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REPORT OF THE MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 4–7 November 2013

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1. Opening

The meeting of the OIE Working Group on Wildlife Diseases (the Working Group) was held from 4 to 7 November 2013 at the OIE Headquarters in Paris, France. The meeting was chaired by Dr William Karesh. Dr Elisabeth Erlacher-Vindel, Acting Head of the OIE Scientific and Technical Department, welcomed the members on behalf of Dr Bernard Vallat, Director General of the OIE.

Dr Vallat joined the meeting on Tuesday 5 November. He thanked the members of the Working Group for their support of the OIE activities on wildlife. He updated the Group on the OIE activities on rabies, as a good example of the "one health" concept, mentioning that the global objective was to reduce the number of human rabies cases worldwide. To reach this objective, the best approach is to fight rabies in dogs, through vaccination, which had an impact not only on human health but also on biodiversity. The Working Group was invited to help the OIE to better understand the effect of dog rabies on biodiversity, which would provide additional arguments for vaccinating dogs, in addition to reducing human cases. He pointed out that this opinion was shared by the FAO[1] and the WHO[2]. With regards to foot and mouth disease, Dr Vallat mentioned the need to have a common standard achievable by all countries for the purposes of international trade, and was of the opinion, that under certain conditions, commodity-based approaches respecting OIE standards may contribute to this goal. Finally, Dr Vallat reminded the members of the Working Group that an agreement had been signed with the CIC[3]; relations with hunters on disease early detection were a new topic for the OIE. He mentioned a potential collaboration with the CIC for the development of a CIC/OIE training programme for European hunters on the early detection and surveillance of classical swine fever and African swine fever.

2. Adoption of agenda and designation of rapporteur

Prof. Ted Leighton was appointed as rapporteur for the meeting. The agenda and the list of participants are provided in Appendices I and II, respectively.

1 FAO: Food and Agriculture Organization of the United Nations
2 WHO: World Health Organization
3 CIC: International Council for Game and Wildlife

3. Feedback from the meeting of the Scientific Commission for Animal Diseases (September 2013) – priority setting for the Working Group

Dr Sergio Duffy, representative of the Scientific Commission for Animal Diseases (Scientific Commission), provided an update on Commission's activities as related to the Working Group. The outcome of the meeting of the Scientific Commission and its questions and directives were noted by the Working Group.

In particular, the Scientific Commission identified the following topics for priority discussion during the meeting: 1) participation of members of the Working Group in upcoming *ad hoc* Group meetings, 2) the role of hunters in wildlife surveillance, 3) the cost of wildlife surveillance, and 4) trans-frontier conservation areas in relation to disease control and status.

4. Information on recent and forthcoming *ad hoc* Group meetings

The reports of the meetings at which a representative of the Working Group had participated were presented for information to the Working Group:

- *Ad hoc* Group on Brucellosis (meeting from 9 to 11 January 2013): Dr John Fischer reported on this meeting. The *ad hoc* Group will convene again in December 2013 to respond to Member Country comments on the January 2013 revision of the *Terrestrial Animal Health Code* chapter.

- *Ad hoc* Group on Validation of Diagnostic Tests for Wildlife (meeting from 15 to 17 January 2013): Dr Fischer reported on this meeting. He informed the Working Group that the guidelines for validating diagnostic tests in wildlife species had been finalised during this meeting and have been sent to Member Countries for comments.

- *Ad hoc* Group on Tuberculosis (meeting from 9 to 11 April 2013): Dr Roy Bengis reported on this meeting. A second meeting of this Group will be scheduled in 2014 to address issues that remain outstanding.

Future ad hoc *Group Meetings*: The Working Group was informed that an *ad hoc* Group on African Swine Fever would meet in 2014. A member of the Working Group will be invited.

5. Disease reporting

a) Update on *WAHIS-Wild*

Dr Karim Ben Jebara, Dr Daria Di Sabatino and Dr Marija Popovic from the OIE Animal Health Information Department (AHID) provided the Working Group with an update on the implementation of the database interface of the OIE worldwide monitoring system for wild animal diseases (WAHIS-*Wild*). The component of the interface used by Member Countries for disease reporting is already in use, but the component through which users can obtain data and information from the monitoring system is not yet available. It will be launched in December 2013. This new and final component of WAHIS-*Wild* was demonstrated to the Working Group. Once this is launched in December, all of the recommendations made by the 2008 OIE *ad hoc* Group on Wildlife Disease Notification will have been implemented through the creation of WAHIS-*Wild*.

An important principle of the WAHIS-*Wild* interface is that it contains no information about the occurrence in wildlife of OIE listed pathogens and diseases. All notifications about the occurrence of OIE listed diseases, in all species, both wild and domestic, are entered into WAHIS and are available to users through WAHID. The WAHIS-*Wild* interface contains information only about pathogens and diseases that are not on the OIE List.

The WAHIS-*Wild* interface will include links to some wildlife health websites relevant to the OIE. The Working Group reviewed and discussed a tentative list of these links and the criteria that might be used to decide what websites to include. The Working Group will undertake further review and consult with the AHID on appropriate links.

In the past, the Working Group or the AHID has reported to the General Session on the occurrence of non-listed diseases in wildlife based on responses to the annual OIE wildlife questionnaire to Member Countries. Since 2008, when the analysis of the questionnaire was given to the AHID, reports have continued to be presented at the General Session. With the completion of the WAHIS-*Wild* interface, annual reports to the General Session will be discontinued, as of May 2014. Through the WAHIS-*Wild* interface, Member Countries will be able to view this information on line whenever it is wanted.

The Working Group congratulated Dr Ben Jebara and the AHID for the development of WAHIS-*Wild* and its interface, which was a great achievement for the benefit both of the OIE and its Member Countries.

b) Review the specific list of wildlife diseases (non-OIE listed diseases) to see if any revisions to the list are needed

Following discussion with the AHID, it was decided to review the list at the next meeting of the Working Group in order to have input on the use of the list through the new WAHIS-*Wild* interface.

