

## *In This Issue*

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### IN MEMORIAM

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Lee Berger, Lee Skerratt, Ian Beveridge, and David M. Spratt compose a touching and compassionate piece to commemorate the life and accomplishments of Rick Speare, a beloved colleague and friend who tragically passed away on June 5, 2016.

### ECOSYSTEM SERVICES IMPACT HUMAN HEALTH

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Changes to ecosystems can significantly impact human health. Both the social and natural sciences explore the effects of environmental change on human health, but much of this work remains disconnected. **Bayles et al.** argue that ecosystem services provide a comprehensive framework to link research efforts across scientific fields and foster a more complete understanding of the human health implications of global environmental change.

### ECOLOGY OF FUNCTIONAL DIVERSITY

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**Morris et al.** characterize whether functional diversity and changes in functional communities rather than shifts in taxonomic communities can affect generalist multi-host pathogen presence in the wild. Furthermore, they test the dilution theory and the role of host variation on a generalist emerging disease. Their results show that linking functional communities to infectious disease is a powerful avenue to exploring the ecology of many of the worlds less understood and more generalist etiological agents.

### DISEASE RISK IN SOCIOECOLOGICAL SYSTEMS

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Radical disturbance from natural disasters or socio-political upheaval, defined here as trauma, can have enduring consequences on environments and societies. Little is known about long-term outcomes of trauma including whether response efforts intended to reduce public health threats instead defer or inflate risks by influencing socioecological reassembly. **Rael et al.** call for innovative theory and tools to foster adaptive response strategies that account for coupled social and ecological dynamics.

### EDUCATING FARMERS

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Hydatidosis is a re-emerging zoonosis caused by parasitic *Echinococcus* tapeworms. **Mateus et al.** assess a vulnerable population of Portuguese sheep and goat farmers and their awareness of the disease to identify the preferred means for distributing educational information. Questionnaires were administered to 279 farmers and a coprological survey of shepherd dogs was performed using 88 fecal samples. Farmers reported several risk behaviors and little knowledge about hydatidosis. A wide diversity of potentially zoonotic parasites was found in dogs. This survey revealed the urgent need for health education and a close collaboration between veterinarian and public health professionals.

### SALMONELLA IN WILD BIRDS

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**Afema and Sischo** evaluated *Salmonella* prevalence, serovars, genotypes, and antibiotic-resistant phenotypes in resident and migratory birds utilizing human-impacted habitats in northwestern Lake Victoria and protected

habitats in Queen Elisabeth National Park. Evidence was found of distinct strains in birds and the environment suggesting some strains in birds are host-adapted and strains circulating in the environment may not necessarily disseminate to birds. Conversely, birds in both impacted and protected areas shared strains with the urban environment, suggesting *Salmonella* disseminates between impacted environments and birds across sites. Overall, more strains were observed in the urban environment posing a risk of *Salmonella* reemergence.

## HEAVY METAL EELS

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Mercury and methylmercury have dire effects on ecosystems because they can be toxic even at low concentrations. **Polak-Juszczak and Nermer** investigate the concentrations of total mercury and methylmercury in eels from different lakes in northeastern Poland as a function of specimen size and weight and to assess the potential health risks associated with eel consumption. Their results show a positive correlation between concentrations of total mercury and methylmercury in eels and their size and weight.

## SHARING WITH GORILLAS

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**Grützmacher et al.** describe outbreaks of respiratory disease in human-habituated wild western lowland gorilla (*Gorilla gorilla gorilla*) and report the first simultaneous detection of a human respiratory syncytial virus (HRSV) infection in these gorillas and in the local human population. Their findings of HRSV in wild but human-habituated gorillas underline the risk of interspecies transmission from humans to endangered great apes.

## AFRICAN SLEEPING SICKNESS

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Human African Trypanosomiasis is a constraint on human wellbeing in sub-Saharan Africa and spillover transmission occurs from the reservoir community of wild mammals. The ecological basis of disease is often neglected and the lack of baseline ecological data limits our understanding of this disease system. **Anderson et al.** outline robust methodology to generate missing data on landcover and wild mammal density that will be applicable to many remote environments. Fuzzy classification and distance

sampling techniques are applied with particular focus on the warthog (*Phacochoerus africanus*) an important reservoir host with a close ecological association with the tsetse vector (*Glossina* spp.).

