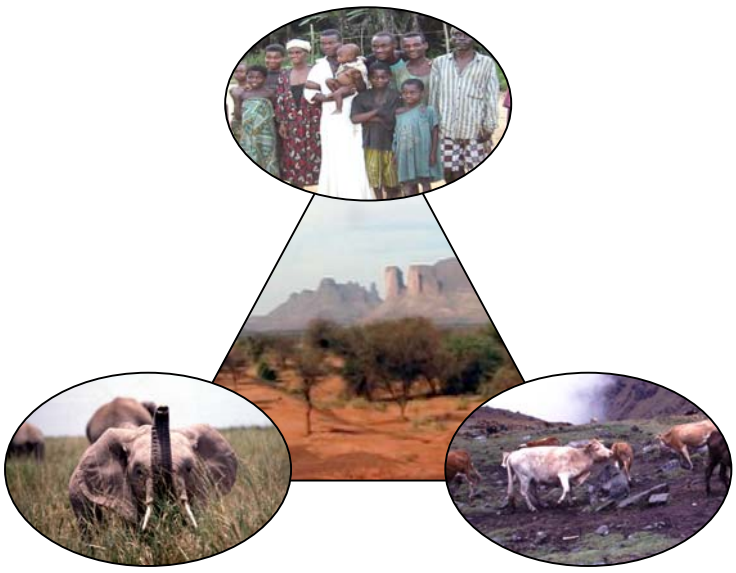
IUCN Vth World Parks Congress

AHEAD Invitees' Briefing Packet

Sunday September 14th, Monday September 15th

Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface: Implications for Wildlife, Livestock, and Human Health



Animal **H**ealth for the **E**nvironment **A**nd **D**evelopment

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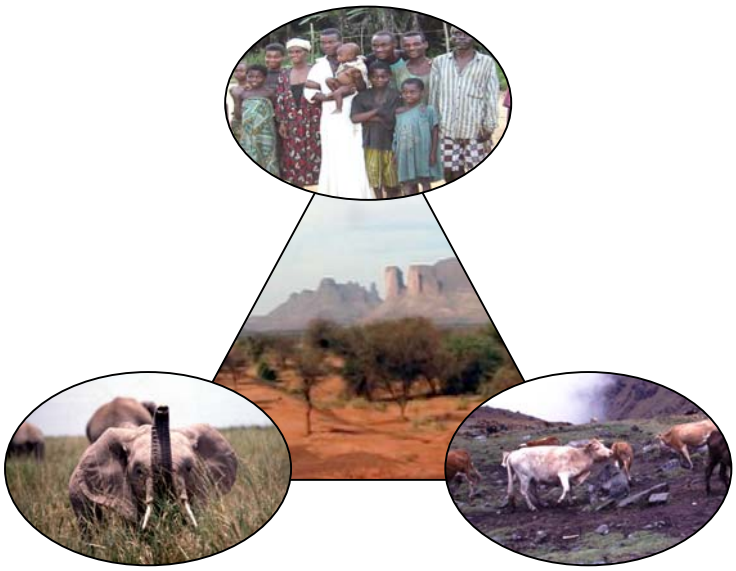

Animal **H**ealth for the **E**nvironment **A**nd **D**evelopment

AGENDA

Sunday September 14th, Monday September 15th

"Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface: Implications for Wildlife, Livestock, and Human Health"

Durban International Convention Center (ICC) - Room 3C

Associated with the "Building Broader Support for Protected Areas" Stream, World Parks Congress

PLEASE make sure you register and collect your security passes from World Parks Congress officials at the Durban Exhibition Center (DEC) before the 14th or early on the morning of the 14th so as not to miss our 9AM start.

SUNDAY, September 14th

Overview of Challenges to Conservation and Development at the Livestock / Wildlife Interface:

9:00 AM Welcome/Introduction- Why Are We Here? (10 min): Steve Osofsky, Billy Karesh (WCS Field Veterinary Program and IUCN SSC Veterinary Specialist Group) and Mike Kock (IUCN SSC Southern African Sustainable Use Specialist Group and WCS Field Veterinary Program)

9:10 **Brief Self-Introductions, and Day 1 Guidelines** (10 min): 'Round the Room': Susie Ellis, Facilitator (CI)

9:20 **Opening Address** (20 min): Richard Kock (PACE/OAU-IBAR, and IUCN SSC Veterinary Specialist Group) "What is this Infamous 'Wildlife / Livestock Interface?'- A Review of Current Knowledge on the Subject"

9:40 Invited presentations begin (10 min each)

The State of Play

9:40 "Transfrontier Parks in Southern Africa: Animal Health Challenges" (Roy Bengis)

9:50 "Diseases of Importance at the Wildlife / Livestock Interface in Kenya" (Elizabeth Wambwa)

10:00 "Relevance of the ROSELT/OSS Programme in Maintaining the Ecological Integrity of Protected Areas and Surrounding Lands" (Jesse Njoka)

10:10 "The Influence of Veterinary Control Fences on Certain Wild Large Mammal Species in the Caprivi Strip, Namibia" (Rowan Martin)

10:20 "Wildlife, Livestock and Food Security in the South-East Lowveld of Zimbabwe" (David Cumming)

10:30-10:50 TEA BREAK #1

Perspectives on Pathogens

10:50 "Tuberculosis- What Makes it an Ideal Disease for the Interface?" (Anita Michel)

11:00 " Bovine Tuberculosis in the African Buffalo: The Role of Population Models" (Wayne Getz)

11:10 "Experiences with and the Challenges of Wildlife Health Management in National Parks of Tanzania" (Titus Mlengeya and Vitalis Lyaruu)

11:20 "Control Options for Human Sleeping Sickness in Relation to the Animal Reservoir of Disease" (Susan Welburn et al.)

11:30 "Rinderpest Surveillance in Uganda National Parks" (Chris Rutebarika)

11:40 "Virus Topotypes and the Role of Wildlife in Foot and Mouth Disease in Africa" (Wilna Vosloo)

11:50 "The Impact of Disease on Endangered Carnivores" (Craig Packer)

12:00 "Veterinary Challenges Regarding the Utilization of the Kafue Lechwe (*Kobus leche kafuensis*) in Zambia" (Victor Siamudaala)

12:10-12:25 QUESTIONS & ANSWERS

12:30-1:30 LUNCH (Group Facilitators and Recorders meet with Susie Ellis over lunch.)

Challenges and Opportunities- Within and Out of the Box

1:30 "The Health Paradigm and Disease Control: Consideration of the Health of Ecosystems and Impacts on Human Health and Rural Livelihoods" (Mike Kock)

1:40 "Conservancies: Integrating Wildlife Land-Use Options into the Livelihood, Development, and Conservation Strategies Of Namibian Communities" (Chris Weaver)

1:50 "'Counting Sheep': The Comparative Advantages of Wildlife and Livestock—A Community Perspective" (Michael Murphree)

2:00 "Foot and Mouth Disease Management and Land-Use Implications in the Zimbabwean Lowveld: the Rationale for Creating a Biosphere Reserve" (Raoul du Toit)

2:10 "Protected Areas, Human Livelihoods and Healthy Animals: Ideas for Improvements in Conservation and Development Interventions" (Gladys Kalema-Zikusoka)

2:20-2:35 QUESTIONS & ANSWERS

2:35 "Impacts and Value of Wildlife in Pastoral Livestock Production Systems in Kenya" (Fumi Mizutani, Elizabeth Muthiani)

2:45 "A Regional / Community Approach to Conservation and Development Interventions at the Livestock / Wildlife Interface" (George Gitau)

2:55 "Complementarity Between Community-Based Animal Health Delivery Systems and Community-Based Wildlife Management? An Analysis of Experiences Linking Animal Health to Conflict Management in Pastoralist Areas of the Horn of Africa" (Tim Leyland and Richard Grahn)

3:05 "Community-Based Animal Health Care—An Opportunity to Help Overcome the Sometimes Conflicting Interests of Rural Communities and Conservationists at the Wildlife/Livestock Interface—Challenges and Research Needs" (John Woodford)

3:15-3:30 QUESTIONS & ANSWERS

3:30-3:50 TEA BREAK #2

3:50 "Introduction of Foot and Mouth Disease-Infected Buffalo into the SAVE Valley Conservancy in Zimbabwe: Success or Failure?" (Chris Foggin and G. Connear)

4:00 "The Disease-Free Buffalo Breeding Project of the State Veterinary Services and South African National Parks" (Markus Hofmeyr)

4:10 "Control of Domestic Dog Diseases in Protected Area Management and the Conservation of Endangered Carnivores" (Karen Laurenson with S. Cleaveland et al.)

4:20 “Impacts of Wildlife Infections on Human and Livestock Health with Special Reference to Tanzania: Implications for Protected Area Management” (Sarah Cleaveland with T. Mlengeya et al.)

4:30 “Synergies Between Livestock Husbandry and Wildlife Conservation in Southern Province, Zambia” (Dale Lewis)

4:40-4:50 QUESTIONS & ANSWERS

4:50-5:00 WORKING GROUPS IDENTIFIED AND INSTRUCTIONS PROVIDED (Susie Ellis, Steve Osofsky)

A maximum of 5 total Working Groups are suggested as follows (**bolded** names are the suggested Working Group Facilitators; *italicized* names are the suggested Recorders). If you feel you’ve been assigned to the ‘wrong’ group or role, please let the facilitator know before the session begins:

(1) Botswana/Namibia/Zimbabwe- Guy Freeland, **Mike Kock**, Neo Mapitse, Gary Mullins, Chris Weaver, Michael Murphree, David Cumming, Raoul du Toit, Chris Foggin, Rowan Martin, *Robert Cook*, Steve Osofsky, Mark Eisler, Delphine Purves

(2) Kenya- George Gitau, Agi Kiss, **Richard Kock**, Fumi Mizutani, Elizabeth Muthiani, Jacob Mwanzia, Jesse Njoka, *Elizabeth Wambwa*, Helga Recke, Kenneth Waithiru

(3) Malawi/Mozambique/Zambia- Misheck Mulumba, *Rod de Vletter*, Simon Munthali, Bartolomeu Soto, Dale Lewis, Victor Siamudaala, Tim Leyland, **Laurel Neme**

(4) South Africa- **Roy Bengis**, Koos Coetzer, Jacques Flamand, Wayne Getz, Markus Hofmeyr, Nick Kriek, Woody Meltzer, Anita Michel, *Philip Nyhus*, Cobus Raath, Wilna Vosloo, Banie Penzhorn

(5) Tanzania/Uganda- Gladys Kalema-Zikusoka, Chris Rutebarika, Innocent Rwego, Michael Woodford, Philippe Chardonnet, Sarah Cleaveland, Robert Fyumagwa, **William Karesh**, *Karen Laurenson*, Titus Mlengeya, Pete Morkel, Craig Packer, Susan Welburn, John Woodford, Mary Phillips

5:00 - ? WORKING GROUPS SESSION 1.

1. Brainstorm to produce a list of priority protected areas in your Working Group’s region, including those that are / could become transboundary.
2. Identify the 2-3 highest priority protected areas.
3. Define (list) the major health-related challenges/threats for each priority area.

-End of Day One Working Sessions-

Don’t forget tonight’s Group Dinner at the Protea Hotel Edward!

MONDAY, September 15th

New Working Groups formed as needed based on highest-priority protected areas as indicated by Day 1 outputs/priorities.

Overview- Moderated Working Groups outline project concepts they think can practically address the health-related challenges discussed yesterday. Working Groups are to be landscape-focused so that the proposal outlines that are developed are geo-referenced to places (which include core protected areas of some type) of conservation interest (specific landscapes of focus will likely depend on representation at the meeting). The emphasis should be on projects that can and should be developed and implemented soon. Concepts emphasizing further research must justify that the proposed research is critical to improved management practices on the ground.

8:00-8:30 AM PLENARY SESSION.
Review of yesterday's outputs/priorities, new Working Group assignments and instructions (Susie Ellis and Steve Osofsky).

8:30 – 10:00 WORKING GROUP SESSION 2.

1. Prioritize health-related challenges for the top 1-3 priority protected areas identified within each group.
2. Begin defining 2-3 pilot projects (including transboundary endeavors) that can address the 2-3 highest priority health-related challenges for each area (*what are the most important things to do to address these challenges- why, who, what, how, when?*) Please see worksheets to be provided.

10:00-10:30 TEA BREAK #1

10:30-12:00 WORKING GROUP SESSION 3.
Continue working to flesh-out 2-3 pilot projects (including transboundary endeavors) that can address the 2-3 highest priority health-related challenges for each area (*what are the most important things to do to address these challenges?*)

12:00-1:00 LUNCH (**Working lunch**- One to two representatives from each Working Group volunteer to convene to delineate "measures of success"- what criteria should these conservation and development interventions be measured by? A suggested list of indicators of success relevant to goals at the livestock/wildlife interface should be outlined. This outline is to be distributed to all participants as the afternoon Working Groups get underway.)

1:00 – 2:15 WORKING GROUP SESSION 4.
Finalize 2-3 pilot projects (including transboundary endeavors) that can address the 2-3 highest priority health-related challenges for each area (*what are the most important things to do to address these challenges?*)

2:15 – 3:45 PLENARY: WORKING GROUP REPORTS (10 MINUTES EACH, AND 5 MINUTES QUESTIONS/DISCUSSION PER GROUP)

3:45- 4:00 TEA BREAK #2

4:00 – 4:45 WORKING GROUP SESSION 5.
Refine/finalize pilot projects based on feedback from plenary session. Groups should reference how identified or modified "measures of success" may help them monitor conservation / development results in their landscapes. HAND IN FINAL ELECTRONIC AND HARD COPY VERSIONS TO FACILITATOR.

4:45-5:15 GROUP DISCUSSION/REFLECTION

5:15-5:30 **Closing Address** (15 min): Billy Karesh, Richard Kock (Co-Chairs, IUCN SSC Veterinary Specialist Group) Key Themes Emerging from this Forum

5:30-5:45 **Meeting Conclusion** (15 min): Steve Osofsky (WCS) and Mike Kock (SASUSG/WCS) Thanks, and Next Steps.

-End of Meeting-

Follow-up: One product of the meeting will be proceedings of the papers presented on Day 1, and a written summary of the outlines for envisioned future work produced by Day 2's Working Groups. Longer term, WCS would like to work with interested participants from the various Working Groups to help them more fully develop the outlines into full proposals for eventual donor consideration. Obviously this will involve broader consultation within the regions of focus with a wider range of stakeholders than could be accommodated at this initial forum.

8/18/03


WORLD PARKS CONGRESS 2003
DURBAN
BENEFITS BEYOND BOUNDARIES
IUCN
The World Conservation Union
The Wellcome Trust
NSF
SPECIES SURVIVAL COMMISSION
VETERINARY SPECIALIST GROUP
WILDLIFE CONSERVATION SOCIETY
Sustainable Use Specialist Group
PACE
Pan African Programme for the Control of Epizootics
OIE
WWF
Russell E. Train Education for Nature Program
IUCN
The World Conservation Union
Pfizer
WWF
USAID

Abstracts

What is this Infamous 'Wildlife / Livestock Interface?'- A Review of Current Knowledge on the Subject

Richard Kock

With the exponential growth of human populations in Africa over the last century, the inevitable decline in wildlife habitat and populations has been rapid. The loss has been primarily in areas of human settlement and agriculture, as here, the habitat loss is extreme. Wildlife survives increasingly in pockets of land peripheral to these areas as a result of the establishment of protected area systems (parks, reserves and sanctuaries) or in the remaining forests, wetlands and vast arid rangelands of Africa, which have not been settled or exploited. Africa is now a mosaic from developed landscapes to relatively unchanged habitats, which recall pre-ice age communities. Probably the most stable systems over the last centuries, where the habitats have remained relatively intact, are the dry rangelands. These areas are less attractive to human settlement as the environment and climate are harsh and agriculture is limited by low rainfall and nutrient-poor soils. Consequently, these are areas with a lower human density and the livelihoods are often based on pastoral livestock and now rarely, hunter-gatherer systems. Ironically, due to lack of political empowerment and cash poverty, these traditional communities are considered backward and unproductive by urban society whereas they should be praised for their more environmentally sustainable land-use practices, and means sought to enhance their incomes without destroying their way of life.