The Working Group recommended that it work with the AHID on a regular basis to further refine criteria for selection of non-listed pathogens and diseases in wildlife for annual reporting and to use the OIE database (WAHIS-*Wild*) to review and analyse the occurrence and the reporting of these diseases in ways that may inform future recommendations to revise the selection of pathogens and diseases to be reported.

c) Review the criteria used for identifying non-OIE listed pathogens found in wildlife and explanatory statement

The Working Group reviewed the Report of the 2008 meeting of the OIE *ad hoc* Group on Wildlife Disease Notification and its own report of the meeting held in 2011, in which wildlife disease notification was also discussed. The Working Group confirmed its agreement with the guiding principles for selection of non-listed pathogens and diseases in wildlife to be notified to the OIE on a voluntary basis that were recommended in the 2008 report:

"The guiding principles for such inclusion is based on relevance:

a) *to human health, livelihoods and well-being,*

b) *to domestic animal health and*

c) *to environmental integrity and ecological sustainability*

Emerging diseases affecting wildlife or important human or domestic animal disease for which wild animals serve as affected or unaffected reservoirs are examples of candidates for inclusion.

The Group recognised that some non-infectious diseases should also be considered for inclusion on the wildlife disease list. These may cause significant mortality and have effects on wildlife at the population level (*e.g. botulism, diclofenac*). *It may be important to recognise these diseases to distinguish them from occurrence of diseases of more direct concern to the OIE, such as avian influenza or Newcastle disease, and provide members with possible differential diagnoses. Such outbreaks also may serve a sentinel function for risk of the same non-infectious diseases to humans and domestic animals.*

The Group considered whether the OIE should seek information on wildlife mortality events of undetermined cause. Some of these may be sentinels for emerging diseases. At the same time, recording of such events could overwhelm the capacity of wildlife focal points to prepare annual disease occurrence reports."

The Working Group also confirmed the conclusions in its report of 2011 (page 2), which noted that there are two different reasons for OIE Member Countries to report non-listed diseases in wildlife:

1. to document "new or unexpected occurrences"
2. to accumulate knowledge on the presence/absence of diseases/infections to document sanitary risks in the future.

The Working Group considered that these previous two reports would provide sufficient guidance on the rationale for reporting non-listed diseases in wildlife and on criteria for the selection of non-listed pathogens and diseases in wildlife to be reported annually to the OIE.

6. Emerging and noteworthy wildlife disease occurrences: reports from members of the Working Group on Wildlife Diseases

Information provided by members of the Working Group

AFRICA

Anthrax: Sporadic cases of anthrax in wildlife were reported from Ghana, Namibia, South Africa and Zimbabwe. In South Africa, mortalities were reported in elephants (*Loxodonta Africana)*, African buffalo (*Syncerus caffer*), Impala (*Aepyceros melampus*), Greater kudu (*Tragelaphus strepsiceros*), Nyala (*Tragelaphus angasi*) and Burchells zebra (*Equus burchelli*).

Avian influenza (H7N7 and H5N2): Outbreaks of avian influenza (H7N7 and H5N2) were reported in farmed ostriches in the western and Eastern Cape Provinces of South Africa.

Bovine tuberculosis: In South Africa's Kruger National Park and Hluhluwe/Imfolosi Park, sporadic cases of bovine tuberculosis were reported in African buffalo, Greater kudu, lion, spotted hyaena (*Crocuta crocuta*) and impala.

Bubonic plague: An outbreak of bubonic plague in humans was reported from Madagascar.

Coenurus cerebralis: Three outbreaks of cerebral cysticercosis were reported in intensively farmed Sable Antelope (*Hippotragus niger*) in the Eastern Cape Province of South Africa. Domestic dogs infected with *Taenia multiceps* were the source of infection of these very expensive antelope.

Ebola haemorrhagic fever: An outbreak of Ebola haemorrhagic fever in humans was reported from Occidentale Province of the Democratic Republic of Congo.

Poaching: Probably one of the most serious animal health problems facing wildlife in Africa today is rampant poaching, which is spiralling out of control. By far the most serious poaching events are syndicated "profit poaching" of elephants (*Loxodonta Africana*) for ivory and rhinos (*Ceratotherium simum* and *Diceros bicornis*) for horns.

It is estimated that approximately 30,000 elephants were poached in Eastern and Western African countries during 2013, and the poachers are now turning their attention to the southern elephant populations. During September and October, in excess of 300 elephants were poisoned using cyanide on salt licks and water holes in Zimbabwe's Hwange National park. The Mozambique elephant populations have also been hard hit by poachers armed with military assault rifles.

South Africa, which is home to the world's largest rhino populations (black and white), lost in excess of 600 rhinos to poachers in 2013.

The bush meat industry is also expanding to feed migrant labourers in logging camps and oil wells in the West Africa's tropical rain forests.

Rabies: Rabies is endemic in many African countries where community owned and feral dogs are the most important role players. During 2013, South Africa also reported sporadic cases of rabies in bat-eared fox (*Otocyon megalotis*), black-backed jackal (*Canis mesomelas*), aardwolf (*Proteles cristata*), chacma baboon (*Papio ursinus*), large grey mongoose (*Herpestes sanguinea*), lion (*Panthera leo*), rock hyrax (*Procavia johnstoni*), Selous' mongoose (*Paracynictus selousi*), striped polecat (*Ictonyx striatus*), suricate (*Suricata suricata*) and yellow mongoose (*Cynictus pennicilata*).

Trichinellosis in farmed Crocodiles: *Trichinella nelsoni* infection was reported in farmed crocodiles in South Africa.

ASIA

Filoviruses: Rousettus bats not only *Rousettus aegyptiacus* (natural host of Marburg virus) but also *Rousettus amplexicaudatus* (Philippines), and *Rousettus leschenaultii* (Bangladish) were seropositive for filoviruses (Ebola Reston) suggesting that Rousettus bats may be key sylvatic carriers of filoviruses.

