainty in estimates of time required to eliminate the disease from closed elk populations, the fundamental conclusion of elimination was robust and consistent in these preliminary analyses. These results, coupled with potential effects on disease prevalence from changes in transmission rates associated with alterations in elk distribution and concentration and removal of prion-infected carcasses, suggest that wolves could serve to control CWD in free-ranging populations.

### **Carcass Transport and Disposal Guidelines for Cervids**

Dr. John Fischer, Southeastern Cooperative Wildlife Disease Study reported that the risk of CWD introduction via carcasses is unknown, but can be greatly reduced, if not eliminated, by proper disposal. CWD management likely will continue to rely on removal of animals in affected populations by hunting and this approach should reduce the risk of spread to new areas, adjacent and remote. Currently, a variety of approaches to carcass movement and disposal from state to state make it difficult for hunters to understand and comply with regulations designed to prevent the importation of specified risk materials. A more uniform approach from state to state should promote compliance and reduce risk of introduction via this method. For this reason, guidelines for state wildlife agencies are being developed by a working group within the Fish and Wildlife Health Committee of the International Association of Fish and Wildlife Agencies. Carcass transport regulations are in essence a substitute for the lack of uniformly proper disposal of materials from cervid carcasses. Carcass transport and disposal issues may be handled through a regulatory or non-regulatory approach; however, effective public education is the key to success because regulations are extremely difficult to enforce. The Draft guidelines currently are undergoing final revision prior to distribution to state wildlife management agencies and will be accessible at the CWD Alliance Website ([www.cwd-info.org](http://www.cwd-info.org)). Dr. Fischer emphasized that attention to carcass transport/disposal issues should be just one component of a comprehensive program to minimize the risk of CWD introduction

### **CWD Update from USDA-APHIS-Veterinary Services**

Dr. Dean Goeldner, USDA-APHIS-VS reported that in FY 2005, APHIS received \$18.688 million in appropriated CWD funding. This included \$2.5 million in congressionally earmarked funding. The remainder was divided between the VS captive cervid program and support of wildlife activities for the states, tribes, APHIS-Wildlife Services research and evaluation of rapid test technology. Dr. Goeldner also provided the following highlights of FY 2005 activities:

#### **APHIS-VS Activities Related to Captive Cervids**

The APHIS final rule on the *Chronic Wasting Disease Herd Certification Program and Interstate Movement of Captive Deer and Elk* is in departmental clearance. Comments from the Office of General Counsel are being incorporated into the document and the draft Uniform Methods and Rules, a companion guidance document to the final rule, is being modified to reflect those changes.

APHIS-VS continues to purchase and depopulate captive cervid herds under the provisions of VS Memo 574.2, which establishes procedures for defining areas where CWD has become established in wildlife with the intent of purchasing high-risk herds in those areas. Three states, Nebraska, South Dakota and Wisconsin, have completed the process for establishing such areas. To date, three elk herds in Nebraska, one reindeer herd in South Dakota, and four white-tailed deer herds in Wisconsin have been depopulated under this program.

A total of 15,628 farmed cervids were tested for CWD in FY 2005. Since surveillance began in 1997, 31 farmed elk herds and 8 farmed deer herds in 9 states have been identified as CWD-positive herds, with New York being the latest to identify positive farmed cervids. At this time, four positive elk herds remain in Colorado and two positive deer herds remain in Wisconsin.

VS continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals. Five such herds were depopulated in FY 2005 with APHIS funding. A new CWD database for farmed and captive cervids has been developed and is being piloted in Indiana, Ohio and Wisconsin.

#### **APHIS-VS Activities to Address CWD in Free-ranging Cervids**

Results from the final reports of FY 2003 cooperative agreements with state wildlife agencies indicate that about 90,000 wild cervids were tested for CWD in the 2003-04 hunting season. It should be noted that some states reported all test results regardless of funding source while others reported only testing paid for with federal funding. Final reports on FY 2004 agreements are due 90 days after the agreement period ends. Thus, all are due before December 31, 2005. It is critical that these reports be submitted. The use of reporting and surveillance templates is appreciated and feedback or suggestions on the application and reporting processes are encouraged. FY06 cooperative agreement applications will not be considered until FY04 final reports are received and approved.

FY 2005 cooperative agreements have been finalized. A little more than \$5 million was made available to the state wildlife agencies. The tier system developed in consultation with the International Association of Fish and Wildlife Agencies and utilized for the past three years remained in place. Tier 1 states were eligible for \$280,000; tier 2 states for \$90,000; and tier 3 states for \$54,000. Three states chose not to apply for funding in FY05. This, and other unrequested funding, allowed APHIS to offer New York full Tier 1 funding after CWD was identified in wild deer there in April and to offer Connecticut, Massachusetts, New Jersey, Pennsylvania and Vermont full Tier 2 funding. In addition, \$120,000 in end-of-year assistance was provided to West Virginia, where CWD was detected in free-ranging white-tailed deer in September.

VS again provided \$750,000 to support tribal CWD activities in FY 2005. In addition to the ongoing cooperative agreement with the Native American Fish and Wildlife Society, 23 individual tribes received CWD assistance.

#### **2<sup>nd</sup> International CWD Symposium**

APHIS-VS was pleased to cosponsor and participate in this important conference in Madison, WI in July.

**Expectations for FY 2006 and beyond**

The agriculture appropriations bill for FY 2006 has been passed by Congress and it appears that the CWD line item will be \$18.71 million. However, across-the-board rescissions are expected and other assessments have yet to be calculated. The number of congressional earmarks has also increased, although the total amount of earmarked dollars remains about the same. Therefore, it is not yet clear how much will be available for the various aspects of the CWD program. Furthermore, the numbers of Tier 1 and 2 states (as defined by the current formula) have increased. VS will work with the International Association of Fish and Wildlife Agencies (IAFWA) to determine an equitable way to distribute the available funding once allocations are known.

Beginning in FY 2007, APHIS will be changing its cooperative agreement cycle to a calendar year basis. Thus, FY 2007 cooperative agreements will begin on January 1, 2007 and end on December 31, 2007. FY 2006 cooperative agreements will be written to end on December 31, 2006. However, new agreements will include language that allows for a one-time extension of up to 12 months to complete a project. Further details will be provided as they become available.

The Committee passed one Resolution indicating support for development implemented, and adequate funding for a National Fish and Wildlife Health Plan.