When considering the "Wildlife/Livestock Interface," the understanding for this paper is that the wildlife component comprises the large mammals, which in one way or another interact with the livestock population and more specifically, herbivores. It is here in particular that the scene is changing and novel problems are arising. This does not mean the remaining animals—carnivores, reptiles and so on—are not important. The impact of predation and the prevalence of snakebites on livestock might be examples! These subjects are best dealt with in other forum.

A major impact of the changing landscape has been increasing competition for the finite resources and it is here that the interface has become more apparent and contact more frequent. In summary, the "Wildlife/Livestock Interface" has become more intense in certain areas, whilst it is no longer an issue in many others.

The interface can present itself in many different ways and a better definition of the interface is needed where it has a real impact economically or in terms of health on either the livestock or wildlife populations. This will help in clarifying the issues and focusing research and management efforts appropriately. The subject is large and this paper will only review the more important animal health issues at the interface:

- Diseases of importance that pass between wild and domestic animals at the physical interface with a focus on infections impacting trade in animals.

- Diseases that are transmitted through vectors between livestock and wildlife and the influence each community has on the overall prevalence and impact of the disease.
- Contact rates in relation to the competition for the resources shared between wildlife and livestock – forage and water.

Transfrontier Conservation Area Initiatives in Sub-Saharan Africa: Some Animal Health Challenges

Roy G. Bengis

As Africa's conservation areas come under increasing pressure from expanding human resource needs, the transfrontier conservation area (TFCA) initiatives are a welcome breath of "fresh air" from a biodiversity conservation point of view. In addition, the integration of land across international borders, as well as the consolidation of state and privately / communally owned land in joint ventures, may have major positive economic potential for the specific region. These initiatives are strongly supported by conservationists, eco-tourism enterprises and the public at large, because they are the first tangible moves that may reverse the current encroachment experienced by existing and established conservation and wilderness areas, as expanding local communities battle to survive the onslaughts of nature's climatic fluctuations and plagues which threaten their food security. The TFCA vision explores the possibility that the changing of land-use practices, from subsistence farming on marginal land to community participation in eco-tourism based enterprises, may have sustainable economic and ecologic benefits for all.
In the Southern African Development Community (SADC) region, there are currently seven TFCA's, involving land from two or more participating countries that have already been established OR are in the process and have political support with international agreements at various stages of development and planning. A further fifteen potential TFCA's have been identified by the Peace Parks Foundation in the SADC sub-region.

It is definitely not the intention of this paper to portray these environmental conservation initiatives in a negative light. The message that needs to be conveyed however, is that all parties involved should enter these initiatives with their eyes "wide open," forewarned of the potential animal health implications and challenges that may be expected when increasing the currently existing geographic range of certain animal pathogens and disease vectors. It is totally predictable that without international boundary barrier fences and with biological bridges being formed by contiguous wildlife populations, any contagious / infectious disease or vector present in any one of the participating countries or areas may eventually spread throughout the entire TFCA. Potentially problematic infections should be identified early by surveillance and monitoring, and pro-active joint containment and control measures should be established when and where necessary.

These animal disease issues may also be compounded by the enlarging wildlife / livestock interface which may negatively impact on adjoining communities. This paper

deals with some of the more problematic animal infections and disease vectors that have been identified in certain TFCA's.

Diseases of Importance at the Wildlife/Livestock Interface in Kenya

Elizabeth Wambwa

The rangelands of Kenya occupy 74% of the country's land area and are largely inhabited by nomadic or transhumant pastoralists who comprise less than 15% of the total population. This extensive production system allows a greater interface between domestic and wild animals. This interface also occurs on large scale private or community ranches, and with communities that border the protected areas (national parks and game reserves) around the country. With livestock and wildlife sharing the same ecosystems, there is exchange of several diseases. The resurgence of some livestock and wildlife diseases in Kenya that were previously controlled is of serious concern and can be attributed to several factors. The uncontrolled or illegal movements of livestock by pastoralists within the country and across national borders in search of grazing, markets or following cattle rustling is a major factor in the spread of diseases. Seasonal wildlife movements result in constant interactions with livestock and also increase the possibility of occurrence of transboundary diseases.

The most prevalent and economically important diseases in Kenya include those caused by viruses such as rinderpest, Rift Valley fever, foot and mouth disease, African swine fever, malignant catarrhal fever and rabies (Karstad, 1986; Mushi, 1986; Rossiter, 1986). Bacterial diseases include anthrax, brucellosis and contagious bovine pleuropneumonia (Karstad, 1986). Protozoal diseases such as trypanosomiasis and theileriosis (Grootenhuis, 1986) and numerous ectoparasites and helminths are also prevalent. The presence of some important transboundary diseases has greatly reduced Kenya's export of wildlife, livestock and their products to lucrative international markets. This is due to stringent requirements in sanitary standards for international trade in animals and animal products established by the World Organisation for Animal Health (OIE), that are a prerequisite for exporting products.

New and innovative approaches to disease control are needed, as the human-livestock-wildlife situation in Africa is highly dynamic and current knowledge and veterinary skills should be applied at the interface. Government policy needs to focus strongly on improvement of disease control and marketing of livestock, wildlife and their products. There is need for regional integration within East Africa to allow for free trade in animals and animal products.

This paper briefly describes the wildlife-livestock interface in Kenya with emphasis on the important diseases at this interface. It suggests measures to enhance disease control and improve trade in wildlife, livestock and their products.

Relevance of ROSELT/OSS Programme in Maintaining the Ecological Integrity of Protected Areas and Surrounding Lands

Jesse Njoka

The ecological changes taking place in protected areas are both due to natural processes and human activities. In the absence of long term monitoring data from the protected areas it is difficult to distinguish these two types of changes. Various initiatives to monitor these changes using modern technologies such as remote sensing devices among others are being tested in an uncoordinated fashion. There is need for establishing long - term ecological observatories at the local level to monitor the ecological integrity of protected areas and the adjacent buffer zones to obtain sound scientific data on the interaction of the local human population and the natural resources, especially with respect to those within the protected areas. The goal of the Réseau d'Observatoires de Surveillance Ecologique à Long Terme (ROSELT) programme is to monitor these changes on a long-term basis to generate scientific information for decision-making in development and for conservation of ecological integrity.

The ROSELT programme also seeks to identify management indicators at the local observatory level. Each observatory includes both the protected areas and systems altered through agriculture or urban development. The programme involves several countries participating as member countries of OSS.

In order to assess how the natural system is changing with time, ROSELT seeks to establish a baseline map / state of the area under each observatory against which changes can be monitored in the future. The programme has identified several observatories which are representative of the important ecological zones in the drylands. The baseline study involves compilation of existing information from previous studies and selection of the minimum data set to be collected on a regular basis at the lowest cost. Selection of indicators, which will assist decision-makers to assess trends in the ecological integrity of protected areas as well as areas under agriculture, will be an important output of this programme. These indicators will monitor changes in the ecological, social, economic and management trends of protected areas and surrounding areas. A well-designed monitoring and evaluation model will be able to detect threatening processes such as those related to invasive species, poaching, natural resources conflicts, and unsustainable exploitation of natural resources.

Since the pilot observatories in each participating country are certified in terms of the quality of scientific data that is collected, this certification process can be extended to protected area systems as well as to areas beyond the boundaries of protected areas. The ROSELT programme is relevant at the local level for each observatory, but several observatories at the nation level will scale-up the ability to detect problems that imply the need for policy change. This approach will also scale-up interpretation of information at sub-regional and regional levels.

The Influence of Veterinary Control Fences on Certain Wild Large Mammal Species in the Caprivi Strip, Namibia

Rowan B. Martin

This paper is based on consultancies carried out for the Ministry of Environment and Tourism, Namibia from October 2002-April 2003 to develop management plans for Southern Savanna Buffalo (*Syncerus caffer caffer*), Roan Antelope (*Hippotragus equinus*), Sable Antelope (*Hippotragus niger niger*) and Tsessebe (*Damaliscus lunatus lunatus*).

Rainfall is ultimately the factor limiting the distribution and abundance of these species in southern African savannas. Prior to the great rinderpest epidemic at the turn of the 19th century, the range of buffalo extended to all parts of southern Africa with an annual rainfall exceeding 250mm. Rainfall determines not only the final carrying capacity of the range for buffalo but also the age of first conception and fecundity of females. Roan, sable and tsessebe do not occur naturally in areas where annual rainfall is less than 400mm and their numbers are strongly correlated with the long term cumulative surpluses and deficits above and below the mean annual rainfall.

The Caprivi is the only part of Namibia which enjoys an annual rainfall above 500mm and it is to be expected that the area would carry populations of all of these species at densities of the order of 1-2/km^2. In northern Botswana in the area contiguous with the Caprivi, buffalo numbers may be as high as 100,000 and there are substantial populations of roan (1,500), sable (3,000) and tsessebe (10,000). Immediately across the international boundary, the abundance of these species decreases drastically and the populations are fragmented into isolated subpopulations.

A range of potentially limiting factors was examined to assess the primary causes of the species' poor conservation status. In the eastern Caprivi, poor land use planning may be the primary factor limiting wild species. The *ad hoc* westward expansion of humans and domestic livestock threatens the integrity of the range for all wild species. Wedges of human settlement are fragmenting the range and, in several places, continuity of species populations can only be maintained through spatial links with northern Botswana. Any ill-considered placement of veterinary fences in this area would be likely to result in the total isolation of a number of small subpopulations and, ultimately, their demise. In the western Caprivi (the Caprivi Strip), the present location of veterinary fences has caused the isolation of Mahango and Khaudum National Parks and effectively broken all linkages not only between the east and west Caprivi but also between Botswana and Namibia. At a time when there are high expectations for trans-frontier conservation areas, this is a retrogressive development. Various alternative configurations and mitigating measures for veterinary fences were recently proposed in a major study

commissioned by the Botswana government but, as yet, no decisions have been reached which alter the *status quo*.

Conservation issues here may be secondary to the long-term development potential for the Caprivi and northern Botswana based on wildlife management as the primary form of land-use. The financial and economic values offered by wildlife far exceed those possible from domestic livestock.

Wildlife, Livestock and Food Security in the South-East Lowveld of Zimbabwe

David H. M. Cumming

The South-East Lowveld (SEL) of Zimbabwe covers an area of ~ 50,000 km^2 and is characterised by high temperatures, low rainfall (<400mm per annum) and periodic severe droughts. It is also an endemic Foot and Mouth Disease area. Apart from a high potential for irrigation in limited areas, the SEL is best suited to extensive wildlife and livestock production. Subsistence dry land cropping fails in most years because the growing season is too short and unreliable. With the advent of game ranching in the 1950s there has been an increasing shift from cattle ranching to wildlife and tourism. The current land reform programme has adversely affected the wildlife/tourism sector and resulted in an increase in area under subsistence agro-pastoralism. Food security is a key issue for the region because cereal production from dry land cropping in the communal farming sector areas falls well below household requirements in most years, resulting in a high dependence on food aid.

Wildlife tourism is ecologically and economically the most suitable form of extensive land use for most of the region and there are currently major moves to extend this through the development of transfrontier conservation areas. However, the question of food security and the role of livestock *vis a vis* wildlife in rural livelihood strategies remains unresolved and contentious. Key biophysical and resource management constraints, arising largely from conservative policies on agriculture, land use, and resource access rights, are examined and strategies for achieving resilient and sustainable multispecies production systems are explored.

Tuberculosis – What Makes it an Ideal Disease for the Interface?

Anita L. Michel

In recent years it has become evident that the role of wildlife in the epidemiology of bovine tuberculosis (BTB) has been greatly underestimated, both in developing countries as well as in the developed world. With the breakdown of traditional control programmes and a lack of an effective vaccine, it is almost impossible for affected countries to eradicate or even prevent the further spread of this chronic disease.

Compared to developed countries, where economic losses in the livestock production sector represent the most serious effect of *M. bovis* infection at the wildlife-livestock interface, the range of implications can be much broader in developing countries.

In South Africa, the two largest game reserves, the Kruger National Park (KNP) and the Hluhluwe-Umfolozi Park (HUP), have become endemically infected with bovine tuberculosis after the disease has spilled over from domestic cattle during the second half of the 20th century. Although African buffalo (*Syncerus caffer*) are the main reservoir in both cases, other species have recently shown potential to serve as maintenance hosts. Apart from the impact of this disease on the conservation of endangered species, on the genetic diversity within infected species, and on the economic impact with regards to international trade, tuberculosis caused by *M. bovis* poses a direct health threat to communities living along the border of infected ecosystems. The prevalence of bovine tuberculosis in communal cattle is currently unknown for most of the areas, but the risk of *M. bovis* transmission from wildlife is rapidly increasing as exceedingly high herd prevalences are reached in buffalo and as the spectrum of affected wild animal species becomes broader. Against the generally proclaimed reduced susceptibility of humans to *M. bovis,* the human-livestock interface in this particular case should be considered a favourable environment for zoonotic tuberculosis because immuno-suppression due to infection with HIV/AIDS can pave the way for infectious agents otherwise unable to cause disease on their own.

Along the borders of KNP and HUP, an estimated 165,000 people are living in close contact with and consume products from cattle with an unknown BTB status, but which form part of the wildlife-livestock-human triangle.

Bovine Tuberculosis in the African Buffalo: The Role of Population Models

Wayne M. Getz, Paul C. Cross, Anna E. Jolles, James O. Lloyd-Smith, Sadie J. Ryan, Peter W. J. Baxter, Justine Bowers, Craig T. Hay, Christiane Knechtel, Craig J. Tambling, Wendy C. Turner and J. T. du Toit

The spread of bovine tuberculosis (*M. bovis*, also BTB) in wild populations of African buffalo (*Syncerus caffer*) can be modeled at various levels of complexity, including components, that *inter alia* deal with: basic and refined demographic and epidemiological processes; behavior as it relates to herd organization and the movement patterns of individuals among herds; ecological factors that focus on buffalo-vegetation, buffalo-lion, and buffalo-other grazer interactions; environmental effects, particularly the influence of rainfall and the distribution of water; BTB reservoirs in other species, as well as BTB transmission between buffalo and other species, including domestic cattle and humans; and finally, the effects of various management actions in controlling BTB in natural populations. To avoid getting embroiled in details, models should only contain sufficient complexity to answer the question at hand. Here we evaluate the form and utility of various modeling components in addressing different kinds of basic and applied questions regarding the spread of BTB in populations typified by herds in the Kruger National Park, the Hluhluwe-Umfolozi Provincial Game Park, and the Klaserie Private Game Reserve, all in South Africa.

Experiences and Challenges of Wildlife Health Management in National Parks of Tanzania

Titus Mlengeya and Vitalis Lyaruu

Wildlife populations and the natural lands they inhabit are the world's foremost heritage. Tanzania is one of the countries with abundant biological diversity and a 'high megafauna' wildlife population. The wild species are given a high level of protection in over 28% of the country's land area in the form of national parks, game reserves, game-controlled areas and forestry reserves. Through gradual development of tourism, wildlife is foreseen to have an important and growing economic role in poverty eradication for Tanzania. Wild species have been able to tolerate natural disasters, and their populations are known to rebound back to normal where the ecosystems are not disturbed. However, with the recent development of an increasing human population and human activities around protected areas, natural ecosystems have been greatly impacted and the well-being of animals compromised. Risks for disease transmission between wildlife, livestock and humans have increased significantly. Among the most challenging conditions include the giraffe ear disease, sexually-transmitted disease in baboons, skin infection in giraffe, human-related diseases in chimpanzees, and other human-livestock-wildlife conflicts.