Low pathogenic avian influenza (LPAI) H7N9 in China (People's Rep. of): This virus has a different character from H5N1, such as more efficient mammalian receptor binding capacity and replication in low temperatures. Human cases with a significant mortality rate were reported from China (People's Rep. of). It has not been found in wild birds other than two urban pigeons.

Middle East respiratory syndrome (MERS) virus: This coronavirus has caused human infection and mortality in the Middle East. A small insectivorous bat (Egyptian Tomb bat – *Taphozous perforatus*) has been suggested as a candidate for the natural host following the finding of a small genetic sequence matching the human isolates of the virus and closely related coronaviruses in other insectivorous bats in other parts of the world. Nevertheless, an epidemiological link between wild animals and human infection was not proven so far.

Rabies: For the past 52 years Chinese Taipei has been considered rabies free, but when wildlife surveillance for rabies was initiated in 2013, 143 Chinese ferret-badgers (*Melogale moschata*) were tested positive for rabies. The genetic diversity of isolated viruses suggests that the introduction of rabies into Chinese Taipei might have occurred several decades ago.

Severe fever with thrombocytopenia syndrome: This human disease is caused by a new *Bunyaviridae phlebovirus* carried by ticks and human cases were reported in China (People's Rep. of), Korea, and Japan. The role of wildlife is yet to be determined, though positive serology results have been reported in deer and wild boar.

EUROPE

African swine fever (ASF): ASF virus was introduced in the Georgian Republic in April 2007 by importation of meat products later contaminating swill feed. The virus was recognised to be of East African origin (Genotype II). Since then, the disease has spread locally, but has sporadically leap-frogged a distance and has started spreading again (South Russia where it has become endemic). In Europe no invertebrate vector, such as soft ticks, has been identified, and the disease is transmitted by contact between susceptible domestic or wild swine. Swill feeding is the commonest way of introduction of infectious material in pig and wild-boar populations in Transcaucasia and the region. The role of maintenance and transmission of the disease in free-living wild-boars needs to be elucidated, but the main route of transmission appears to be by contaminated feed or eating carcasses of other porcine victims. Apparently soft ticks, do not play a significant role in this outbreak. ASF has been maintained on the island of Sardinia by infectious contacts among free-ranging pigs and wild boars for 20 years.

Since the disease has now been detected close to the borders of Poland and Lithuania, debates are occurring regarding the possibility of barrier fencing the border of the European Union to prevent the spread of the infection in natural populations of wild boars. This follows the apparent previous success of a fenceline along a highway in Eastern France which appeared to stop the spread of classical swine fever in wild boars. Fencing poses problems for movements of other free-living mammals and can have deleterious ecological consequences over the long term.

***Brucella melitensis* infection in Ibex (*Capra ibex*) in the Bargy Mountain:** After the discovery of one case of human brucellosis in a child, an epidemiological retrospective study in 2012 identified an infected dairy farm in the French Alps. Suspected of being responsible for the contamination of the milking cow, ibex from the Bargy, Haute-Savoie, were investigated. Lesions, and infection, as well as antibodies were recorded in some individuals. The decision to cull ibex of more than five years was made as a precautionary measure.

Fox rabies in Greece: Greece has been rabies-free since 1987. From the year 2012 onward, rabies has re-emerged in red foxes, and wild and domestic animals in northern and central Greece. Rabies was diagnosed in red foxes, shepherd dogs and cats; hundreds of subsequent human exposures required a post-exposure treatment. Phylogenetic analyses of virus isolated from animals have suggested a recent spread of rabies from Bulgaria to other Balkan countries as a local event unrelated to viral strains affecting dogs in Turkey. Epidemiological studies showed previous movement of rabies from Hungary, Serbia and Romania into Bulgaria.

Widespread outbreak of West Nile fever (WNF): In 2013, during the season suitable for mosquito transmission of West Nile virus (WNV), nearly 800 human cases of WNF were recorded by the European Centre for Disease Prevention and Control from the South of Russia and Ukraine, across neighbouring countries, to Turkey, Greece, Italy, Spain (Andalusia recently), and to Tunisia. Infected horses were reported to WAHIS in Greece and in wild birds (crows) in Serbia and Bosnia Herzegovina.

New chytrid fungus isolated in salamander in Netherlands: A team of pathologists characterised a newly recognised chytrid fungus, called *Batrachochytrium salamandrivorans* sp. nov., from salamanders following a decline in population. This chytrid causes erosive skin lesions and mortality. Together with the closely related *B. dendrobatidis*, this taxon includes highly pathogenic fungi for amphibians.

Possible Morbillivirus related mass stranding in Italy: 122 cetacean carcasses were found stranded on the coasts of Tuscany, Lazio, Campania, Calabria, Sicily and Sardinia between January and March 2013, i.e. more than 10 times the average recorded in the summer in this Mediterranean area. This stranding involved 96 striped dolphins (*Stenella coeruleoalba*), 7 bottlenose dolphins (*Tursiops truncates*), 1 fin whale (*Balaenoptera physalus*), 1 pilot whale (*Globicephala melas*), 3 Risso's dolphins (*Grampus griseus*) and 14 undetermined species.

Data have been obtained from post-mortem investigations regarding the possible causes of this mortality outbreak, although conclusions cannot be drawn. Dolphin Morbillivirus (DMV) was deemed to be the most likely cause of death, but other infectious (such as *Photobacterium damselae damselae*, *Toxoplasma gondii*, and Herpesvirus) or non-infectious agents may have played an important role in this mortality event.

Radioactive wild boar in Italy: On the occasion of routine tests on wild boar in the Piedmont mountain area (March 2013, Italy) the Italian Health Ministry discovered radioactive contamination by Cesium 137 in 27 hunted wild boar. Investigations are still under way in the region in water and soil, and on a range of wild animals to assess the extent of the contamination. Regional environmental experts consider the most likely cause of the radioactive contamination is from the Chernobyl nuclear facility. Similar findings were reported years ago in the Vosges area in France and revealed a contamination limited to wild boar meat. Wild boars consume mushrooms, which concentrate Cesium 137. Residue from the Chernobyl fallout has been given as the explanation of the levels of radiation noticed in the muscle of boars.

