

Veterinary Wildlife Services' research highlights

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Mathew Mutinda records data for his PhD project in rhinoceros anaesthesia; more efficient and safer protocols for the chemical immobilisation of animals are developed as part of the day to day operations of SANParks' Veterinary Wildlife Services.



Veterinarians, veterinary technicians, and the capture teams keep busy immobilising animals to remove snares, relocate individuals, treat wounds, rescue orphans and dehorn rhinoceros. When an animal is immobilised, it is an opportunity to collect biological samples that are stored in the Veterinary Wildlife

Services (VWS) Biobank, which provides a unique and valuable resource for research. In addition, the VWS team is actively involved in field studies, investigating disease epidemiology, physiological effects of different immobilisation drugs, development of diagnostic tests, as well as establishing blood reference

values for different species (which are test values based on results seen in healthy animals), along with collaborators from South African and international universities and research institutes. This research is crucial in providing information about the health of free-ranging wildlife which serves as a foundation to

THE FUNCTION OF VETERINARY WILDLIFE SERVICES WITHIN SANPARKS RANGES FROM HANDS-ON TREATMENT OF ANIMALS TO BEING INVOLVED IN FIELD STUDIES, THAT SPAN DISEASE EPIDEMIOLOGY, IMMOBILISATION DRUGS, DEVELOPMENT OF DIAGNOSTIC TESTS, AND ESTABLISHING BLOOD REFERENCE VALUES FOR WILDLIFE

improve methods for capture, as well as understand how diseases exist in complex ecosystems.

Infectious diseases are a major focus since they affect wildlife health as well as create threats to livestock and agricultural trade. Many of the endemic diseases in Kruger NP are "controlled diseases", which are regulated by the Department of Agriculture, Land Reform and Rural Development (DALRRD). This results in restrictions in movement of susceptible species from KNP. Since buffaloes are maintenance hosts for several important diseases (foot-and-mouth, bovine tuberculosis, brucellosis), they are intensely studied. Research highlights from 2021/2022 include a publication in the journal *Science* entitled "Endemic persistence of a highly contagious pathogen: foot-and-mouth disease in its wildlife host". This collaborative project between researchers from VWS, Oregon State University (USA), The Pirbright Institute (UK), University College London (UK), Onderstepoort Veterinary Institute, and Skukuza State Veterinarians, described the mechanism by which a highly contagious virus can persist in a population (Jolles et al. 2021). The



Top: Ashleigh Donaldson monitors a lion for her PhD research project on novel anaesthetic protocols.

Bottom: Thembeke Mtetwa, PhD student, analyses rhinoceros blood for oxygen content.

pioneering work showed that the presence of persistently infected carrier buffalos were important in keeping the disease from “burning out” in the population, which leads to an ongoing risk of spill-over into livestock bordering the park.

Another infectious disease that is endemic in Kruger’s wildlife is bovine tuberculosis, caused by infection with *Mycobacterium bovis*. Investigations have shown that these bacteria can infect a wide variety of domestic and wild animal species, as well as humans. Although infection in the Kruger buffalo and lion populations have been known since the 1990’s, cases continue to be added to the current list of more than 15 affected species. In 2021, a publication in Emerging Infectious Diseases by The Animal TB Research Group from Stellenbosch University, in partnership with VWS and state veterinary staff, described the discovery of infection in two young bull elephants (Miller et al. 2021). The significance of this finding is that elephants and other species that share a habitat with *Mycobacterium bovis* maintenance hosts, such as African buffaloes, may be at risk of becoming infected. Opportunistic surveillance also led to the finding of the first case of bovine TB in a wild hippopotamus from the Greater Kruger (Kerr et al. 2021).

Understanding how diseases are transmitted is a key to developing control strategies. It is hypothesised that KNP predators, such as lions and African wild dogs, become infected by eating prey with bovine TB; however, there has been little evidence to determine if they can spread it within a pride or pack. In 2021, researchers from the Animal TB Research Group were able to show that *Mycobacterium bovis* can be

found in the respiratory secretions of wild dogs (Meiring et al. 2021). The significance is that translocation of infected individuals could present a threat of disease introduction to new populations.

To study the impact of diseases on individual and population health, there is a need to develop accurate rapid methods of identifying infected animals. This has been at the forefront of research collaborations between VWS and Stellenbosch University researchers. Advances in blood-based diagnostic tests, like those used for human TB, have included an optimised assay that can detect infection in lions, leopards, and cheetahs, which will facilitate epidemiological studies in these species. Ongoing surveillance for bovine TB in KNP rhinoceros and elephants also rely on tools being developed as part of these collaborations and will create a foundation for assessing the long-term effect on these populations.

A cornerstone of VWS research is evaluating novel approaches to

improve techniques for the safe immobilisation of wildlife. In 2021, two large field projects were successfully implemented, including one that aims to evaluate the efficacy and safety of ketamine-medetomidine and ketamine-butorphanol-medetomidine for the immobilisation of lions, and the second that evaluates the effects of different drug combinations used to chemically capture white rhinoceros (*Ceratotherium simum*). Both projects will result in PhD degrees for students registered with the University of Pretoria Faculty of Veterinary Sciences. VWS staff co-supervise these students, whose studies were made possible by the availability of animals, laboratories, and experienced veterinary staff to support the research.

SANParks' continued investment attracts new and ongoing research collaborations with South African and international institutions. These will ultimately translate to improved protocols of working with wildlife as well as greatly increasing understanding of wildlife disease.

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