For the last seven years, Tanzania National Parks (TANAPA) has been developing a Wildlife Veterinary Unit to address the numerous up-and-coming wildlife health challenges. However, considering the expanse of the area and diversity of species to be covered, the ability of the Unit to address relevant issues is low. Factors affecting the Unit's capabilities include: the small number of veterinary staff; inadequate skills; insufficient funding and equipment, and low awareness of the impact of diseases on wildlife systems among decision makers. Since most of the emerging diseases affect large ecosystems or even cross international boundaries, there is a need to strengthen local capacity to detect and identify disease threats, launch efficient reporting mechanisms, and foster concerted efforts to manage and mitigate the impacts of disease.

Control Options for Human Sleeping Sickness in Relation to the Animal Reservoir of Disease

Susan C. Welburn, K. Picozzi, J. Fyfe, E. Fèvre, M. Odiit, M.C. Eisler and P.G. Coleman

To our knowledge, sleeping sickness has existed in SE Uganda for more than 100 years but little effort or resources have been applied to controlling the reservoir of the disease in domestic livestock or in wildlife. Control options have instead focused on controlling tsetse flies. Considering that the spot prevalence of *T. b. rhodesiense*, the human infective parasite in cattle, can be up to 18% in cattle in SE Uganda, while less than 1 in 1000 tsetse flies are similarly infected, it would seem appropriate to target interventions towards controlling the animal reservoir of disease. A recent survey in this region has shown 100% of village cattle positive for *T. brucei* over an 18 month period of surveillance. Since this parasite appears relatively non-pathogenic to Zebu cattle, the implications of cattle keeping for human health in this setting are serious.

Rinderpest Surveillance in Uganda National Parks

Chris S. Rutebarika

Rinderpest still poses a potential threat to both the wild and domestic ungulates in eastern Africa. In Uganda, there is a very close association between livestock and wildlife. Vaccination against rinderpest in livestock ceased in 2001. Since the wildlife has never been vaccinated, serosurveillance in this ecosystem to determine the activity and the distribution of the virus is a very useful tool being used by the member states under PACE programmes.

In addition, passive data is collected on a regular basis by the staff of Uganda Wildlife Authority and local government veterinary services. "Suspected outbreaks" and rumours in both livestock and wildlife are investigated fully.

The rinderpest high-risk areas are located in the eastern and northeastern parts of Uganda, and the data collected from wildlife surveillance will augment data from livestock surveillance and support the implementation of the OIE pathway.

Understanding the circulation and distribution of rinderpest virus in wildlife is an essential component of rinderpest eradication and wildlife conservation programmes in Uganda.

Virus Topotypes and the Role of Wildlife in Foot and Mouth Disease in Africa

Wilna Vosloo, A. D. S. Bastos, M. Sahle, O. Sangare and R. M. Dwarka

The epidemiology of foot and mouth disease (FMD) on the African continent is influenced by two different patterns, *viz*. a cycle where wildlife plays a role in maintaining and spreading the disease to other susceptible domestic animals and wild ungulates and another that is maintained within domestic animals. In southern Africa the former cycle predominates due to the presence of African buffalo (*Syncerus caffer*), the only wildlife species for which long term maintenance of FMD has been described. In East Africa both cycles probably occur, while in West Africa, due to the absence of sufficient numbers of wildlife hosts, the disease is maintained largely in the domestic cycle.

Foot and mouth disease is endemic to most countries in sub-Saharan Africa, except in southern Africa, where a number of countries have been able to control FMD by separating infected buffalo and other wildlife species from livestock using fences. Vaccination is used on a limited scale in domestic animals in close proximity of the potential infectious hosts. In other parts of the sub-continent control of FMD is surpassed by more urgent needs such as poverty and famine. However, FMD is one of the diseases that needs to be controlled should countries want to access international agricultural export markets. FMD cannot be eradicated from Africa unless all infected buffalo are removed, which from an ecological and ethical point of view would be untenable.

A better understanding of the epidemiology of the disease could aid in planning control strategies. The use of molecular epidemiological studies has assisted greatly in this regard by highlighting historical and current patterns of spread across borders and demonstrating the presence of viral topotypes that occur in both cycles of spread. Geographical clustering of virus strains into topotypes has been demonstrated for all 6

serotypes occurring on the continent and genetic variation is such that topotype distribution should be heeded when vaccination for control of FMD is considered.

The Impact of Disease on Endangered Carnivores

Craig Packer

The potential for frequent, virulent disease outbreaks has increased as human populations have come into closer contact with wildlife. The risk to humans from wildlife disease is widely recognized (e.g. Ebola, anthrax, and possibly SARS), but less attention has been paid to the risk to wildlife from domesticated animals. Wild dogs and Simien foxes have been decimated by rabies and lions by canine distemper, and both diseases originated from unvaccinated domestic dogs. Similar threats clearly endanger small isolated populations of wild carnivores that, by themselves, could never sustain deadly viruses. This paper emphasizes the impact of multi-host pathogens on long-term population trends in the Serengeti lions, and outlines the techniques we are using to measure the effectiveness of a large-scale dog vaccination program on the health of wild carnivores.

The Health Paradigm and Disease Control: Consideration of the Health of Ecosystems and Impacts on Human Health and Rural Livelihoods

Michael D. Kock

Historically when considering disease control methods, authorities in Africa have paid scant attention to the impact these methods might have on ecosystems, the flora and fauna that reside therein, nor the livelihoods of human communities who might rely on these resources. Healthy ecosystems contribute to sustainable development and human well-being, and provide a diverse resource base that can be utilized on a sustainable basis to address poverty.

Ecosystems should not be viewed purely as “wildlife” or “natural community” based; rather, they should be seen to support the myriad activities of humans and animals that occur on a daily basis, including livestock production. Recognition of the many ecosystems (both natural and human-derived, i.e. altered but healthy systems) that exist over a landscape and how they are interconnected is essential in developing a holistic approach to managing diseases and protecting biodiversity. Veterinarians need to move away from a “reductionist” approach to disease control and begin to recognize the value of a “one medicine, many ecosystems” approach to protecting livelihoods, addressing poverty and environmental issues.

Ecosystem health can be assessed by adopting a biomedical approach. For example, the development of ecological health or condition monitoring criteria that are linked to health monitoring of communities and their livestock would form a critical component of an ecosystem health approach. This would allow the monitoring of the overall condition of the ecosystem and its components in an "umbrella" fashion contributing towards the well-being of people, livestock, wildlife and the environment. Monitoring should occur across landscapes, be multi-disciplinary, complimentary, detect (diagnose) problems and lead to the generation of solutions (treatment).

Conservancies: Integrating Wildlife Land-Use Options into the Livelihood, Development, and Conservation Strategies of Namibian Communities

Chris Weaver

Namibia is a large, sparsely populated southern Africa country. Since its independence in 1990, the Government of the Republic of Namibia (GRN) has introduced an innovative conservancy formation strategy that has engaged more than 150,000 rural communal area residents in a national conservation movement. The passage of the conservancy legislation in 1996 has resulted with the registration of 29 communal conservancies, which encompass more than 74,000 km^2 of wildlife habitat. Seventeen of these conservancies are immediately adjacent to state protected areas, and cumulatively, increase the buffer and corridor areas around and between the existing protected areas by more than 42%. The groundswell of support for conservancies is being generated by an escalating flow of benefits that has doubled during three of the past four years, reaching more than US$1.1 million in 2002. The conservancy movement has markedly changed the attitudes of communal area residents, and communities are now integrating wildlife and tourism enterprises into their livelihood strategies. As a consequence, land-use patterns across Namibia's arid and semi-arid communal areas are changing towards more environmentally appropriate and sustainable forms of game production, which concomitantly, enhances the viability of Namibia's extensive protected area network. Though conservancies are already producing significant environmental, social and economic gains, it is believed that most of today's highly successful conservancies (i.e., the Nyae Nyae Conservancy) still have massive upside potential to increase income and benefits to their membership. However, in order to capitalize on such conservancies' growing populations of rare and valuable game, there is a need to address veterinary concerns and restrictions that severely inhibit the ability of conservancies north of Namibia's veterinary "Red Line" to market their valuable game resources.

"Counting Sheep": The Comparative Advantages of Wildlife and Livestock – A Community Perspective

Michael J. Murphree

Community wildlife management programmes across Africa have strived to encourage wildlife management over livestock production by small scale rural farmers. However, despite data that indicates a higher return per sq km and improved habitat management in areas under wildlife management systems, small scale farmers in communal situations will in almost all cases favour livestock over wildlife.

Why?

There are several factors that determine the comparative advantages of livestock and wildlife such as tenure, policy/legislation and the fugitive nature of the wildlife resource. These factors have traditionally worked against wildlife as an attractive and viable land use option by small scale farmers in communal tenure regimes. However, wildlife has advantages of its own such as resistance to drought and disease, cultural and traditional values, high economic returns (in certain circumstances) and is most often the "meat" of preference. Where are we in this balancing act of choices? With over twenty years of community wildlife management experience in Southern Africa what are the current trends? Will community wildlife management programmes even out the advantages and disadvantages? Does Southern Africa have lessons to learn from other parts of Africa? This paper will examine these issues and questions from the perspective of a small scale communal farmer.

Foot and Mouth Disease Management and Land-Use Implications in the Zimbabwean Lowveld: the Rationale for Creating a Biosphere Reserve

Raoul Du Toit

The Lowveld region of Zimbabwe is the semi-arid southeastern sector of the country, in which mean annual rainfall is 300-600 mm per annum. This region, being about 200,000 km_, comprises 20% of Zimbabwe. It includes state land (notably the Gonarezhou National Park), Communal Lands (subsistence production) and commercial ranching areas that until recent political unrest in Zimbabwe were converting rapidly into wildlife production as the primary land-use in place of cattle ranching. These commercial ranching areas contain approximately 260 black rhinos, which constitute about half of Zimbabwe's total black rhino population. In addition, the Lowveld contains significant populations of wild dog, elephants, cheetah, white rhino, etc. The initiation of the Great

Limpopo Transfrontier Area can and should lead to the inclusion of wildlife producing areas of the Lowveld within a massive regional wildlife complex.

Although land-use patterns in the Lowveld have recently been disrupted by land invasions and by associated problems during a period of economic and political instability, the future of the area clearly lies in the comparative ecological and economic advantage that has been demonstrated in wildlife-based land-uses, regardless of who owns the land. There is an urgent need now to initiative planning and dialogue between stakeholders in order to maximize the wildlife potential of the Lowveld, as Zimbabwe emerges from current instability. This may best be achieved through the initiation of a Lowveld Biosphere Programme, for which international funding and technical support must be secured. This programme would have to be strongly linked to the re-establishment of control measures for Foot-and-Mouth Disease, which must become a priority for future development assistance to Zimbabwe owing to the impacts of this disease not only on Zimbabwe's beef industry but also on the economies of adjacent countries (South Africa and Botswana).

Protected Areas, Human Livelihoods and Healthy Animals: Ideas for Improvements in Conservation and Development Interventions

Gladys Kalema-Zikusoka

Effective protected area management is undermined by disease transmission at the wildlife, human and livestock interface. The poorest people in developing countries tend to live at the borders of protected areas where the value of land is often reduced because of the threat of "problem" wildlife. Additionally, most protected areas are found in remote locations with limited access to adequate health facilities both for people and their animals, leading to a persistence of preventable diseases. Zoonotic diseases can be transmitted between wildlife, people and domestic animals in close contact, especially if they are closely related. This can potentially have devastating consequences for public health, wildlife conservation and ecotourism. In certain instances all three sectors can be affected.

An ideal example is the association between people and habituated great apes. In Uganda, scabies skin disease outbreaks in a tourist group of mountain gorillas (*Gorilla beringei beringei*) resulted in morbidity and mortality. These outbreaks are thought to have been associated with the relatively high incidence of scabies in the local community. Further scabies outbreaks in another habituated group of mountain gorillas is one of the factors delaying the start of tourism to this group. Ecotourism provides employment for surrounding communities and revenue that is shared for community development. Not only are people's livelihoods improved, but so is their attitude towards wildlife conservation. This particular case shows that disease prevention measures in wildlife can only be effective if public health is improved. Tuberculosis (TB) and brucellosis are zoonotic diseases that can be transmitted between cattle and people. Around protected

areas, frequently these cattle mix with closely related wildlife, such as buffalo (*Syncerus caffer*) providing an opportunity for disease transmission. This case shows that preventing disease in people can only be done effectively by controlling disease in cattle and wildlife. In both these cases, health education to improve hygiene including boiling milk (TB and brucellosis) and washing clothes (scabies) is necessary.

An integrated approach could be more cost effective in preventing and controlling diseases around protected areas. This could be limited to close collaboration such as sharing knowledge and health information between medical, veterinary and wildlife departments, or could be fully integrated by combining health programs for wildlife, people and their domestic animals. Though most protected areas are in remote locations, some protected areas have relatively good infrastructure for wildlife conservation and ecotourism activities. People in the wildlife and tourism community can improve the situation by extending their resources to improve health service delivery for people and their domestic animals, such as transportation of medication to people in remote areas. To achieve a great impact, multidisciplinary teams from wildlife, medical, veterinary and Information and Communications Technology (ICT) sectors should be created to combine expertise in education and health programs. Mutual training programs in wildlife, domestic animal and human health monitoring, as well as sharing of laboratory facilities for disease diagnosis, could help to maximize the use of limited resources while building local capacity and being more sustainable. Research on interrelated conservation and public health issues should be encouraged and results shared with policy makers. Finally, funds from health donors could be given to wildlife conservation where it directly affects public health and similarly funds from conservation donors could be given to public health where it directly affects wildlife conservation. Close collaboration between governments, NGOs, the private sector, universities and schools would be needed to develop efficient and effective programs.

Impacts and Value of Wildlife in Pastoral Livestock Production Systems in Kenya

Fumi Mizutani and Elizabeth Muthiani

Four Kenyan pastoral communities in semi-arid areas of Laikipia and Amboseli participated in an in-depth socioeconomic household survey corresponding to one-year periods within the March 2001 - March 2003 time-frame. One hundred households were selected randomly from the geographical clusters within each community in order to compare characteristic of different communities. The year surveyed was considered, by the communities, an average/good year for Laikipia and a bad year for Amboseli.

Laikipia communities had fewer cattle than the Amboseli community and derived less net profit proportionately. However, the wildlife-based enterprise benefited every level of

the community in poorer pastoral communities- more than in wealthier ones compared to the benefits derived from livestock production.

Reductions in communities' livestock production caused by predation and major diseases have been calculated using the Livestock Production Efficiency Calculator. We will discuss differences in group ranch sizes, rainfall, soil fertility and progress in community-based wildlife utilisation.

A Regional / Community Approach to Conservation and Development Interventions at the Livestock / Wildlife Interface

George Gitau

Conflicts between humans, livestock, wildlife and the environment have remained a sensitive issue in many parts of Africa, especially in East Africa. These conflicts arise from the use of shared natural resources that have been increasingly dwindling during the last few years. The latter is associated with increasing human population, change of land tenure system and land use to agro-pastoralism and sedentarisation of formally migratory groups of pastoralists. In addition, there has been an increased uncontrolled encroachment of national parks and private ranches by the pastoralists in search of grazing resources.

The United Nations Convention to Combat Desertification (UNCCD) selected the African Union-Interafrican Bureau for Animal Resources (AU-IBAR) as one of its focal points. The UNCCD mandated AU-IBAR to address the Thematic Programme Network 3 (TPN3) that focuses on the theme area of "rational use of rangelands and fodder conservation." In order to address the above theme, AU-IBAR has initiated a cluster of stakeholder meetings in 2002 comprised of local, regional and international institutions with interest or currently working at the livestock / wildlife / environment interface. After a series of meetings between AU/IBAR and the partners, existing gaps were identified in the understanding of the socio-economic, political and institutional drivers for environmental change and degradation at the interface between the livestock within pastoral systems and wildlife and the environment. A proposal has been developed for funding and is currently receiving positive consideration by UNEP-GEF.