Seoul virus infection in humans and isolation of the virus in synanthropic and pet rats: In January 2012, the Rare and Imported Pathogen Laboratory in the UK detected a case of infection by the Seoul virus (SEOV, a Hantavirus) in a patient affected by acute renal failure. Subsequently, the SEOV was demonstrated by the reverse-transcription polymerase chain reaction (RT-PCR) technique in rats (*Rattus norvegicus*) living in proximity to the patient. The virus presents new characteristics and was named "Humber" from the place it was located. The pathogenicity in humans of the Humber virus strain is a new characteristic for SEOV in Europe where the infection is sporadically described in the brown rat (*Rattus norvegicus*), but has not been

recognised as a frequent cause of disease in humans. Nevertheless, a year later, another serious case of SEOV infection was recorded in a patient in Wales. The virus was close but different from the Humber strain. This time, the source of infection was pet rats from Oxfordshire. The facility providing the rats was investigated and a proportion of rats in the colony were infected with the same virus, now called the Cherwell virus strain. The owner of the animal facility and his wife were both exposed and tested antibody positive against the virus. Recently in Sweden, another pet rat was diagnosed with SEOV by RT-PCR.

Unusual local mass mortality of wild boar in France: The French "SAGIR" network (which aims at game surveillance thanks to the collaboration between the hunters' federation and the national hunting and wildlife agency) has registered an unusual mortality in the wild boar population of the Ardèche department (in south-east France) since early July 2013. The clinical signs in wild boars include neurological signs in animals in good body condition. Initial screening for swine fevers, Aujeszky's and Teschen diseases and toxic compounds has been negative. According to the pathological and epidemiological investigations, it has been considered with a high degree of confidence that the "edema disease" caused by enteric infection of *Escherichia coli* (0139 K82)is the leading cause of mortality observed during four months in Ardèche.

Virulent rabbit haemorrhagic disease threaten Lynx recovery in Spain: Outbreaks of rabbit haemorrhagic disease (RHD) have occurred recently in previously vaccinated young rabbits on farms in Spain and Portugal. Investigation identified a virulent RHD virus variant. This virus seems be the cause of a large outbreak of RHD in free-living European rabbits (*Oryctolagus cuniculus*) across the Iberian Peninsula, which has led to a severe decrease in several wild rabbit populations. This mortality of the main prey of Iberian Lynx (*Lynx pardinus*) and Imperial eagles (*Aquila heliaca*) can seriously jeopardise actions aimed at conserving these endangered predators.

NORTH AMERICA

Chronic wasting disease (CWD): CWD continues its slow spread east and west from the areas in western Saskatchewan into which it was originally imported in the 1980s. No effective control programmes are in place; surveillance programmes have been reduced. In the United States of America, Florida and New York recently announced prohibition of the importation of live captive cervids susceptible to CWD. The states cited the importance of protecting their free-ranging white-tailed deer herds from this disease as their primary reason for the importation bans. Researchers recently announced that CWD infectivity is present in plants grown in soil contaminated with the CWD prion. They produced disease in transgenic mice that were inoculated intracerebrally with material from the plants. Another group announced that localised culling of deer by sharpshooters was a disease management strategy that could maintain low disease prevalence while minimising impacts on recreational deer harvest.

European wild boar feral in Canada: European wild boar, which were imported into Canada in the 1980s for farming and subsequently escaped or were released when farms failed, have now established large and widely distributed populations in the prairie provinces of Canada. It is unlikely that they can be eradicated and thus wild boar must be considered a newly established invasive species, which adds a new dimension to wildlife health management in Canada. While the imported animals carried no pathogens, wild populations are very likely to expand their range into that of feral pigs in the United States of America, establishing a transmission corridor for pathogens between these populations.

Fatal erysipelas in muskoxen: In August of 2012 and of 2013, dead adult wild muskoxen were found on Banks Island, Northwest Territories, Canada. The carcasses were decomposed when detected and conditions at the site suggested sudden death with no physical evidence as to cause. The bacterium *Erysipelothrix rhusiopathiae* was cultured from the bone marrow of several specimens from both years, and systemic infection with this bacterium is considered the cause of death. This is a very unusual manifestation of infection with this bacterium in wild ungulates, but is perhaps similar to the acute septicaemia form of infection well described in domestic pigs. There are no wild, feral or domestic pigs present in the Canadian arctic where this outbreak occurred. In the 1980s, similar mortality events involving large numbers of adult muskoxen, predominantly males, occurred in this same population caused by systemic infection with *Yersinia pseudotuberculosis.* Attempts are underway to characterise the *Erysipelothrix* from these muskoxen and to quantify exposure and mortality in muskoxen caused by this bacterium.

Haemorrhagic disease: In 2013, there has been mild to locally heavy morbidity and mortality of wild ruminants, particularly white-tailed deer (*Odocoileus virginianus*), due to haemorrhagic disease (HD), which is caused by several serotypes of epizootic haemorrhagic disease virus (EHDV) and bluetongue virus (BTV). One area that is particularly heavily affected is in the Rocky Mountains in western Montana where HD had not been reported in the past, and this outbreak has been confirmed to extend into southern Alberta. In Montana, the primary serotype detected has been EHDV-2. In 2012, the United States of America experienced the highest HD activity ever reported, with estimated mortality nationwide greater than 53,000 deer. The EHDV-2 serotype was responsible for most of the deer mortality. Of particular significance in 2012 was the detection of EHDV-6 in approximately 25% of animals from which orbivirus was isolated. This serotype was first found in the United States of America in 2006, and it has been isolated from only a small number of affected deer nearly every year since then. However, EHDV-6 was detected across a very broad geographical range in 2012, and it was the predominant serotype isolated in several states.

***Sarcocystis canis* causing fatal disease in wild seals:** In February 2012, 400 dead young grey seals (*Halichoerus grypus*) were reported on a nursery island on Canada's Atlantic coast. This amounted to a 16% mortality rate in that year's young at this nursery site. A lengthy investigation found that the cause of death was encephalitis caused by the terrestrial protozoan parasite *Sarcocystis canis*. This appears to be another example of terrestrial pathogens affecting marine mammals, along with recently documented infections with *Toxoplasma gondii* and *Sarcocystis neurona*.