## COMBATING CHAGAS

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Research on zoonotic disease transmission at human-wildlife interfaces has gained momentum in recent decades. People who dwell in rural zones within a matrix of natural habitat may be at increased risk for zoonotic disease exposure. Balancing public safety with the preservation of natural ecosystems can be challenging to rural residents. **Shender et al.** determined that woodrats (*Neotoma* spp.) on northern California rural properties were infected with *Trypanosoma cruzi*, the causative agent of Chagas disease. Woodrat microhabitat use assessment suggested that modifying the landscape adjacent to human residences could reduce disease transmission risk while maintaining peripheral woodrat populations and their ecosystem benefits. In Honduras, prevention measures face the challenge of achieving widespread and long-term sustainable adoption by communities. **Rodríguez et al.** integrate social network analysis and a gender-sensitive approach to understand how community members communicate and collaborate with each other to manage their environment and improve human health. Results from a case study highlight how social relations and gender interact to shape preventive behaviors aiming at reducing the risk of Chagas disease transmission. Adoption of preventive health behaviors were more likely when men who participated in training activities collaborated with women with a high level of knowledge of Chagas disease.

## CERRADO CDV AND PARVOVIRUS

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Wild carnivores are potentially susceptible to several viral diseases such as canine distemper virus (CDV) and parvovirus that can severely impact carnivore populations. This is especially true in the central Brazilian Cerrado where **Furtado et al.** investigated the exposure of free-ranging wild carnivores and domestic dog to these viruses. Serological tests showed that wild carnivores and domestic dogs were exposed to CDV and parvovirus. It is important to monitor the health of the carnivore populations in the region as well as conducting molecular diagnosis of the

virus to determine involvement of domestic dogs in transmission of these viruses.

## BRINGING IN THE *Bd*

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The international trade in amphibians has long been implicated as a major factor in the global spread of the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*). In this manuscript, **Wombell et al.** report on the diversity, number of animals, and presence of *Bd* in amphibian consignments arriving at Heathrow Animal Reception Centre from 2009 to 2012. They recorded 43 genera from 12 countries entering the UK and detected *Bd* in consignments from the USA and Tanzania. The overall prevalence was 3.6 %, indicating a low but persistent introduction of *Bd* through the trade in amphibians.

## BOXED IN

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Box turtles are the most common terrestrial turtle in the eastern US. Due to their natural history characteristics, they make ideal sentinels for ecosystem changes, such as habitat fragmentation, contamination, and pathogen emergence. **Lloyd et al.** describe the clinical pathology of 825 box turtles to establish a baseline characterization of wellness. Future studies can utilize these results to determine the impact ecosystem changes have on the health of a species.

## FEEDING THE PROBLEM

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Antimicrobials are known to be widely used in commercial feed rations for livestock and poultry. **Cuong et al.** conduct the first systematic survey of antimicrobials in commercial feed rations for pigs and poultry in Vietnam. High levels of antibiotics were found in pig feed. Overall, 57 % of total

antibiotic usage consisted of antimicrobials regarded as import for human medicine by WHO, including tetracycline, amoxicillin, neomycin, colistin, and bacitracin. This is a concern since antimicrobial use in animal production is expected to increase with economic development and intensification of production systems in Vietnam.

## BAD MONKEYS

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*Yersinia pseudotuberculosis* is known as an important causal agent of non-plague yersiniosis in a wide range of hosts including wildlife, livestock, companion animals, and humans. **Zhao et al.** describe an outbreak of *Y. pseudotuberculosis* serotype O:1a infection in captive rhesus monkeys in China. This report draws attention to the occurrence of this serotype in non-human primates. The relatively high fatality rate reported in this outbreak underlines its potential impact on conservation efforts of non-human primates.

## PROTECT THE SHRIMP

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Shrimp farming depends on the supply of healthy and good-quality shrimp seed. However, decapod pen-styldensovirus (PstDV1) an economically significant, often lethal, and transmissible pathogen of penaeid shrimp may infect shrimp larvae. Accidental transportation of infected larvae appears to be the causative agent of dispersal of PstDV1 into non-endemic areas. Epidemiological surveillance studies of shrimp larvae are important measures to prevent the dispersion of PstDV1. **Mendoza-Cano et al.** demonstrate a high overall prevalence (49.5 %) and persistence of PstDV1 in post-larval stage shrimp in 19 Mexican hatcheries, which has implications for shrimp farming and also for wild shrimp and crustacean populations.