The main objectives of the project proposal are 1), to develop models and approaches to stabilize livestock/wildlife populations for sustainable livelihoods, biodiversity conservation and reduced land degradation and 2), to enhance capacity for management at the livestock-wildlife interface for economics and/or food security in Africa. This will be achieved through community and regional approaches via compilation of a database from available information from other studies and from pilot activities set-up by the project, and by enhancement of capacity for dissemination of the livestock / wildlife / environment interface model through the Thematic Programme Network 3 in Africa.

Complementarity Between Community-Based Animal Health Delivery Systems and Community-Based Wildlife Management? An Analysis of Experiences Linking Animal Health to Conflict Management in Pastoralist Areas of the Horn of Africa

Tim Leyland and Richard Grahn

Community-based animal health delivery systems have been developing since the early 1980s across all continents. They are now accepted as viable mechanisms for bringing services to remote, marginalised and under-served livestock-keeping communities. In recent years there has been a concerted drive in the pastoralist areas of the Horn of Africa to make these systems sustainable through privatisation, supported by enabling policies and legislation. This process has forced advocates for these delivery systems to confront core non-animal health problems, such as access to markets, political marginalisation of pastoralist communities and conflict. This paper briefly describes how successful community-based animal health delivery systems function. It gives examples of the positive impact these projects have had on the livelihoods of livestock owners. They have also proven vital in gaining the confidence of pastoralists and assisting the pastoralists themselves to manage local conflicts such as livestock raiding. The authors note that whilst much progress has been made at the community level in conflict management, sustainable peace and improved economic outcomes requires policy and legislative change by responsible governments, based on a fuller understanding of pastoralist problems. This understanding will have to come from pastoralist communities themselves through their attainment of a voice and ability to advocate for improvements.

During the course of animal health-linked conflict management work in pastoralist areas, the weak management of wildlife resources has emerged as a community concern. Opinion leaders in pastoralist communities are advocating increased efforts from communities and other stakeholders to address the massive wildlife depletion that has taken place in pastoralist areas of the Horn of Africa over the past 30 years, primarily through game meat off-take. Some of the local leaders' suggestions are presented. The authors note that pastoralists are more likely to address issues of wildlife and habitat destruction once their more crucial livelihoods problems (particularly animal health and conflict) are being solved.

Given the geographical closeness of wildlife with pastoralist grazing lands in the Horn of Africa, the paper examines community involvement in wildlife conservation and management around protected areas. It asks whether some of the lessons learned from community animal health programmes and their links with conflict prevention could be utilised to improve wildlife conservation and management in pastoralist communities. The authors conclude that there is an opportunity to add value to community-based wildlife management schemes by linking them with community-based animal health initiatives. Such linkages require more dialogue and collaboration between conservationists, veterinary practitioners and pastoralists.

Community-Based Animal Health Care – An Opportunity to Help Overcome the Sometimes Conflicting Interests of Rural Communities and Conservationists at the Wildlife / Livestock Interface - Challenges and Research Needs

John D. Woodford

Throughout sub-Saharan Africa, wild animals, man and the large and small animal species he has domesticated have shared the same territories for almost two millennia. The complex succession of interactions between humans, domestic animals and wildlife species has come to be known as the "wildlife / livestock interface." During this same period man has become so successful that he and his attendant domestic animal populations have come to threaten the equilibrium of the environment upon which their continued survival is so dependent. One of the more important consequences of the increased levels of interaction between humans, domestic and wildlife species at this interface is the transmission of diseases between and within each of these groups. Some of these diseases may lower livestock productivity due to varying degrees of morbidity and mortality, others are threatening the survival of certain wildlife species and some have important zoonotic implications.

Public sector reforms brought about by Structural Adjustment Programmes (SAP) have led to radical changes in policy governing the provision of public services in most countries of sub-Saharan Africa. These reforms have involved a redefinition of the roles of the public and private sectors and what are now considered "public good" and "private good" services and, consequently, represent an increasing opportunity for the private sector to take part in the commercial side of animal health service delivery.

Whilst conventional models of private veterinary practice have found a niche in urban and peri-urban environments, in most rural areas, where the majority of livestock keepers live, the socio-economic climate is such that these conventional models have so far failed to penetrate the market for the provision of clinical services and veterinary pharmaceuticals.

This paper looks at opportunities to engage members of communities that share the resources at the wildlife / livestock interface (and in underserved areas elsewhere) to play an active role in the prevention and control of livestock, wildlife and human disease through the establishment of Community-based Animal Health (CAH) service delivery systems. The impact of CAH delivery systems has been measured in terms of improved human livelihoods, successful control of epizootic livestock disease and as a useful accessory to improved livestock disease surveillance and reporting systems. However, very few of the delivery systems cited in the literature offer sustainable solutions for adequate supervision of the quality of services being offered or of the drug supply chain. As yet only a few countries have started to introduce legislation which makes provision for the delivery of animal health services by para-professionals.

In spite of the many success stories, and the increasing number of published reports on the impact of CAH delivery systems, many senior policy makers remain unconvinced that Community-based Animal Health Workers (CAHWs) should have a role to play in the delivery of animal health services in underserved areas. Whilst there are risks attendant upon the provision of animal health services by CAHWs, these are likely to be considerably less than those associated with the widespread misuse of veterinary medicines by livestock keepers in the absence of a well-trained animal health service provider. There is strong evidence that livestock keepers can derive substantial benefits from ready access to the affordable services offered by CAHWs.

Our challenge today is to find sustainable ways of ensuring the quality of animal health services in underserved areas through the involvement of para-professionals working under the supervision of private veterinarians and regulated by adequately remunerated and thus well-motivated members of the state veterinary services.

Introduction of Foot-and-Mouth Disease-Infected Buffalo into the Save Valley Conservancy in Zimbabwe: Success or Failure?

Chris Foggin and G. Connear

A total of 618 buffalo (*Syncerus caffer*), known to be carrying foot-and-mouth disease and originating from the west and southern regions of Zimbabwe, were released into the Save Valley Conservancy in the south-east region of Zimbabwe between 1995 and 2002. This Conservancy consists of 24 different titles deeds with multiple ownership. It is 3420 km^2 in area and is stocked with numerous other species of wildlife. On veterinary instructions to facilitate the buffalo release, all livestock was removed, and a double, electrified fence was constructed around the 312 km perimeter of the Conservancy: the inner fence being 1.2 m high with 6 strands and the outer fence 1.8 m high with 12 to 14 strands. Despite careful fence maintenance, an outbreak of foot-and-mouth disease occurred in cattle adjacent to the Conservancy within two years of the initial release. Subsequent to that, a further four outbreaks of the disease have occurred within 10 km of the outside of the perimeter fence, though not all of them appear to have originated within the Conservancy. Ongoing sero-surveys of wildlife indicate that foot-and-mouth disease virus circulates widely in eight species of antelope, and especially greater kudu (*Tragelaphus strepsiceros*), which have shown 34% sero-prevalence. Since the year 2000, the continuing land crisis in Zimbabwe has further facilitated spread of this disease with some 22% of the Conservancy being occupied against the owners' wishes, resulting in the destruction of 80 km of the perimeter fence. There are presently over 5000 cattle within the Conservancy and many wildlife animals have been illegally killed. It is concluded that, to date, this buffalo introduction has had more failures than successes.

Control of Domestic Dog Diseases in Protected Area Management and the Conservation of Endangered Carnivores

Karen Laurenson, Titus Mlengeya, F. Shiferaw, Sarah Cleaveland

Disease is an increasing threat to many of the world's endangered carnivores, from those in North America to those in Africa. To date, rabies and canine distemper have given the greatest concern, causing severe declines in and local extirpations of a range of species, including the black-footed ferret, Channel Island foxes, Ethiopian wolves, African wild dogs and lions. In many of these examples, particularly in Africa, outbreaks in wildlife have occurred when pathogens have spilled over from a surrounding reservoir of domestic dogs. With dog populations and thus this risk of spillovers constantly increasing, many protected area managers are taking measures to reduce this disease risk to endangered carnivores. The range of approaches available includes reducing disease in target species, reducing disease incidence in the reservoir dog population and preventing contact between the target and reservoir species. Reducing disease risk in endangered carnivores can be effected by directly vaccinating or treating endangered individuals. This approach has been tried for black-footed ferrets, African wild dogs and Channel Island foxes, but has been limited by logistical and technical constraints such as the availability of safe and efficacious vaccines. Reducing disease incidence in reservoir dogs has been tried by directly vaccinating or treating or indirectly through reducing the size of the dog population by culling or limiting reproduction. Dog vaccination has been carried out around several protected areas in Tanzania such as the Serengeti NP, Ruaha NP and Udzungwa NP and in Ethiopia, particularly the Bale Mountains National Park, to protect the Ethiopian wolf. If done with sufficient scale and commitment, this approach has been effective. Culling and limiting dog population size face considerable cultural challenges. Education campaigns to encourage responsible dog ownership have been conducted in Ethiopia, although with limited effect. Future work to reduce the need for dogs in Ethiopia is planned. Reducing contact could be achieved through fencing or other physical barriers, restraining dogs or through reducing human and thus dog movements in wildlife habitat. Fences are a common feature of protected areas in South Africa, but have not always prevented rabies outbreaks, particularly when small carnivores may be a vector from reservoir dogs or a component of the reservoir themselves. Encouraging owners to tie dogs has had limited success in Ethiopia. Overall, wildlife managers are ill-equipped to reduce disease threats to endangered carnivores and, to conduct successful campaigns, currently available approaches must be tailored to the specifics of the situation.

Impacts of Wildlife Infections on Human and Livestock Health with Special Reference to Tanzania: Implications for Protected Area Management

Sarah Cleaveland, Karen Laurenson, Titus Mlengeya

Microbial pathogens are integral components of natural ecosystems and play an important role in the evolution and ecology of host communities. However, the growth of human population and expansion of human activities has affected contact and transmission patterns between human and animal populations, leading to the emergence of several major diseases that affect human health, livestock economies and wildlife conservation.

Zoonotic pathogens, particularly those that infect wildlife, pose a particular risk for human disease emergence (relative risk for zoonoses = 1.97; for pathogens infecting wildlife =2.44). Zoonotic diseases associated with wildlife, such as sleeping sickness and anthrax, also pose a potential threat to the tourist sector, which is a major source of foreign exchange in many African countries. Wild animal populations are often implicated as reservoirs of emerging zoonoses, but we have little knowledge of the infection dynamics of these diseases in wildlife, which limits the options and effectiveness of disease control.

Infections in wildlife also have major implications for livestock development in areas adjacent to wildlife (protected) areas. Most livestock pathogens (54%) can also co-infect wildlife. Where wild populations are the source of disease for livestock, land-use conflicts invariably arise, typified by problems associated with malignant catarrhal fever (MCF) in East Africa and foot-and-mouth disease in southern Africa. MCF has been a major factor contributing to the decline in livestock production in pastoralist communities living in and around protected areas of East Africa, leading to a growing demand for cultivation, a form of land-use generally incompatible with wildlife conservation. In other resource-poor communities, a deteriorating livestock production base, exacerbated by diseases transmitted from wildlife, has also fuelled a growth in illegal wildlife hunting to meet growing demands for both dietary protein and cash income.

Options to control infection in wildlife are limited and current strategies, such as culling and movement restriction, have major negative repercussions on wild populations. The engagement of wildlife managers in issues relating to both public health and livestock development is therefore crucial in order to develop effective and appropriate strategies for disease control.

Synergies Between Livestock Husbandry and Wildlife Conservation in Southern Province, Zambia

Dale Lewis

Wildlife conservation solutions in rural areas surrounding protected areas are often hidden in a complex web of livelihood constraints and needs that increase the risks for wildlife/human conflicts. Most wildlife managers are not trained to look for such relationships and rural development specialists generally do not adapt their rural livelihood solutions to conservation. This paper illustrates the critical importance of building conservation programs around such relationships for wildlife areas where the potential for human/wildlife conflict exists. Such conflicts are especially exacerbated when human populations suffer hardships of food shortages and low income. Two real-life examples are given in Zambia where disease of domestic species, cattle and poultry, plays an important role in influencing rates of poaching. Pilot studies show how appropriate interventions that enhance the synergy between wildlife conservation and human livelihoods through applied animal husbandry can lead to low cost solutions to wildlife conservation.

Biographical Sketches

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Dr. Philippe Chardonnet spent the last 20 years working for CIRAD (*Centre International de Recherche en Agronomie pour le Developpment*), being posted in a number of countries in Africa, Asia, the South Pacific and South America. His work takes place in developing countries and deals with different, although related, fields of activity: (i) rural development, (ii) wildlife management, (iii) wildlife/people interactions. In 2001, he joined a Paris-based NGO that is active in wildlife conservation worldwide, the *International Foundation for the Conservation of Wildlife*.

Some of his topics of activity have been (not necessarily in order of importance): (1) deer farming and ranching under tropical conditions; (2) rinderpest epidemiology in African wildlife; (3) training of wildlife veterinarians and wildlife rangers in Africa and Asia; (4) game meat production and game ranching on communal land in Zimbabwe; (5)

sustainable use of bushmeat in Central Africa; (6) development of livestock production in Guinea-Bissau, Rwanda, Burundi, Ethiopia under emergency and post-emergency situations; (7) resolution of conflicts 'wildlife vs. people' in several countries such as Brazil (jaguar and puma) and Zimbabwe (elephant); (8) rescue operations, re- endangered taxa such as marsh deer (Brazil), kulan (Turkmenistan), northern black rhinoceros (Cameroon), Mesopotamian fallow deer (Iran), endemic South Pacific islands birds (New Caledonia); (9) improving sustainability of hunting by local communities in Central Africa, Brazilian Amazonia, New Caledonia; (10) designing new schemes of wildlife management within and outside of protected areas.

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Rabies has been a principal interest for many years, triggered initially by concerns about disease threats to African wild dogs in the Serengeti, but now resulting in a wider involvement in rabies control throughout Africa and Asia. The complementary aims of several current research projects are to provide information necessary for the development of large-scale rabies control programmes in sub-Saharan Africa that will provide benefits both to public health and wildlife conservation.

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Professor Koos Coetzer is currently Professor and Head of the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science at the University of Pretoria as well as a part-time Professor in Tropical Veterinary Medicine at Utrecht University, the Netherlands, supporting collaborative research and postgraduate training between the two faculties.

Some of Professor Coetzer's honors include: Research Award of the South African Veterinary Association for outstanding research published in scientific journals (1982); Bill Venter Literary Award (1997); Gold Medal of the South African Veterinary Association in recognition for outstanding scientific achievements and promotion of veterinary science (1997); Malbrant-Feunten Award of the French Veterinary Academy (1998); International Award from the Faculty of Veterinary Science, Spain for the production of a video of high quality on Rift Valley fever (1998).

Professor Coetzer holds a B.VSc. (1973), B.VSc. Honours (1980) and a M.Med. Vet. (Path) degree from the University of Pretoria.

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Robert A. Cook, V.M.D., M.P.A. is an Adjunct Professor of Environmental Affairs at Columbia University in New York City and the Chief Veterinarian and Vice President of the Wildlife Health Sciences (WHS) Division of the Wildlife Conservation Society (WCS). He has 20+ years of experience in zoo and wildlife medicine and has served in his present capacity as Chief Veterinarian for the last 13 years. It was under Dr. Cook's guidance that the Field Veterinary Program was established in 1989 as the first global effort to support the health and conservation of wildlife populations in native habitats. The WHS programs in Clinical Care, Pathology and Field Veterinary Medicine are responsible for the health of over 23,000 animals in five New York facilities including the Wildlife Centers in Central Park, Queens and Prospect Park, the New York Aquarium

and the Bronx Zoo. The WHS Division also oversees the health-related programs at the WCS Wildlife Survival Center on St. Catherines Island, Georgia. With the Field Veterinary Program taking the lead, WHS is deeply involved in the health aspects of the Wildlife Conservation Society's international conservation programs, providing services and research to a number of the 300 WCS projects in 53 nations.