Snake fungal disease: Since 2006, increasing numbers of free-ranging snakes in the eastern and Midwestern United States of America have been diagnosed with severe fungal dermatitis, a syndrome known as snake fungal disease (SFD). *Ophidomyces ophiodiicola*, a newly characterised species of fungus, is consistently isolated from snakes with SFD. However, there is no conclusive evidence that *O. ophiodiicola* is the causative agent for this disease, and other fungal species have been isolated from affected snakes. To date, SFD has been confirmed in Florida, Illinois, Massachusetts, Minnesota, New Jersey, New York, Ohio, South Carolina, Tennessee, and Wisconsin. Snakes with SFD may have scabs or crusty scales, subcutaneous nodules, abnormal molting, white opaque cloudiness of the eyes not associated with molting, or localised thickening and crusting of the skin. Lesions typically are most severe on the head, but distribution can vary. Infections have been found in the northern water snake (*Nerodia sipedon)*, eastern racer (*Coluber constrictor*), rat snake (*Pantherophis obsoletus* species complex), timber rattlesnake (*Crotalus horridus*), massasauga (*Sistrurus catenatus*), pygmy rattlesnake (*Sistrurus miliarius*), and milk snake (*Lampropeltis triangulum*). SFD is not known to affect any other orders of reptiles and is not transmissible to humans, pets (aside from captive snakes), or livestock.

White-nose syndrome, a fatal infection of cave-hibernating bats in North America caused by the invasive fungus *Pseudogymnoascus destructans* (previously named *Geomyces destructans*) was found in several new locations in the Atlantic provinces of Canada from November 2012 to May 2013. Based on mortality rates observed in hibernation sites for which there are population data that pre-date the arrival of this disease, more than 90% of the three susceptible species of bat in this region have died of the disease. In Canada, infected bats have been found as far west as 85 degrees west longitude. The disease continues to spread to the west and south of New York, where it was first detected in 2006. Mortality rates approaching 97% have been observed in some hibernacula. The little brown bat (*Myotis lucifugus*) has been particularly badly affected, and the disease represents a severe threat to two endangered species, the grey bat (*Myotis grisescens*) and the Indiana bat, *Myotis sodalis*. The disease or its causative agent have been confirmed or are suspected to be present in 25 states from Maine to Oklahoma.

7. Avian influenza: wild bird surveillance – update from OFFLU and from H7N9 survey in OIE Member Countries

Drs Keith Hamilton and Gounalan Pavade from the OIE Scientific and Technical Department met the Working Group to discuss ideas for compiling information from avian influenza surveillance programmes in wild birds being conducted globally, and considerations of the benefits of coordinating and improving the sharing of results of current or future efforts. A concept note previously developed for OFFLU[4] for a technical activity on influenza surveillance in wild birds has been approved by both the OFFLU Management

4 OFFLU: Joint OIE-FAO Network of Expertise on Animal Influenza

Committee and the OFFLU Steering Committee (see Appendix III). The Working Group supported the development of this technical activity and recommended that the OIE continue to encourage a coordinated effort to conduct surveillance of wild birds for all strains of influenza virus through OFFLU or other mechanisms as appropriate.

The Working Group discussed two other efforts that support the concept and value of coordinated surveillance in wild birds. The first was compiled in a manuscript submitted for a publication by Olson *et al*. that indicates that 75% of avian influenza subtype diversity can be monitored by wild bird surveillance conducted in a small number of countries of the northern hemisphere. The second was the results of a survey of OIE Member Countries conducted by the AHID that illustrate the on-going wild bird surveillance activities of Member Countries in areas of the world most likely to provide sampling efforts with a high level of efficiency for monitoring influenza virus diversity in circulation.

8. Trans-frontier conservation areas in relation to OIE Standards for disease free zones

The concept of trans-frontier conservation areas (TFCAs), also known as peace parks, involves the opening of transboundary landscapes to allow for protection of habitats and dispersal of wildlife. The TFCA vision and initiative explores the possibility that changing land-use practices from subsistence farming on marginal land to community participation in nature-based ecotourism may have sustainable economic and ecological benefits for all. It should be noted that historically, parks and wildlife protected areas were often selected for areas poorly or marginally suitable for livestock production or having diseases detrimental to humans or livestock.

Habitat and landscape types determine the wildlife species mix, and it is the presence or absence of certain epidemiologically key host and vector species that will affect the animal disease status of the TFCA and may affect the disease status of the participating countries.

Certain TFCAs, especially those situated in arid savannahs, desert landscapes and high altitude grasslands, generally do not have species that pose any major animal health threats. These TFCAs do not generate concern in the status or control of foot and mouth disease (FMD) and some other significant OIE listed diseases. The major TFCAs of concern are those located in the tropical and subtropical savannahs of sub-Saharan Africa, because they are home to one or more key species that maintain or amplify certain OIE listed disease agents; these include African buffalo, wild suids, wildebeest, spiral-horned antelope species and various zebra species.

The Working Group discussed the implications of TFCAs in these regions, especially how to attempt to achieve compatibility between the conservation initiatives and the potential animal and human health considerations. Joining the Working Group in this discussion was Dr Alex Thiermann, President of the OIE Terrestrial Animal Health Standards Commission, and by telephone Dr Markus Hofmeyr, Chief Veterinarian of South Africa National Parks and Dr Mark Atkinson, Director of the Animal and Human Health for the Environment and Development programme based in Botswana.

The Working Group focused on two questions:

1) How can disease-free status be defined for countries that share TFCAs taking into consideration the provisions of the OIE *Terrestrial Code*?

2) How do TFCAs affect those countries seeking disease-free status?

There is no generic solution to disease issues associated with TFCAs. These must be evaluated TFCA by TFCA, case by case. Relevant wildlife health expertise should be part of the team that assesses disease status for the OIE. The PVS[5] tool includes evaluation of wildlife expertise.