Dr. Cook graduated from the University of Pennsylvania School of Veterinary Medicine in 1980 and pursued a career in zoo and wildlife medicine thereafter. Recently he fulfilled his desire to have a more global impact on wildlife health issues by returning to school to receive his Masters in Public Administration from Columbia University in 2002. With his background in both the health of wildlife and global policy issues on these matters, he accepted an adjunct teaching position at Columbia University in its School of International and Public Affairs.

Dr. Cook is Chair of the Animal Health Committee of the American Zoo and Aquarium Association (AZA) as well as Chair of the Captive Wildlife and Alternative Livestock Committee of the United States Animal Health Association. He is a past President of the American Association of Zoo Veterinarians. Dr. Cook also has a long-standing interest in pain amelioration and is a scientific advisor to the Mayday Fund. In addition, he serves as a scientific advisor to the Morris Animal Foundation and as a member of the Conservation Endowment Fund Committee of the AZA.

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Dr. David Cumming has been working in wildlife research and conservation in Zimbabwe and southern Africa since the 1960s. He graduated in Zoology and Entomology from Rhodes University in South Africa, started work in fisheries research but soon joined Zimbabwe's Department of National Parks & Wildlife Management in 1964. After 12 years at the Sengwa Wildlife Research Institute in Chirisa (where he did his doctoral research on warthog ecology), he became Chief Ecologist and headed the Branch of Terrestrial Ecology. In 1988, he retired early as Deputy Director of National Parks to set up the WWF Multispecies Animal Production Systems Project. This grew into the WWF Southern African Regional Program where he was Program Director until early 2001 when he became an independent consultant and a research associate in the Tropical Resource Ecology Programme (TREP) at the University of Zimbabwe. Dr. Cumming's main current research interests are in ecology and management of large mammalian herbivores, the influence of land use policy and practice on biodiversity and resilience in social-ecological systems, and the conservation and management of

elephants. Invertebrates remain an abiding interest and he works with his wife Meg on termites and spiders.

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Rod de Vletter, a Swaziland citizen, is a tourism and environment specialist working for the World Bank since 1993. He is the owner of two nature reserves and an ecotourism lodge in Swaziland, and the founder of Swaziland's environmental NGO, Yonge Nawe. He is one of the originators of the Transfrontier Conservation Areas (TFCA) Initiative and has been working on Coastal Zone Management, Biodiversity and Tourism Corridors, and Tourism and Conservation policy and program development. His working experience covers Mozambique, Zimbabwe, Swaziland, Malawi and Uganda. Recently, Mr. de Vletter has been working with the International Finance Corporation to design the South East Africa Tourism Investment Program (SEATIP) and with the Government of Mozambique to design its Sustainable Tourism and Conservation Program.

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Raoul du Toit is a Zimbabwean. He commenced his professional career in the field of Environmental Impact Assessment (EIA), having undertaken post-graduate training at the University of Cape Town. He has been particularly involved in EIA's of large hydroelectric schemes on the Zambezi and Cunene Rivers. He diverted into rhino conservation work through his appointment in 1985 to the IUCN African Elephant and Rhino Specialist Group, as Scientific Officer. For three years, he coordinated the conservation efforts of this group within Africa. In 1988, Mr. du Toit developed a WWF project to survey the status of black rhinos in the Zambezi Valley and since then has worked as a Project Executant with WWF. In 1990, he was seconded to the Zimbabwean Department of National Parks and Wildlife Management, where he worked for seven years to initiate and implement the Rhino Conservancy Project in Zimbabwe. This entailed establishing viable rhino breeding groups in semi-arid areas of Zimbabwe, amalgamating game ranches into large conservancies to provide adequate habitat, setting up protection and monitoring systems, and helping to deal with the ongoing economic

and political challenges to these private sector projects. He also helped to establish the regional rhino conservation programme of the Southern African Development Community and is involved in this programme as a technical adviser on rhino projects in several countries.

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Susie Ellis, Ph.D., is the Vice President for Conservation International's (CI) Indonesia and Philippines programs, working out of Washington, DC. She oversees management and program development, as well as the scientific integrity of field projects. Dr. Ellis also raises funds and increases awareness of the urgent biodiversity crisis currently facing both countries. Well-known in the international conservation community, she has worked in more than 25 countries and has written more than 80 technical papers, proceedings and book chapters.

Prior to joining CI, Dr. Ellis spent 10 years working for the World Conservation Union's (IUCN) Conservation Breeding Specialist Group, facilitating more than 100 collaborative biodiversity / species conservation and strategic planning workshops and securing the operation of the expert group. With David Wildt, Dr. Ellis co-led a 5-year collaborative interdisciplinary program for giant panda conservation in China that has enhanced collaboration among agencies responsible for their conservation, as well as among U.S.-based partners. She has also worked extensively with the Cheetah Conservation Fund (Namibia) to facilitate its long-range organizational and scientific strategic planning, which has resulted in funding for facility expansion and the organization's scientific direction.

Dr. Ellis is also well known in the zoological community, and has worked for the Minnesota Zoo, Lincoln Park Zoo (Chicago), San Diego Zoo and Sea World, Inc. (San Diego), and as a consultant for the Aquarium of the Pacific (Long Beach).

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With broad experience with African, Middle Eastern and Asian wildlife, Dr. Flamand has worked as a wildlife veterinarian in South Africa in the Kruger National Park and on the Natal Parks Board. He was Director of both the National Wildlife Research Centre (TAIF) and King Khalid Wildlife Research Centre, Riyadh, Saudi Arabia. Dr. Flamand was Veterinary Adviser to the Dept. of National Parks and Wildlife Conservation in Royal Chitwan National Park, Nepal.

His interests and the majority of his life's work entails: wild animal captures; wild animals' adaptation to captivity, holding, transportation; reintroductions and parasitism of game species, together with the interaction and the disease implications of game animals mixing with domestic stock. Game ranching and wildlife veterinary ecology are also areas of interest. The genetics of small populations and the implications thereof, especially in the rhinoceros and lion, have been major subjects of his study. In Saudi Arabia, Dr. Flamand developed a protocol for the eradication of tuberculosis in a captive breeding herd of Arabian oryx held at TAIF, the first such attempt in a wild ungulate anywhere in the world. His most recent posting in Chitwan was to establish a veterinary programme designed to address the veterinary concerns of both the wildlife and surrounding domestic livestock.

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Dr. Chris Foggin has spent most of his professional life in the service of the Zimbabwean Government. Prior to the establishment of his Wildlife Unit within the Department of Veterinary Services (DVS), Dr. Foggin had been primarily involved in research within DVS on rabies epidemiology, and had also played a pioneering role in developing management practices for the intensive production of crocodiles and ostriches, in addition to undertaking emergency wildlife work on an irregular basis.

The foot-and-mouth disease-free buffalo programme emanated from Dr. Foggin's offices. As head of the Wildlife Unit, he has been responsible for Veterinary Regulations concerning the movement of wildlife both within the country and externally. The relocation of oxpeckers is an ongoing exercise, and with the promotion of venison

production and marketing, Dr. Foggin has been called on to assist in developing this section.

The ongoing rhino snaring crisis and the pressures of dealing with wildlife/cattle disease problems in Zimbabwe's current economic situation have added greatly to the workload for the Wildlife Unit.

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Guy Freeland, BVMS (Glasgow '65), MSc (Edinburgh University, Centre for Tropical Veterinary Medicine '78), MRCVS has had a long and distinguished career in international veterinary medicine.

In the 1970s and early 1980s, his Overseas Development Administration (ODA) assignments took him to Swaziland, Sarawak, and Bangladesh, followed by a World Bank assignment in Nigeria. From 1983 to 1999, Dr. Freeland was the Senior Animal Health and Production Adviser to the British Government's ODA, (now the Department for International Development, DFID). His responsibilities included livestock project appraisal, monitoring, supervision, and review in some 45 countries in Africa; West, South, and South-east Asia; and Pacific regions. He also had oversight of ODA/DFID's Animal Health and Livestock Production Research Programmes, and provided advice on assistance to International Research Institutions.

Since retiring from the civil service in 1999, his free-lance consulting has taken him to Botswana, Vietnam, Lao PDR, and Nepal, and has also included work in the United Kingdom.

He is a member of the Board of Directors of VETAID, and Chairman of the Board of Trustees of Worthing Animal Clinic.

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Dr. Robert Fyumagwa received his B.V.M. degree from Sokoine University of Agriculture (SUA) in 1990. From 1991 to 1998, he worked as a private practitioner in a mixed-type of veterinary practice in Dar es Salaam, Tanzania. From September 1998 to September 2000, Dr. Fyumagwa finished his postgraduate studies at SUA, specializing in parasitology. In October 2000, he joined Tanzania Wildlife Research Institute (TAWIRI) as a veterinary research officer—the position he is currently holding. While in private practice, Dr. Fyumagwa participated in a rinderpest vaccination campaign for Masai pastoralists in 1997. After joining the wildlife sector, he completed a capture course in Zimbabwe in 2001. Dr. Fyumagwa attended the Envirovet course in 2002. His future plans included more training on wildlife disease and postgraduate training in wildlife management and ecology. Dr. Fyumagwa has been an active participant in the TAWIRI Annual Conference since December 2000.

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Dr. Wayne M. Getz was born in South Africa in 1950, but has been a faculty member of the University of California at Berkeley since 1979. He has a Ph.D. from the University of the Witwatersrand (Applied Mathematics, 1976) and a D.Sc. from the University of Cape Town (1995). He is a Fellow of the California Academy of Sciences, the American Association for the Advancement of Sciences, an Alexander von Humboldt US Senior Scientist Awardee, a past Research Fellow of the Stellenbosch Institute for Advanced Studies, and currently is an Extraordinary Professor at the University of Pretoria Mammal Research Institute. Dr. Getz is a Past-President of the Resource Modelling Association and has organized US-NSF funded workshops in southern Africa on the topics of "Resource Utilization" and "Community-Based Wildlife Management." His publications include a coauthored Princeton University Press monograph "Population Harvesting: Demographic Models of Fish, Forest, and Animal Resources." His current research focuses on the application of mathematical modeling and analysis to problems in conservation biology, wildlife management, and epidemiology. Dr. Getz is the PI of an

on-going US-NSF funded study of the spread of bovine tuberculosis in the African buffalo population in the Kruger National Park.

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Dr. George K. Gitau graduated with a Bachelor of Veterinary Medicine from the University of Nairobi, Kenya in 1987. He thereafter obtained a Master of Science from the University of Guelph, Canada (1992) and a Doctorate of Philosophy from the University of Nairobi (1997). Dr. Gitau currently works with the African Union/Interafrican Bureau for Animal Resources (AU-IBAR) and coordinates AU-IBAR's project on the Livestock, Wildlife and Environment Interface, among other things. Dr. Gitau is also a Senior Lecturer at the Veterinary School of the University of Nairobi and is currently on leave of absence from the university. Dr. Gitau has specialised in veterinary epidemiology and has over 10 years field experience in smallholder dairy production systems in the highland ecosystems of Kenya. During the last 5 years, Dr. Gitau has been working in the pastoral rangeland ecosystems of Kenya, one of which is the Maasai pastoral ecosystem that has an extensive interaction of people, livestock and environment. One of Dr. Gitau's interests and working areas currently is the livestock, wildlife and environment interface, which is being pursued together with other scientists and stakeholders and with the support of UNEP-GEF.

Dr. Gitau is attending the WPC AHEAD forum as a representative of AU-IBAR, the coordinator for the IBAR's project on Livestock, Wildlife and Environment Interface, and Thematic Programme Network 3 (TPN3) Focal Point for UNCCD that addresses the area of "rational use of rangelands and fodder management".

Markus Hofmeyr

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Born in Johannesburg, Markus went to veterinary school with the objective of getting into wildlife. During university years he worked as a guide in Pilanesberg National Park and during holidays at various game reserves. After qualifying as a vet, Markus worked at a variety of practices and went to Canada for few months where he gained some North American wildlife experience. Back in South Africa, a stint in exotic animal medicine (dealing with birds, monkeys, and snakes) was an important step for him.

In 1995, Markus got his break in the wildlife industry when he was employed in Madikwe Game Reserve- where at that time the largest animal translocation in the world was taking place. In the five years he spent there, he gained a tremendous amount of ecological, veterinary, and management experience in wildlife translocations and the running of a large game reserve. From there he moved to the Kruger National Park where he currently holds the position of Principal Scientist- Veterinary Services.

One career highlight has been his involvement with the re-introduction of the endangered African Wild Dog into Madikwe Game Reserve. The experience gained with the work done in Madikwe has improved the knowledge of wild dogs, and has been used extensively in other introductions of wild dog elsewhere in South Africa.

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Dr. Gladys Kalema-Zikusoka worked as Veterinary Officer of the Uganda Wildlife Authority from 1996 to 2000. During her tenure, Dr. Kalema-Zikusoka was involved in setting up veterinary programs and developing a policy framework for wildlife conservation to support the timely and efficient delivery of veterinary services including: translocation and reintroduction, and problem animal management.

As part of her zoological medicine residency program through North Carolina State University, Dr. Kalema-Zikusoka received the African Wildlife Foundation (AWF) Charlotte Fellowship Conservation Award in 2000. This led to new research on tuberculosis at the human, wildlife and livestock interface in Queen Elizabeth and Bwindi Impenetrable Forest National Parks in Uganda in 2001 and 2002.

Following-up on the research findings and recommendations, Dr. Kalema-Zikusoka became Founder and Chief Executive Officer of Conservation Through Public Health, an international grassroots NGO, established in 2002, to promote conservation with public health by improving primary health services for people and animals around protected areas throughout Uganda.

Dr. Kalema-Zikusoka obtained a Bachelor's degree in Veterinary Medicine from the Royal Veterinary College, University of London in 1995. She completed a zoological medicine residency and Masters in Specialized Veterinary Medicine at North Carolina State University and North Carolina Zoological Park in the USA in 2003. She also obtained a Certificate in Non-Profit Management from Duke University in the USA in 2003.

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William Karesh, D.V.M., heads the Field Veterinary Program (FVP) of the Wildlife Conservation Society, which has over 300 field projects in 50 countries around the world. Dr. Karesh was hired to develop this program in 1989 to address health-related issues among field biologists and conservationists. The program provides services overseas for the Society's field staff as well as workers from government agencies and non-governmental organizations. The FVP also conducts research on the health status of free-ranging wildlife populations, provides training for foreign veterinarians and biologists, and frequently assists overseas organizations and agencies with wildlife translocations, as well as confiscation and rehabilitation issues. Major initiatives of the FVP include the development of multi-national wildlife/livestock/human health programs and policy consultation for developing country governments and bilateral aid organizations.

In 1999, the Wildlife Conservation Society's Field Veterinary Program initiated the first comprehensive preventive health program for free-ranging lowland gorillas aimed at protecting populations in three range states (Gabon, Congo and CAR) from the risk of exposure to emerging or introduced diseases. This program was created in response to the growing interest in gorilla ecotourism, proliferation of ecological / wildlife research, and expansion of human communities in and around the forests of Central Africa. This program was up and running during the recent Ebola outbreaks that have swept across northern Congo and Gabon, allowing FVP vets and collaborating scientists to respond quickly to the crisis.

Dr. Karesh is also Co-Chair of the IUCN SSC Veterinary Specialist Group.

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Dr. Michael Kock is a veterinarian who works as a conservation practitioner, with a particular interest in the issues of ecosystems, wildlife and their relationship to human health and well-being. His career as a wildlife veterinarian has spanned several continents, but Africa is his home, and the African people and wildlife provide his sustenance. Dr. Kock was born in South Africa, but grew up in Zimbabwe, traveling from there to do his veterinary degree in England. Veterinary work was pursued in America and the Middle East before he returned to Zimbabwe where he was heavily involved with rhinoceros work during the poaching heydays of the 1980 and 1990s. His work has carried him across Africa to Cameroon and throughout Southern Africa. He believes that the future of conservation lies in winning the hearts and minds of the rural people of Africa and supporting their aspirations and improving the health of their livestock. Dr. Kock has broadened his horizons by involvement with organizations such as Theatre for Africa in educating people on conservation and health issues; he is a member of the Southern African Sustainable Use Specialist Group (SASUSG). He believes the key to success in conservation in the developing world is by adopting a participatory approach, capacity-building, educating, and supporting homegrown solutions.