5 PVS: Performance of Veterinary Services

The Working Group felt that although FMD was the primary disease of concern and the discussions centred mainly on this disease, there were several other diseases that are endemic in Africa that should be borne in mind, including African swine fever, theileriosis, trypanosomosis, malignant catarrhal fever and African horse sickness.

Many African countries that have buffalo populations persistently infected with FMD serotype SAT (South African Territories) viruses do not have developed beef export economies, and are frequently net importers. In these countries, FMD is mostly seen as a minor disease. Other diseases such as heartwater, African swine fever, trypanosomosis, theileriosis and Rift Valley fever are much more important as causes of disease losses in livestock. At this stage, only Botswana and Namibia have currently developed beef export markets outside the region.

Where the disease status of countries or zones bordering a TFCA is the same, the TFCA does not affect those countries.

Where FMD-infected animals are present in TFCAs, the options for international trade for the participating countries would be to use commodity-based trade approaches respecting OIE standards, to trade with countries of the same status, or to consider zonation, which entails the development of physical or immune barriers, and a surrounding protection zone with intensive surveillance as well as livestock movement control and traceability. The development and use of regionally appropriate SAT vaccines would significantly improve risk management. Countries should decide in many situations on the balance they wish to achieve between beef production for internal use and economic development based on biodiversity-driven eco-tourism, and accept the livestock production limitations caused by FMD free with vaccination status.

Cattle in the protection zone bordering the TFCA as well as those belonging to communities embedded within the TFCA, should be allowed and encouraged to use commodity-based trade of deboned, de-glanded and matured meat, should there be a demand for other than local use.

In summary, the Working Group suggested that there are three levels to the issue of TFCAs and their participating countries.

Level 1 – The TFCA is free of FMD and thus both countries are free (or countries on all sides share the same status).

Level 2 – The TFCA is not free of FMD: barriers and surveillance for infection are needed within the TFCA to reduce risk of transmission to free zones to a negligible level.

Level 3 – The risk of transmission cannot be reduced: trade can only be managed through commodity-based approach respecting OIE standards.

Regarding the new FMD *Terrestrial Code* chapter, the Working Group felt that the list of species that are epidemiologically significant for FMD be limited to domestic ruminants, domestic swine and African buffalo. The other susceptible wild species could be useful for surveillance for new strains of SAT types spilling over from buffalo, but they do not play a role in maintaining infection and surveillance of these species is not warranted to establish freedom from disease. The *Terrestrial Code* definitions of a "case" or an 'outbreak" should also be re-examined to define cases or outbreaks as occurring in domestic ruminants, domestic swine or African buffalo. The role of wild suids in FMD epidemiology appears to be limited, but their role in ASF epidemiology should not be under-estimated.

9. Discussion on the role of and liaison with hunters in disease surveillance applicable to wildlife

Dr Torsten Mörner joined the Working Group by teleconference to discuss opportunities and avenues to increase the involvement of hunters in wildlife disease surveillance.

The OIE and CIC have agreed to work together to increase the participation of hunters in wildlife disease surveillance. A collaborative programme to train hunters to perform a surveillance role, perhaps by first training the trainers who, in turn, will train hunters, will be undertaken. The Working Group noted that training might be achieved in several different ways, such as including surveillance training in general hunter training programmes, where these exist, organising a wildlife disease session at the annual CIC conference, and developing fact-sheets, websites, and videos, such as the newly produced OIE videos on hunters and wildlife health.

The Working Group encouraged the OIE to pursue the goal of enhancing wildlife disease surveillance through the organised participation of hunters. Dr Mörner offered to participate directly in developing a hunter training programme. Current concern about the potential spread of African swine fever in wild boar into the European Union may offer OIE and CIC an opportunity to pilot hunter training and other forms of hunter engagement in surveillance in the affected areas of Eastern Europe.

10. Collaborative Partnership on Sustainable Wildlife Management – update and follow-up

The Secretariat for the Convention on Biological Diversity has requested organisational engagement in the recently created Collaborative Partnership on Sustainable Wildlife Management (CPSWM). At the request of the OIE, the Working Group reviewed the minutes of the second meeting of the participants, held 30 September – 1 October, 2013, in Namibia, and two project concept notes being proposed. In the minutes of the meeting, it was noted that the OIE will be leading an initiative on African swine fever. Related to the two concept notes representing proposals for work activities, the Working Group suggested that the CPSWM consider asking wildlife management stakeholders to set priority needs to help the CPSWM participants (most of which do not have wildlife management responsibility) in evaluating proposed activities. This would shift the focus of proposals from a supply-based approach to a demand or needs-based approach.

The concept note proposed by the International Union of Forest Research Organizations (IUFRO) to develop a Glossary of Technical Terms in Wildlife Management seeks to provide a descriptive guide to how terms are used by different stakeholders and to help translate or demonstrate comparative terminology. The Working Group encouraged the OIE to provide IUFRO with the OIE Glossary(ies) so that they can be included in the product being developed for the CPSWM. The Working Group also offered to provide advice or guidance on wildlife-related terminology to IUFRO or CPSWM.

The concept note proposed by FAO to develop a Global Initiative to Develop Guidelines for Responsible Wildlife Management in Production Landscapes seeks to compile information on human–wildlife conflicts, bushmeat and hunting issues, illegal activities, and sustainable practices, and to develop an internet management platform to share best practices and guidelines. The Working Group reviewed the concept note and found that while the goals are laudable, there are a number of elements that require addressing. These include:

1) A tremendous body of knowledge is currently available on good wildlife management practices, in fact, there is an entire professional discipline in this field that includes advanced training programmes, with textbooks, extensive literature and guidelines readily available for wildlife management techniques. Many countries have well managed, sustainable wildlife management systems in and around production areas and in countries lacking these types of programmes, the most significant barriers to sustainable wildlife management have little to do with a lack of access to information or a lack reports, case studies and or guidelines. Thus the Working Group expressed concern that the project was not addressing key challenges countries face such as good governance, compliance, capacity to address illegal activities, land-use decision making, economics of international demand, societal/political will, etc.

2) Related to the above, if the breadth of currently available information from the last two to three decades of work in sustainable wildlife management was organised and the best information made available by a professional wildlife management organisation such as The Wildlife Society with its membership of

3000 wildlife managers worldwide, this proposed concept might be accomplished at 5–10% of the proposed budget with the added benefit of connecting active, professional wildlife managers with their counterparts in countries with needs for long-term collaborations and mentoring.

3) Given the vast differences in social, cultural, legal and economic factors affecting sustainable wildlife management capacity and approaches among countries, country or subregional efforts using a more direct Global Environment Facility (GEF) or other funding mechanism approach and experienced professional wildlife managers and other relevant professional expertise working directly with country level authorities could prove most cost effective and provide a higher likelihood of success.

4) The Working Group noted that animal health was not mentioned in the concept note as a factor in improving wildlife management, and this is a significant omission.

11. OIE Collaborating Centres for Wildlife

a) Collaborating Centre for Training in Integrated Livestock and Wildlife Health and Management (South Africa): The annual report to the OIE from 2012 was reviewed.

b) Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens (Canada/USA): The annual report from 2012 was reviewed and the activities in 2013 were presented to the Working Group by Prof. Leighton, Director of the Canadian Cooperative Wildlife Health Centre.

The Working Group noted that both Collaborating Centres were very active in meeting the needs of OIE Member Countries and in supporting OIE programmes.

12. Training of Wildlife Focal points

a) Future Planning – Third Cycle of Workshops

Dr Erlacher-Vindel reported to the Working Group that a third cycle of training workshops for the OIE National Focal Points for Wildlife was now organised and planned. The first of these workshops would be held in Botswana for English-speaking African countries and the Middle East on 12–14 November 2013, and subsequent Workshops on the same topics would be held in Chad (January 2014), Canada (March 2014), Russia (April 2014) and Japan (July 2014)

The workshops include an introduction to the OIE and the role of OIE National Focal Points for Wildlife (0.5 day), a working session on wildlife health risk assessment and decision support through multi-criterion decision analysis (MCDA) (1 day), and hands-on training in wildlife disease notification and the use of WAHIS-*Wild* (1.3 days).

The session on risk assessment and MCDA was prepared by the Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens, and the Centre will also provide instruction for this section of the Workshop. Notes and exercises for this section are contained in a 122 page workbook. Prof. Leighton from the Collaborating Centre described the curriculum and the table-top exercises to be used to give participants a working knowledge of health risk assessment and MCDA.

It was noted that MCDA could be applied to a wide range of decision options, including setting priorities for surveillance among candidate pathogens and diseases. This application of MCDA is included in the Workbook for this third training workshop.

b) Printing of Training Manual – Second cycle

The Training Manual for the first Training Workshop for OIE National Focal Points for Wildlife is available on the OIE website in three Languages (http://www.oie.int/international-standard-setting/specialists-commissions-groups/working-groups-reports/working-group-on-wildlife-diseases/).

The Manual (Workbook) for the second Training Workshop has been prepared and used in English, Spanish, French and Russian, and can readily be formatted for electronic publishing and download from the OIE website. The Workbook for the third Training Workshop likewise will be translated and can readily be formatted for electronic publication.

The Working Group recommended that the OIE take steps that are required to make the training manuals from the second and third Training Workshops available on line. Each is structured to serve as a self-learning document and thus can be used by Focal Points and others who were unable to attend the workshops. The Working Group also recommended to the OIE that the existence and availability of these training manuals be publicised widely, through normal OIE channels and through links negotiated with wildlife- and animal health-oriented websites and list-servers.

13. World Rabies Day

World Rabies Day is 28 September each year. Prof. Artois reported to the Working Group on one OIE-supported programme for World Rabies Day 2013 carried out in association with the Collaborating Centre for Training of Official Veterinarians (Ecole nationale des services vétérinaires, Marcy-l'Etoile, France). This was an on-line series of videos of questions and answers about rabies between students and rabies experts from several different continents. The website (http://www.ensv.fr/rabies/) is to remain a forum for dialogue on rabies through written questions and answers.

14. OIE *Scientific and Technical Review* – One Health – August 2014: current status

Work on the One Health thematic issue is progressing on schedule. Publication is scheduled for August or September of 2014. Working Group members are writing some of the manuscripts and also helping with reviewing others.

15. Work programme and priority setting for 2013/2014

The Working Group discussed ideas for potential activities for the coming year pending Scientific Commission review. These included:

- Providing website links to be used in the soon-to-be launched WAHIS-*Wild* website;
- Developing a cost analysis framework for disease surveillance in wildlife with examples, to be provided to the Scientific Commission before its February meeting;
- Working with the OIE to assist with efforts to engage hunters in wildlife disease surveillance and on educational materials to help reduce risk to hunters and risk of hunters accidently spreading disease;
- Consider preparing a scientific paper on rabies and its impact on biodiversity to help broaden stakeholder support for global rabies control efforts;
- Consider preparing a scientific paper on the role of wildlife in certain high priority diseases. Papers would review the state of knowledge of each disease in wildlife, their epidemiological significance, and recommendations regarding disease control in relation to the situation in wildlife. Discussion included proposing a special issue of the OIE *Scientific and Technical Review* for 2016. Offer to review *Terrestrial Code* chapters that are under revision;
- Completing work on the OIE *Scientific and Technical Review* issue on One Health to be published in August, 2014;
- The Working Group members will be available to attend *ad hoc* group meetings as requested;
- Working with OFFLU as requested to assist with gathering information or organising global surveillance of AIV in wild birds;
- Assisting with the publication of Focal Point training manuals – second and third cycle.

16. Other business

a) Cost of Wildlife Surveillance

The Scientific Commission requested the Working Group to discuss the cost of wildlife disease surveillance. The Working Group identified variables that affect the cost of disease surveillance, including: 1) the type or goal of the surveillance being conducted; 2) definitions of populations affecting statistical sampling needs; 3) target species and ease of access for sampling; 4) diagnostics to be performed; and 5) availability or access to existing infrastructure, capacity, programmes, etc.