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Dr. Richard Kock is a British (M.R.C.V.S.) veterinarian of 47 years of age and he has spent over 20 years in the wildlife field attached to the Zoological Society of London, initially as a veterinary officer for its captive collections and subsequently on conservation and animal health programmes around the world.

In 1991, he was seconded from ZSL to the Kenya Wildlife Service (a parastatal institution mandated to manage and conserve all wildlife in Kenya) to head a new Veterinary Unit (5 Vets, 2 Technicians, 30 officers and field staff) for a period of 7 years. The programme was successful with a now functional and sustained Unit at KWS. From November 1998-2000, he was seconded to an African regional body, the Organisation of African Unity/Inter African Bureau for Animal Resources (OAU-IBAR) Pan African Rinderpest Campaign. This has involved the organisation and implementation of extensive sero-surveillance and disease investigation in non-domestic ruminant species throughout eastern Africa and also in the Central African Republic. This activity continued from July 2000 to the present, setting up the Wildlife component of the Epidemiology Unit (PEU) of the new AU/IBAR Pan African Programme for the Control of Epizootics (PACE) programme, involving 30 countries in Africa. His area of responsibility is eastern Africa and the activities include: strategic planning for epidemiosurveillance amongst wildlife species, especially at the wildlife livestock interface; training of national staff in the appropriate veterinary techniques at national and regional levels; and practical support to field surveillance.

Dr. Kock has consulted for the IUCN (elephant), the World Wide Fund For Nature (rhino), The World Bank (Uganda Wildlife Authority development) and The Food and Agriculture Organisation of the United Nations (GREP). He is Co-Chair of the International Union for the Conservation of Nature and Natural Resources (IUCN) Species Survival Commission (SSC) Veterinary Specialist Group, and a member of the Cat and Antelope Specialist Groups of the SSC. He is well travelled, having had involvement in a variety of conservation-related initiatives in Europe, Africa, the Middle East, Eurasia and the Caribbean. He promotes wildlife veterinary matters through extensive publications and at professional meetings. Dr. Kock is a registered specialist in Zoo and Wildlife Medicine with the Royal College of Veterinary Surgeons of England, and a member of the Wildlife Disease Association, the British Veterinary Zoological Society, the World Association of Wildlife Veterinarians, the American Association of Zoo and Wildlife Vets, and the British Veterinary Association.

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Dr. Karen Laurenson qualified as a vet from Cambridge University in 1987 and then spent 3 years in Tanzania studying cheetah behaviour and ecology for a Ph.D. Thereafter, she combined her interests in disease and ecology by carrying-out postdoctoral research on wildlife disease epidemiology, particularly at the wildlife-domestic animal interface, with a long term study of louping-ill dynamics in wild and domestic species (red grouse) in the UK and shorter projects in Namibia and South America. Since 1996, she has been involved in research and conservation programmes to reduce the threat of rabies and other dog diseases to the Ethiopian wolves. Dr. Laurenson was based at the University of Edinburgh Veterinary School as a research fellow and then as a lecturer since 1997. Currently, she is also working part-time for Frankfurt Zoological Society as a Programme Officer for their Africa program, with particular responsibility for projects involving veterinary issues in Ethiopia and Congo.

Dale Lewis

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Dr. Dale Lewis has worked as a conservation scientist for the Wildlife Conservation Society in Zambia for over 20 years. He has contributed to applied research in elephant and hippo management, contributed to such efforts as the establishment of a college for promoting community leaders in wildlife conservation, improved legislation on wildlife management policies, and the development of community-based management systems

and institutions. Dr. Lewis works in close collaboration with the Zambia Wildlife Authority as Technical Advisor for Community-Based Natural Resource Management (CBNRM). Results emanating from his work include the national village scout program, an integrated data base for studying wildlife management approaches in rural areas outside national parks, a national program for CBNRM referred to as ADMADE, and large-scale pilot schemes for testing development models that promote wildlife conservation.

In recent years, Dr. Lewis has undertaken an initiative that links households vulnerable to problems of poverty and hunger to a regional trading center through a program that promotes alternatives to poaching by improving market access and producer prices. The program integrates a variety of disciplines that enable household livelihood needs to be better addressed in ways that lead to lowered human conflicts with wildlife, and to increased wildlife production. In his spare time, he fly-fishes and roams around the African bush with his wife, Julia.

Tim Leyland

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Dr. Tim Leyland is a veterinarian with a M.Sc. in Tropical Animal Health and Production, currently working with Tufts University's School of Nutrition and Policy, Boston, seconded to the African Union.

After experience in private practice, he has worked in underserved livestock-rearing areas for the past 15 years in Papua New Guinea, Afghanistan, Mozambique, Sudan and all the countries of the Horn of Africa. With experience in NGO, government and international agency projects and programmes, he has specialized in community-based livestock projects and veterinary service delivery in developing countries. Dr. Leyland's current activities revolve around researching and implementing field-based animal health delivery systems in order to bring about institutional, policy and legislative change at national, regional and global levels. Over the past 10 years, he has used community-based livestock initiatives to resolve and manage armed conflict, improve livestock marketing and trade, improve disease surveillance, and ensure appropriate emergency relief interventions in remote, marginalized livestock-rearing areas. More recently, his work within the African Union's Interafrican Bureau for Animal Resources has concentrated on the institutional development of African livestock organizations.

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Rowan Martin qualified at Manchester University in the 1960s as an engineer and physicist and switched his career to wildlife and environmental issues in 1970. He worked for the Department of National Parks in Zimbabwe for 25 years and was head of wildlife and fisheries research in the department from 1987 - 1997. Since then, he has been working as a free-lance consultant in the Southern African region on a range of conservation and development projects.

Apart from wildlife ecology, his interests lie in land use planning and institutional structures. He is the author of the well-known Communal Areas Management Programme for Indigenous Resources (CAMPFIRE 1986) and has recently been advocating new models for State protected area management in southern Africa.

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Now retired, Woody Meltzer, B.VSc., was a veterinary consultant to the De Wildt Cheetah Breeding Centre from 1974 to 1994, where he instituted a "rational approach to breeding cheetahs in captivity," undertaking fertility studies and modifying the management of the animals with the result of six out of a possible nine pregnancies in the first year.

From 1977, he was also Veterinarian at the National Zoological Gardens in South Africa; from 1980 to 1985, Dr. Meltzer was Senior Lecturer in Physiology at the Faculty of Veterinary Science, University of Pretoria; from 1985 to 1988, he was involved in biomedical research; and from 1988 to 2001, he held the professorial chair in Wildlife.

From 1976 to 1977, Dr. Meltzer also managed the translocation of elephants to Sabie Sands Game Reserve from Kruger National Park and in 1978, of nyala from Omdumo Game Reserve. Both populations continue to do well.

From 1959-80, Dr. Meltzer was in private practice. He maintains expertise in management of captive wild animal populations, chemical immobilization of wild animals, fertility of cheetah and lion populations, game ranch management, nutrition, and physiology.

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Dr. Anita Luise Michel was born on 20 July, 1963, in Germany. She matriculated in 1982 and obtained the qualification as a veterinarian in 1987 from the Ludwig-Maximilians-University of Munich, Germany. She completed a doctoral thesis on molecular studies on Coxsackie virus at the Max-Planck-Institute for Virology in Martinsried, Germany for which she obtained the degree Dr. Med. Vet. *cum laude* from the same university in 1989. Also in 1989, she joined the research team concerned with viral diseases of animals at the Onderstepoort Veterinary Institute near Pretoria. Her main research fields included diagnostic methods and epidemiology of malignant catarrhal fever in wildebeest and sheep. In 1995, Dr. Michel joined the tuberculosis laboratory of the department of bacteriology at the same institute and became head of this department in 2002. Her main research activities focus on the improvement of diagnostic methods for bacterial diseases and the research on tuberculosis in domestic and wild animals. Dr. Michel is the author or co-author of 21 scientific papers and 36 conference presentations.

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Fumi Mizutani, D.V.M., M.Sc., Ph.D., studied veterinary medicine at Hokkaido University and worked for the scientific committee of WWF Japan before she went to study Tropical Resource Ecology at the University of Zimbabwe. Her specific subject was the reproductive success of foot-and-mouth disease virus-free semi-domesticated African buffaloes compared to that of wild herds. Following her growing interest in

mixed livestock/wildlife systems and particularly on disease transmission between domestic stock and wildlife as well as livestock predation by carnivores as major conflict areas, she subsequently studied predators on a working ranch in Laikipia, Kenya. Under the guidance of the late Professor Peter Jewell at the University of Cambridge, she did her Ph.D. on the impacts of predation in wildlife and domestic stock. Since 1996, she has implemented the Lolldaiga Research Programme at Lolldaiga Hills Ranch, a beef-dairy working ranch in Kenya. Dr. Mizutani is also working as a livestock/wildlife consultant at the Kenya Agriculture Research Institute and the International Livestock Research Institute.

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Dr. Titus Mlengeya obtained his B.V.M. degree from Sokoine University in 1988 and a M.Sc. in Veterinary Epidemiology from the University of Reading, UK, in 1994. He received a certificate for competency with dangerous drugs from the Zimbabwe Veterinary Association in 1997. Dr. Mlengeya served as a wildlife research scientist at Serengeti Wildlife Research Institute from 1987 to 1989. In 1989 and 1990, he was District Livestock Development Officer for the Tanzanian Ministry of Agriculture & Livestock Development. From 1990 to 1993, he established and managed a veterinary clinic in Dar Es Salaam. From 1994 to 1996, he served as Wildlife Epidemiologist for the Tanzanian Ministry of Agriculture & Livestock Development in Dar Es Salaam. Since 1996, he has worked at Serengeti and other Tanzanian National Parks as a wildlife veterinarian. Dr. Mlengeya currently heads TANAPA's Wildlife Veterinary Unit.

Dr. Mlengeya is a member of the Wildlife Conservation Society of Tanzania, the Society for Veterinary Epidemiology and Preventive Medicine, and the Wildlife Disease Association. His current activities include rinderpest surveillance in wildlife (buffalo, other ungulates); treatment of endangered animal species (black rhinos, wild dogs); snare removal (lions, buffalos, hyenas, zebras, other species); vaccination of domestic animals to control rabies, rinderpest, foot and mouth disease, and canine distemper; training of park rangers for animal health monitoring; training of local communities in animal husbandry; and conducting post-mortem examinations of dead wild animals with diagnostic sampling and related laboratory work.

His goals are to continue to monitor and mitigate diseases, conduct necessary research, and maintain healthy wildlife populations in a healthy ecosystem. Dr. Mlengeya provides support for community-based livestock projects to fight poverty in local communities and involves local people in conservation programs.

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Since January 2002, Dr. Misheck Mulumba has been the Director for the African Union/Centre for Ticks and Tick-borne Diseases (AU/CTTBD). His primary duties include: production of tick-borne disease (TBD) vaccines for livestock; training (epidemiology and diagnostics); supervision of postgraduate students; coordination of regional livestock disease work; and participation in policy formation at the livestock/wildlife interface.

Between June 2000 and December 2001, Dr. Mulumba held the position of Deputy Director at AU/CTTBD. He was Chief Veterinary Officer and Subprogram Manager, Animal Production and Health, for the Ministry of Agriculture, Food and Fisheries in Zambia from September 1997 to May 2000. Dr. Mulumba was the Senior Veterinary Officer for the Ministry of Agriculture in Zambia between May 1995 and August 1997, and helped oversee the translocation of more than 2,000 game animals within the country. From December 1993 to December 1999, he was the Counterpart Project Manager and later Project Manager for ASVEZA, a Belgium-funded animal health project. Between October 1989 and November 1993, Dr. Mulumba was a Government Veterinary Officer for Zambia.

Dr. Mulumba is a founding member of the African Chapter of the Wildlife Disease Association (WDA) and a member of the African Association of Insect Scientists (AAIS), the IUCN Veterinary Specialist Group, the Veterinary Association of Zambia (VAZ), and the African Tick Group.

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Dr. Simon Munthali, a Malawian, is 46 years old and has 22 years experience in: protected areas and wildlife management; formulation of wildlife policy; research in the ecology of terrestrial wildlife, ichthyo-fauna, and the socio-economics related to wildlife utilisation (including studies of economic incentives for nature conservation and the formulation of co-management plans for natural resource management). For five years (1998-2003), he was Chief Technical Advisor for the GEF/World Bank Transfrontier Conservation Areas project in Mozambique. This project was aimed at promoting trans-border ecosystem management. Dr. Munthali's qualifications include: B.Sc. (Agric), B.Sc. (Hons. Wildlife Biology), and Ph.D. (Ichthyology).

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Michael Murphree has 16 years of experience in the field of community-based natural resource management. Born in Zimbabwe and educated in Zimbabwe and the USA, he was employed by the Department of National Parks and Wildlife Management (Zimbabwe) in 1987 as an ecologist to work on the CAMPFIRE programme. He left the Department in 1994 to take up a position in Mozambique as Wildlife Policy Advisor through IUCN (Regional Office Southern Africa) where he was involved in the development of Mozambique's first community wildlife management project, Tchuma Tchato.

In 1996 he became the Executive Officer of the Southern Africa Sustainable Use Specialist Group (of IUCN) – a position held until May 2002. Mr. Murphree has worked with and on community-based natural resource management projects in southern and

west Africa. In 1999, he was invited by the Ghana Wildlife Division to assist in developing Ghana's first community wildlife management programme through the establishment of Community Resource Management Areas (CREMAs) and continues to provide periodic inputs into this programme.

As an independent consultant based at the Institute of Natural Resources in Natal, South Africa, he has been closely involved in collating, analysing and disseminating information on community-based wildlife management systems and developing new mechanisms and approaches for project implementation. Mr. Murphree is working on policy and legislative reform issues and is currently involved in developing new approaches to communicate environmental and developmental issues through theatre and exchange visit programmes.

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Dr. Jacob Mwanzia, currently the Senior Wildlife Veterinary Officer for the *Environment and Wildlife Management Section*, in the Emirate of Abu Dhabi, United Arab Emirates, is responsible for the medical care of a wide range of mammals and birds throughout the Emirate's wildlife sanctuaries. Through this position, he implements national wildlife research plans, manages staff, oversees the budget and training, and develops health protocols, in addition to acting as a liaison with the scientific community and the public. In the field, Dr. Mwanzia provides technical support during wildlife capture attempts and translocations. He graduated from the University of Nairobi in 1989 with a Bachelor's degree in Veterinary medicine (B.V.M.) and in 1992 he received his Master's degree in Veterinary Public Health (M.V.P.H.). After graduating, Dr. Mwanzia was a field veterinarian with the Kenya Wildlife Service where, over period of 6 years, he worked with a diverse cross-section of species. Other projects he is currently involved with include: health monitoring of semi-captive Arabian oryx in United Arab Emirates, disease surveillance of desert hare (*Lepus capensis*), and management and nutritional assessment of semi-captive wildlife in U.A.E. Dr. Mwanzia has a special interest in conflict resolution in wildlife management based on his experiences in Africa.

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Dr. Laurel Neme is the Senior Policy Advisor for FRAME, a program of USAID aimed at combining web-based knowledge and an expert community of practice to help decision-makers and practitioners working on environment and natural resource management (NRM) analyze issues, plan strategically and advocate their positions more effectively. FRAME, short for FRAMEwork for improved environmental decision-making, has evolved into an unusual melding of a website and resource/advisory group, designed to improved natural resource management and environmental programs and projects. Dr. Neme is an independent consultant for both public sector and non-governmental clients, including USAID, the World Bank, the World Wildlife Fund and others. Before working on FRAME, she served as an international economist with the US Treasury Department's Office of Multilateral Development Banks where she oversaw the social and environmental aspects of projects and policies at the World Bank Group and regional development banks (including the African Development Bank), and directed the actions of the US Executive Directors for those institutions. In particular, she advised the multilateral banks on both environmental impact assessment, information disclosure, institutional issues and incentives structures all designed to facilitate public participation in the design and implementation of development programs. Dr. Neme holds a Ph.D. from Princeton University's Woodrow Wilson School of Public and International Affairs.