Some information is available from countries currently conducting various types of disease surveillance, for example in South Africa, anthrax surveillance based on park guards opportunistically collecting blood smears from wildlife found dead could cost as little as USD 1500 annually, and large-scale helicopter capture of 300 live large ungulates, such as African buffalo, for tuberculosis surveillance could cost over USD70,000. Additional information or examples might also be available from PVS and Gap analysis work conducted by the OIE on current and projected needed spending for wildlife surveillance in a number of countries.

The Working Group will compile a list of cost factors to be considered in calculating different wildlife disease surveillance activities, as well as some examples of a variety of programme costs in different countries to provide to the Scientific Commission in time for its meeting in February 2014.

b) Name of the Working Group

Discussion of the formal name of the Working Group on Wildlife Diseases was held. The Working Group noted that "disease" may imply more negative connotations than "health," consistent with the change in the OIE to the World Organisation for Animal Health. The Working Group also noted that its activities, such as this year's discussions on sustainable wildlife management, are no longer restricted to diseases *per se*. In light of these developments, the Working Group requested that the OIE Director General consider a recommendation to change the formal name of the Working Group to the "Working Group on Wildlife."

17. Date of next meeting

The Working Group noted the proposed week for its next meeting: 3–7 November 2014.

18. Adoption of the report

The report was adopted by the Working Group.

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…/Appendices

Appendix I

MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 4–7 November 2013

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Agenda

1. **Opening**
2. **Adoption of agenda and designation of rapporteur**
3. **Feedback from the meeting of the Scientific Commission for Animal Diseases (September 2013) – priority setting for the Working Group**
4. **Information on recent and forthcoming *ad hoc* Group meetings**

   Ad hoc Group on Brucellosis, 9–11 January 2013
   Ad hoc Group on Validation of Diagnostic Tests for Wildlife, 15–17 January 2013
   Ad hoc Group on Tuberculosis, April 2013
5. **Disease reporting**
   a) Update on WAHIS-*Wild*
   b) Review the specific list of wildlife diseases (non-OIE listed diseases) to see if any revisions to the list are needed
   c) Review the criteria used for identifying non-OIE listed pathogens found in wildlife and explanatory statement
6. **Emerging and noteworthy wildlife disease occurrences: reports from members of Working Group on Wildlife Diseases**
7. **Avian influenza: wild bird surveillance – update from OFFLU and from H7N9 survey in OIE Member Countries**
8. **Trans-frontier conservation areas in relation to OIE Standards for disease free zones**
9. **Discussion on the role of and liaison with hunters in disease surveillance applicable to wildlife**
10. **Collaborative Partnership on Sustainable Wildlife Management – update and follow-up**
11. **OIE Collaborating Centres for Wildlife**
    a) Report from the Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens (Canada/USA)
    b) Report from the Collaborating Centre for Surveillance and Control of Animal Diseases in Africa (South Africa)
12. **Training of Wildlife Focal points**
    a) Future Planning – Third Round of Workshops
    b) Printing of Training Manual – Second cycle
13. **World Rabies Day**
14. **OIE *Scientific and Technical Review* – One Health – August 2014: current status**
15. **Work programme and priority setting for 2013/2014**
16. **Other business**
17. **Date of next meeting**
18. **Adoption of report**

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Appendix II

MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 4–7 November 2013

List of participants

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Proposal for an OFFLU wildlife/wild bird influenza surveillance technical activity

Background

- OFFLU (the OIE-FAO network of expertise on animal influenza) supports and coordinates global efforts to prevent, detect and control important influenzas in animals, also reducing risks for public health.
- OFFLU works as a global open network of expertise encompassing world leading experts from a range of disciplines.
- OFFLU technical activities deliver outputs including global advice and guidance on surveillance and diagnostics in animals, review papers on the global influenza situation in different species, advocacy for surveillance, development of risk assessment tools, guidance on control measures, e.g. vaccination.
- OFFLU advocates and coordinates sharing of important virological and surveillance data with the wider scientific community, so that it can be used to inform surveillance programmes and control strategies.
- OFFLU collaborates with WHO on influenza issues at the human animal interface including providing information to WHO to assist with selection of viruses for vaccines.
- OFFLU provides *ad hoc* advice to WHO on relevant issues at the human–animal interface.
- The OIE Working Group on Wildlife Diseases (WGWD) had previously submitted a proposal to OIE for low cost targeted global influenza surveillance in wild birds. This was supported by the OIE Scientific Commission for Animal Diseases and the OIE *ad hoc* Group on Epidemiology.
- At the recent Steering Committee meeting of the OIE-FAO Global Framework for Transboundary Animal Diseases, it was recommended that OFFLU should engage wild life experts.

Previous engagement of the wildlife sector in OFFLU

- The OIE Wildlife Working Group drafted a chapter "surveillance for avian influenza in wild birds" for the 'OFFLU Strategy Document for Surveillance and Monitoring of Influenzas in Animals'.
- OFFLU experts have developed a chapter in the OFFLU Research Agenda, "OFFLU Research Priorities on Avian Influenza: Wild Birds".

Potential to further involve the Wildlife Sector in OFFLU

- To provide a platform for discussion, coordination, and data sharing between key wildlife experts involved in influenza surveillance and research.
- Regular review of the OFFLU Research Priorities on Avian Influenza: Wild Birds.
- To review existing findings from 10 years of extensive wild bird surveillance and highlight the main outputs.
- To explore and answer specific technical questions including:
    - What evidence is there that wild birds act as a bridging species between poultry and the wild bird reservoir? Are there biosecurity implications for the poultry sector?

- What is the relevance of influenza infections in other wildlife species?
- What are the benefits of wild bird influenza surveillance? How can the benefits be optimised?

- To decide whether there is a need to develop/coordinated a low-cost targeted wild bird surveillance strategy at a global level accounting for existing surveillance programmes

- To provide OFFLU with technical expertise on influenzas in wild animals

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