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Dr. Jesse Njoka works as a senior lecturer at the University of Nairobi in the Department of Range Management. He has been a chairman of the East Africa Wildlife Society for 7 years. Dr. Njoka has a Ph.D. from the University of California at Berkeley in the College of Natural Resources.

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Philip Nyhus, Ph.D., is Assistant Professor and Co-Chair of the Environmental Studies Program, Department of Earth and Environment, Franklin and Marshall College. From 1999 to 2001, Dr. Nyhus was a postdoctoral research and teaching fellow funded by a National Science Foundation (NSF) Award for the Integration of Research and Education at Colby College. In his interdisciplinary research he bridges the natural and social sciences to addresses human interactions with the environment. He has studied tiger and large mammal conservation in Indonesia and China and is exploring how linkages among coupled human-natural systems can be used to improve biodiversity risk assessment to inform conservation policy at regional and global scales. Dr. Nyhus is Principle Investigator on a grant from NSF's Biocomplexity in the Environment Program (DEB 0083615), "Models and Meta-Networks for Interdisciplinary Research in Biodiversity Risk Assessment," and Co-PI on a proposal under review in the same program, "Biocomplexity and Biodiversity: An Interdisciplinary, Integrated, Multi-Model Approach to Endangered Species Risk Assessment and Education." He has collaborated on developing new models of population viability analysis, disease risk, and spatial analysis. Funding for his research has also come from, among other sources, National Fish and Wildlife Foundation, US Fish and Wildlife Service, National Security Education Program, and The Tiger Foundation (Canada).

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Steve Osofsky, D.V.M., first experienced East Africa in 1984-85 as a Harvard University Traveling Fellow, observing wildlife species in Kenya, Tanzania, and Rwanda while examining conservation challenges from a variety of perspectives including those of local people, NGOs, and governments. As a veterinarian, he has worked in a variety of domestic and international contexts, with his most recent overseas post being that of the first Wildlife Veterinary Officer for the Botswana Department of Wildlife and National Parks. Dr. Osofsky worked directly for the Government of Botswana, and was able to have an active role in hands-on wildlife management as well as policy formulation. He has also worked in the zoological community, and served as the Director of Animal Health Services at the Fossil Rim Wildlife Center in Texas. As an American Association for the Advancement of Science (AAAS) Science and Diplomacy Fellow, he served as a

Biodiversity Program Specialist at USAID and focused on: ground-truthing Integrated Conservation and Development Projects; providing technical advice on wildlife management; and working with the USFWS on the Rhino-Tiger and African Elephant Grants Programs, on CITES policy, etc.

Dr. Osofsky's program / policy interests include: park/buffer zone management and planning; linking wildlife conservation and sustainable development; conflicts at the livestock-wildlife interface (problem predator issues, disease concerns); endangered species management; linking wildlife research to management needs, as well as *in situ* and *ex situ* wildlife veterinary medicine. He is an Adjunct Assistant Professor at the University of Maryland, and also serves on eight IUCN SSC Specialist Groups. Dr. Osofsky had been with the World Wildlife Fund since 1998, serving as their Director, Field Support for species programs in Asia and Africa. In December 2002, he left WWF to join the Wildlife Conservation Society's Field Veterinary Program (FVP) as the Society's first Senior Policy Advisor for Wildlife Health. Helping the Field Veterinary Program to expand into the policy arena is an exciting challenge, one that logically builds upon the scientific and hands-on fieldwork that has long been the FVP's hallmark.

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Dr. Craig Packer graduated from Stanford University in 1972 and completed his PhD at the University of Sussex in 1977. He studied non-human primates in Gombe National Park, Tanzania, off-and-on from 1972-2000, and has headed the Serengeti lion project since 1978. Dr. Packer currently has students working on lions in Tarangire and Serengeti National Parks as well as Ngorongoro Conservation Area, Tanzania. In South Africa, he collaborates with Dr. Rob Slotow, University of Natal-Durban, and is involved in projects at Hluhluwe-Umfolozi and Pilanesberg Parks, as well as a number of private reserves. In addition to his lion work, Dr. Packer is the Principal Investigator of collaborative research projects in the Serengeti funded by the NSF program in the Ecology of Infectious Diseases and the NSF initiative on Biocomplexity.

Dr. Packer is currently Distinguished McKnight Professor in the Department of Ecology, Evolution & Behavior at the University of Minnesota. He was elected to the American Academy of Arts and Sciences earlier this year.

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After an honours degree in Wildlife Management (University of Pretoria), Dr. Banie Penzhorn joined South African National Parks where he worked as researcher in the Eastern Cape Province. During this period, he was granted study leave and obtained an M. Agric. (Wildlife Science) at Texas A&M University. He used his research on ecology and behaviour of Cape mountain zebras for a Doctorate (Pretoria). Dr. Penzhorn resigned after 8 years with SANParks to study veterinary science. He has been teaching at the Faculty of Veterinary Science, University of Pretoria, since 1981. His current research focus is protozoal diseases of wildlife and domestic animals. Dr. Penzhorn's list of publications in refereed journals stands at more than ninety. He is secretary of the Wildlife Group of the South African Veterinary Association and also the current president of the SAVA. He is also an honorary life member and past president of the Southern African Wildlife Management Association.

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Mary Phillips, D.Phil., B.Sc., received her undergraduate training in physiology at University College in London and did her doctoral work and began her subsequent academic career in the University Laboratory of Physiology, Oxford. Dr. Phillips' research was on endothelial and epithelial membrane transport, and she moved to scientific administration at the Wellcome Trust in 1989. She initially managed the Physiology and Pharmacology portfolio, but more recently became responsible for the International Biomedical programme which funds basic biomedical science in resource-constrained countries. Also recently, she assumed responsibility for the management of the Animal Health in the Developing World Initiative.

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Dr. Delphine Purves is the Project Manager for Science and Funding at the Wellcome Trust. She joined the Trust in 1999 as a Science Programme Officer in the Careers and Clinical Initiatives Department, having spent 18 months on secondment as the Executive Assistant to the Director of the Wellcome Trust. Her previous posts include the Scientific Editor of the European Journal of Cancer and various research posts in oncology, particularly neuro-oncology, neuropathology and microbiology.

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Helga Recke, M.Sc., Ph.D., obtained her first degree in horticulture at Hannover University and her Ph.D. in Soil Science/Plant Nutrition at Giessen University in Germany. She worked on fertilizer recommendations based on soil tests with a private company in Germany for 3 years before joining Suedzucker AG, the largest European sugar producer. At Suedzuker AG, she eventually became a senior advisor to the chief executive on agricultural policy during the GATT negotiations and was the German member of the group of policy experts of the European committee of sugar producers in Brussels. Since 1992, Dr. Recke coordinates the European Union funded Agriculture/Livestock Research Support Programme at the Kenya Agricultural Research Institute in Kenya, focusing on natural resource management, animal production and sustainable income generation in Kenyan ASAL (Arid and Semi-Arid Lands) as well as on organisational development.

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Dr. Chris S. Rutebarika received his Bachelor of Veterinary Medicine degree from the Makerere University, Kampala in 1979 and his Master of Science degree from the Royal Veterinary College, University of London in 1990.

He worked as a field veterinarian for ten years and he is currently in charge of disease control at the Department of Livestock Health and Entomology, where he has worked in various capacities since 1991. He is the National Coordinator of the Pan African Control of Epizootics Programme in Uganda.

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Dr. Innocent Rwego holds B.V.M. and M.Sc. degrees from Makerere University in Kampala, Uganda. His professional experience includes veterinary extension work treating domestic animals and conducting elephant crop damage assessments. Dr. Rwego currently works for the Morris Animal Foundation's Mountain Gorilla Veterinary Project as a field veterinarian. He recently completed the Envirovet 2003 Summer Institute Course in Terrestrial and Aquatic Ecosystem Health. His goal is to become a wildlife veterinary epidemiologist, examining disease transmission between wildlife, domestic animals and human communities. Dr. Rwego also wants to work to help ecosystem restorations in Africa.

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Since 1998, Dr. Wilna Vosloo has been Deputy Director of the Exotic Diseases Division (EDD) at Onderstepoort Veterinary Institute, the quarantine facility where research, diagnosis and vaccine production are focused mainly on foot and mouth disease (FMD) and African swine fever (ASF). She is the program manager and project leader of several programs and projects at the EDD, and has managed to procure outside funding from international agencies and pharmaceutical companies for various research projects at the EDD. Dr. Vosloo has spent various periods at different internationally acclaimed laboratories for scientific visits. She was appointed as Honorary Lecturer in the Department of Medical Microbiology, University of Cape Town, Medical School (1996-1999). Dr. Vosloo was appointed as Honorary Lecturer in the Department of Tropical Diseases, Faculty of Veterinary Sciences, University of Pretoria (2002 – current). She acts as supervisor for a number of honours, M.Sc. and Ph.D. students. Dr. Vosloo was awarded the Bronte Steward Research Prize for the most meritorious thesis for the degree of M.D., Ph.D. or Ch.M. in the Faculty of Health Sciences at the University of Cape Town during 1998.

Dr. Vosloo has presented more than 40 papers and posters at various international and national congresses. She has published 14 papers in international journals on FMD research, and is the author of a chapter in a book on the natural habitats of FMD. Dr. Vosloo has been invited to several national and international meetings to provide expertise on FMD and FMD control. She has been invited by the FAO on consultancies to African countries for FMD control and training. She has been invited to serve on the FMD Advisory Committee for the Directorate of Animal Health, South Africa.

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Kenneth Waithiru, B.A., B.Phil., Econ., obtained both of his degrees in economics from the University of Nairobi. He first worked in a commercial bank before joining the government of Kenya as an economist in 1993. Since then, Mr. Waithiru has worked in the National Council of Population and Development as a Population Planning Officer, in the Human Resources Social Services Department as a Senior Economist, and now works with the Ministry of Finance serving as the European Union Desk Officer coordinating, on behalf of the Government of Kenya and the EU, the following programmes among others: Tourism Trust Fund, Kenya Agricultural Research Institute, Kenya Tourism Board, Kenya Wildlife Society, The Elephant Conservation Project and the Biodiversity Conservation Programme.

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Dr. Elizabeth Wambwa is a graduate of the University of Nairobi (Bachelors of Veterinary Medicine) and a holder of a M.Sc. in Wild Animal Health from the University of London's Royal Veterinary College. She has over 10 years hands-on field experience in wildlife health management working at the Kenya Wildlife Service (KWS) and collaborating with other institutes and Veterinary Departments in the region. She is the current chairperson of the Wildlife Disease Association - Africa & Middle East Section.

Dr. Wambwa currently heads the KWS-Veterinary Unit based at its headquarters in Nairobi. KWS is the lead government corporation in Kenya that is mandated to manage and conserve wildlife. The Veterinary Unit supports the mission and goals of KWS and is responsible for ensuring healthy wildlife populations in the country, and managing human-wildlife conflict. Dr. Wambwa organises and oversees all veterinary intervention for wildlife including treatment of sick and injured wildlife, disease outbreak investigations, disease sero-surveillance and translocation of various species of wildlife, among other activities. She contributes to the development of relevant guidelines for the management of wildlife and to the formulation and implementation of research projects of importance to wildlife health. She also supervises veterinary projects undertaken by KWS veterinary officers. Dr. Wambwa has special interest and participates in fora that seek to encourage and develop community-based wildlife enterprises and utilization of wildlife to improve livelihoods.

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Chris Weaver is a Rangeland Ecologist with 26 years of experience in working with a wide range of common-property natural resources in the United States and southern Africa. Mr. Weaver's career commenced in 1976 on the arid to semi-arid rangelands of the southwestern U.S., where he was responsible for managing and undertaking a variety of resource inventories (rangeland, wildlife, water, soils, etc.), environmental impact assessments, and ranch management plans. Clients included the Bureau of Land Management, USDA Forest Service, San Carlos Indian Tribe, Tono O'dom Indian Tribe, Navajo Indian Tribe, Hopi Tribe, Mobil Oil, and numerous private landholders.

From 1982 to 1992, Mr. Weaver was based in Lesotho, southern Africa, where he initially worked as a Range/Livestock Specialist and Manager for the Land Conservation and Range Development (LCRD) Project, and thereafter, the Lesotho Agricultural Production & Support Project (LAPIS). Since 1993, Mr. Weaver has resided in Namibia, serving as the Chief of Party for the highly successful WWF Living In A Finite Environment (LIFE) Project. In this role, Mr. Weaver oversees a team of technical staff who provide support and assistance to the Namibia National CBNRM Program and communal area conservancies in their efforts to sustainably manage and benefit from their wildlife, rangeland, and tourism resources through such income-generating enterprises as trophy hunting, game production and cropping, community-based tourism, joint-venture lodge developments, and crafts production and marketing.

In addition to the above long-term assignments, Mr. Weaver has worked throughout the southern Africa region, participating in an assortment of assignments in Botswana, Malawi, Mozambique, South Africa, Zambia, and Zimbabwe, as well as Kenya in East Africa.

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Dr. Sue Welburn is a reader in molecular epidemiology based at the Centre for Tropical Veterinary Medicine, University of Edinburgh, United Kingdom. Over the past 15 years, her research work has been centered on southeast Uganda and Tanzania, focusing on the

epidemiology of human sleeping sickness and interactions at the trypanosome / tsetse fly interface. Key objectives of this research programme have been to quantify the importance of the animal reservoir of disease for human sleeping sickness and to delineate the policy implications for control options. Sleeping sickness has existed in SE Uganda for more that 100 years, but little effort or resources have been applied to controlling the principal parasite reservoir of the disease in domestic livestock or in wildlife. Control options have instead focused on controlling tsetse flies. Considering that up to 18% of cattle in SE Uganda may be infected with the human parasite whilst less than 1:1000 tsetse flies are infected, it would seem appropriate to target interventions towards controlling the animal reservoir of disease.

John Woodford

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Dr. John Woodford is a graduate of the School of Veterinary Medicine, Nairobi University (1976). After completing a year as House Physician in Large Animal Medicine at the University of Glasgow Veterinary School, he obtained membership in the Royal College of Veterinary Surgeons. In 1985, following several years as an assistant in private veterinary practice in Australia, England and Kenya, Dr. Woodford obtained a Master of Science in Tropical Veterinary Medicine from the Centre for Tropical Veterinary Medicine at Edinburgh University. Since then, Dr. Woodford has embarked upon a career as a veterinarian managing livestock development projects and programmes, focusing especially on the provision of animal health services in a wide variety of production systems and countries in sub-Saharan Africa (Ethiopia, Eritrea, Cameroon, Kenya, Tanzania, Southern Sudan and Zambia) and Central Asia (Afghanistan).

In recent years, Dr. Woodford has been closely involved in the development of management systems for the implementation of public sector reforms directed towards the improvement of livestock production and the provision of animal health services targeting sedentary small-holder and pastoralist livestock production systems. This work has focused on the development of strategies leading to the creation of partnerships between the public and private sectors and the formulation of appropriate legal frameworks which are designed to ensure that livestock keepers in remote or low input / low output production systems have access to affordable and, at the same time, adequately supervised and regulated animal health services which comply with international standards for the trade of livestock and livestock products.

Michael Woodford

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Dr. Michael Woodford graduated at the Royal Veterinary College, London, in 1946. After 20 years in rural agricultural practice in Dorset, UK, he spent four years working for the Nuffield Unit of Tropical Animal Ecology on tuberculosis in the African buffalo in the Queen Elizabeth National Park, Uganda. In 1971 he joined FAO and served for five years on the Kenya Wildlife Management Project. When that project terminated, he was posted by FAO to Afghanistan and later to Mozambique and Kenya. He retired from FAO in 1984 and since then has worked as an independent wildlife consultant for a wide variety of international agencies in 27 different countries, ranging from Greenland to the Philippines. He is a member of the Office International des Epizooties (OIE) Working Group on Wildlife Diseases and now lives in Portugal. He was the founder and first Chair of the IUCN SSC Veterinary Specialist Group.

Angela Yang

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For the past 18 years, Angela has worked with animals in captivity at the Stanley Park Zoo (Vancouver), Dallas Zoo (Texas), and Disney's Animal Kingdom (Florida). Her interests are in animal behaviour and she has worked closely with African ungulates for many years. More recently, Angela has been involved with *in situ* programs in Africa, South America and Australia. She has been traveling to Peru to organize a program called "Zookeepers Without Borders" for the Detroit Zoo. Angela graduated from the University of British Columbia with a B.Sc. in wildlife management/animal behaviour. She joined the Field Veterinary Program as the assistant coordinator in May 2003.

March 6, 2003

Dear Colleague:

It is our pleasure to invite you to participate in a unique forum being organized for ***September 14th and 15th, 2003*** within the context of the World Parks Congress:

Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface:

Implications for Wildlife, Livestock, and Human Health

Who and What- You have been selected for invitation to this important forum because of your expertise and experience at the interface between wildlife, livestock, and human health. The theme of this World Parks Congress is, quite appropriately, 'Benefits Beyond Boundaries.' The World Parks Congress itself is only held once every 10 years, and fewer than 50 international animal health and other experts have been invited to participate in this opportune working meeting focused on the wildlife/livestock interface (see invitees list attachment **4-AHEADInvitees.xls**). We hope you will join us, and help *raise the profile of your issues* in this important conservation venue. In fact, we welcome co-sponsorship by your home institution. It is our hope that by the time the Congress arrives, many of you will be co-conveners of this important meeting along with the Wildlife Conservation Society (WCS), the IUCN SSC Veterinary Specialist Group (VSG), the IUCN SSC Southern African Sustainable Use Specialist Group (SASUSG), the Pan-African Programme for the Control of Epizootics / Inter-African Bureau for Animal Resources (PACE/IBAR), and others.

Where and When-

****Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface: Implications for Wildlife, Livestock, and Human Health:*** **SEPTEMBER 14 and 15, 2003**

*Within the ***IUCN World Parks Congress*****: SEPTEMBER 8 – 17, 2003**

*Associated with Congress Stream ***"Building Broader Support for Protected Areas":*** **SEPTEMBER 11 – 15, 2003**

The IUCN World Parks Congress is being held in Durban, South Africa September 8 – 17, 2003 (attachment "**3-WorldParksProgram**" provides an overview of the agenda, with more details on the Congress itself available at www.iucn.org). The relevance of animal health to protected areas and conservation more broadly will be introduced in the open sessions of the "Building Broader Support for Protected Areas Stream" on the 12th. **To participate in the wildlife/livestock/human health forum it is essential that you arrive before the two full-day *working sessions* on Sunday September 14th and Monday September 15th.** Please see attachment **5-DraftAHEADagenda**. We of course encourage you to participate in as much of the Congress as you are able. [Please complete attachment **2-WPCNominForm.doc** and e-mail or fax it back as indicated to IUCN. They need the form to manage logistics of the meeting.**]** *We hope to be able to cover the costs of all invitees for airfares and lodging for the nights of the 13th, 14th and 15th*. More details on funding will follow, as we are still exploring options with several potential donors.

Why- For those of you familiar with the convening institutions, you know that bringing the health sciences more intimately into conservation's mainstream has been among our strongest collective goals. The Wildlife Conservation Society (WCS), lead sponsor of this forum, is the only large international nongovernmental conservation organization with a Field Veterinary Program dedicated to strengthening the links between the conservation and health sciences. WCS is now launching a collaborative initiative called **A**nimal **H**ealth for the **E**nvironment **A**nd **D**evelopment –***AHEAD***. With the World Parks Congress being held in South Africa, this seems like a perfect venue to kick it off. ***AHEAD***'s initial focus is on Southern and East Africa and its key protected areas, buffer zones, and corridors (real and proposed within the transboundary vision continuing to gain momentum regionally). We look to you to help define the most pressing animal-health related conservation and development challenges, and to also share the solutions you feel are most promising. The IUCN SSC Veterinary Specialist Group (VSG), now co-chaired by Dr. Richard Kock and Dr. William Karesh, is very interested in the nexus of conservation and animal health policy. To that end, co-sponsoring this forum is very appropriate for the VSG as we begin our first triennium together. The Pan-African Programme for the Control of Epizootics / Inter-African Bureau for Animal Resources (PACE/IBAR), representing the first *continental* epidemiology programme, focuses on unraveling the epidemiology of diseases of economic and ecological importance to livestock as well as wildlife, including but not limited to rinderpest. The IUCN SSC Southern African Sustainable Use Specialist Group (SASUSG) works to bring sound science to bear on natural resource management decisions that directly affect the livelihoods and cultures of Africa's people, as well as the future of Africa's wildlife. Acting as a catalyst for research, policy debate, information management, and action on sustainable use issues, the SASUSG has long recognized the importance of the health sciences to sound natural resources

management. As socioeconomic progress demands sustained improvements in health for humans, their domestic animals, and the environment, our institutions recognize the need to move towards a "one health" perspective- an approach that we hope will be the foundation of our discussions in Durban.

Our goal for this forum is to be catalytic. **The ideas you bring to the table remain your own.** Simply put, by raising the profile of these issues, it is our hope that the donor community will also be sensitized to the importance of the types of work we all believe are critical. As described below, this forum is meant to foster the development of concrete plans for conservation and development work at the wildlife/livestock/human health interface, and we hope to work with you to help find funding to help you get the work done. While we can of course make no guarantees at this stage, we do feel that the forum we hope you'll participate in in Durban is an excellent first step toward building a network of colleagues willing to share lessons learned and work together- to enhance prospects for conservation and development in their areas of focus for years to come. In short, we hope you'll become an active member of the ***AHEAD*** network and help shape its core conceptual underpinnings.

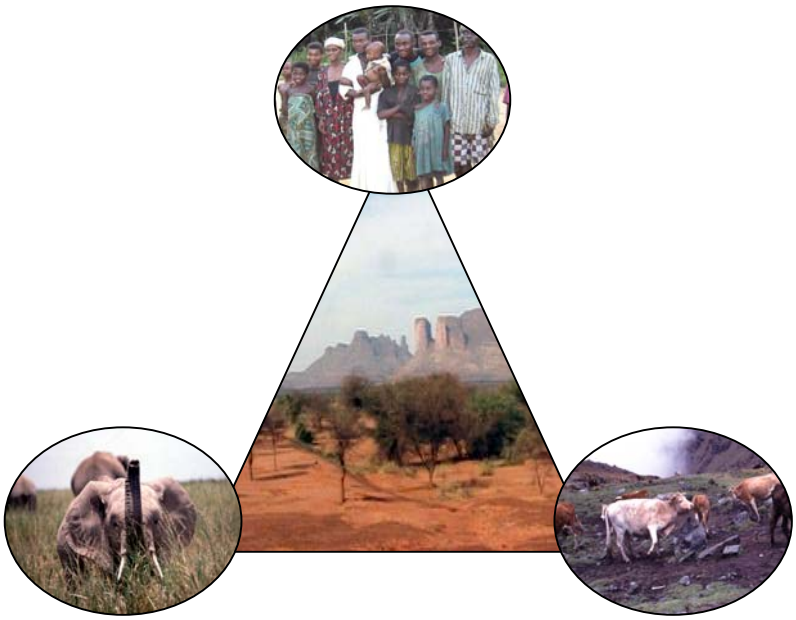
An agenda for the two-day working forum is outlined below. The symposium focuses on concrete deliverables- a plan for follow-on action, as described in the agenda. Catalyzing real world change for the better is of course very important to all of us. We think animal and related human health issues represent an unfortunately all-too-often neglected sector of critical importance to the long-term ecological and sociopolitical security of protected areas around the world. Whether we are talking about the ongoing tuberculosis crisis in and around Kruger National Park, the impacts of foot and mouth disease on land-use planning in southern Africa, or the brucellosis saga costing US authorities in and around Yellowstone National Park millions of dollars to manage, these issues merit more *proactive* attention in and around many of the world's protected areas, conservancies, buffer zones, and corridors than they have gotten to date. We hope you agree.

Please note that the draft agenda below is illustrative. Any of the topics listed are "up for grabs" if you want to address them in the paper / 15 minute talk we are asking you to consider presenting. Feel free to suggest any other topic you feel is relevant. Once we know who is planning to attend and what topics they will address, a final agenda will of course be circulated (a draft mock agenda showing time allotments is in attachment **5-DraftAHEADagenda**). *Please note that there are only 26 fifteen-minute speaking slots available* (one day of such presentations). We will try to accommodate as many proposed presentations as possible- likely on a 'first come, first served' basis. Even if you choose not to present a talk on day one of the working meeting, we still want you to join us! The Working Group Sessions on the second day of the forum (again, see agenda) are *essential* for the outcome of this meeting to be successful, and your participation in these creative, interactive sessions is needed! Please see attachment **1b-ReplyForm.doc** sent with this letter for the information we need you to send back to us ***as soon as possible*** in order to ensure a results-oriented, productive meeting. If for some reason you would like to recommend a specific colleague in your place, we are open to such suggestions as well as to suggestions of other participants we should consider (see **4-AHEADInvitees.xls** for current list of invitees). Please recognize that space is very limited, so it is unlikely many additional invitations can be extended.

We look forward to hearing from you! Again, please send back the reply sheet (**1b-ReplyForm.doc**) sent to you with this letter as soon as possible. The additional informational attachments referred to above will be sent to those invitees indicating they will attend, or to any invitees requesting additional information.

Sincerely,

Steve Osofsky- Senior Policy Advisor, Wildlife Health- WCS Field Veterinary Program
William Karesh- Head- WCS Field Veterinary Program; Co-Chair IUCN SSC VSG
Richard Kock- Technical Officer- Wildlife Epidemiology Unit PACE/IBAR; Co-Chair IUCN SSC VSG
Michael Kock- Animal Health Advisor- IUCN SSC SASUSG



PLEASE SEE NEXT PAGE.

Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface:

Implications for Wildlife, Livestock, and Human Health

Organized / sponsored by (list still under development): Wildlife Conservation Society's (WCS) (lead); IUCN SSC Veterinary Specialist Group; Pan-African Programme for the Control of Epizootics / Inter-African Bureau for Animal Resources (PACE/IBAR); IUCN SSC Southern African Sustainable Use Specialist Group (SASUSG); YOUR INSTITUTION HERE??

Activity: A two-day interactive forum at which invited Southern and East African and other experts share their vision for conservation and development success at the wildlife / livestock interface with World Parks Congress attendees and invited representatives from bilateral and multilateral development agencies and other interested parties.

Purpose: To foster a sharing of ideas among African practitioners and development professionals that will lead to concrete and creative initiatives that address conservation and development challenges related to health at the livestock/wildlife/human interface. The focus of presentations will be ongoing efforts and future needs in and around the region's flagship protected areas and conservancies and their buffer zones- the places where tensions and challenges at the livestock/wildlife interface are greatest.

Day 1- Overview of Challenges to Conservation and Development at the Livestock / Wildlife Interface:

Opening Address: Dr. Richard Kock- PACE / IBAR and IUCN SSC Veterinary Specialist Group

(Sample Possible Themes of Day 1 Invited Presentations- ***Please tell us what you what like to present on- these are just suggestions!***):

* Diseases that affect the natural resources management and livestock sectors

* Human livelihoods and healthy animals- ideas for improvements in conservation and development interventions

* Disease surveillance in wildlife, livestock and people- importance and practicalities

* Community-Based Animal Health Care- successes and failures around protected areas

* Grass-roots human health and animal health intervention strategies- are there economies of scale (and of science) in combined approaches?

* Veterinary services and the role of governments- priorities for the future

* Conservation NGOs and Development NGOs and the 'human health-livestock health-wildlife health triangle'- models for better collaboration

* Transboundary conservation landscapes and implications for domestic and wild animal movements and international management

*Animal and human trypanosomiasis: potential for expansion of tsetse fly range via transboundary protected areas

*Persistence and re-emergence of human sleeping sickness in the Serengeti-Mara ecosystem

* Persistence and re-emergence of human sleeping sickness in and around Uganda's protected areas

*Containing wild animal maintenance hosts of foot and mouth disease (FMD): implications for countries with disease-free status / those seeking disease-free status

*Virus topotypes and the role of wildlife in foot and mouth disease (FMD)

* Food-security and land-use policy: finding the right balance between wildlife and livestock in marginal semi-arid lands

*Role of disease prevention and control in poverty reduction and food security strategies- public and private sector animal health policy and implementation needs within and beyond park boundaries

*Protected areas, animal disease, and impacts on trade- balancing priorities in East and Southern Africa

* Wildlife as a land-use choice: practical and regulatory veterinary concerns for community-based as well as large-scale commercial enterprises

*Rinderpest: historical impacts and current issues for protected areas and pastoralists- strategies for control at the livestock / wildlife interface

* Options and trade-offs related to improved livestock production tempering a growing bushmeat trade

* Communications and health: the value of improved information technologies to the 'human health-livestock health-wildlife health triangle'

* What if we do nothing? 'Business as usual' and prospects for ecosystem health in protected areas and their buffer zones

Day 2- Moderated Working Groups bringing African and other experts and senior foreign assistance professionals together to outline key priorities for future work on the themes discussed on Day 1:

AM- Moderated Working Groups outline project concepts they think can practically address the challenges discussed on Day 1. Working Groups to be landscape-focused so the proposal outlines that are developed are geo-referenced to places (which include core protected areas) of conservation interest (landscapes of focus will likely depend on final representation at the meeting). The emphasis should be on projects that can and should be

developed and implemented soon. Concepts emphasizing further research must justify that the proposed research is critical to improved management practices on the ground.

AM session 1: Working Groups, arranged by country, meet to outline pilot project ideas for Botswana, Kenya, Malawi, Mozambique, Namibia, South Africa, Tanzania, Uganda, Zambia, Zimbabwe. Concepts for transboundary work to be included in these outlines. Each Working Group should focus on no more than 3-4 pilot project concepts (including transboundary endeavors) to outline.

AM session 2: plenary- Each Working Group selects a representative to explain pilot project concept(s) outlined for their region.

Working lunch- Representatives from each working group convene to delineate "measures of success"- what criteria should these conservation and development interventions be measured by? A suggested list of indicators of success relevant to goals at the livestock/wildlife interface should be outlined. This outline is to be distributed to all participants as the afternoon Working Groups get underway.

PM session 1: Working Groups Meet, this time together with any other Group relevant to identified transboundary work (thus forming larger Transboundary Groups). Transboundary project concepts are to be outlined and refined, with 'cross-border' sharing of ideas essential. Working Groups without identified transboundary needs continue to work on project concepts for their chosen landscapes.

PM session 2: plenary- Each Transboundary Working Group selects a representative to briefly explain pilot transboundary project concept(s) outlined for their region. Working Groups without identified transboundary needs select a representative to summarize key new thoughts since the AM sessions. Presenters should reference how identified or modified "measures of success" may help them monitor conservation / development results in their landscapes.

Closing Address: Dr. Steve Sanderson, Chief Executive Officer of the Wildlife Conservation Society

Follow-up: The immediate product of the meeting will be proceedings of the talks given on Day 1, and a written summary of the outlines for envisioned future work produced by Day 2's Working Groups.

Longer term, WCS will work with interested participants from the various Working Groups to help them more fully develop the outlines into full proposals for donor consideration. Obviously this will involve broader consultation within the regions of focus with a wider range of stakeholders than could be accommodated at this initial forum.

PLEASE SEE SEPARATE REPLY FORM- THANK YOU.