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5.2.8 Non-invasive assessment of ovarian activity in free-ranging eastern black rhinoceros (*Diceros bicornis michaeli*) in Kenya

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Abstract

Eastern black rhinos (*Diceros bicornis michaeli*) are a critically endangered species living in diverse habitats across Africa. In Kenya, once threatened with extinction due to massive poaching pressures, increased protection has resulted in losses being less than 1% annually today. Still, some populations have failed to achieve desired population growth targets. At OI Jogi Wildlife Conservancy, some individuals are experiencing sub-optimal reproduction based on historical calving records and long inter-calving intervals (>3 years). Hormones drive the reproductive process, so non-invasive assessments of endocrine patterns can be useful indicators of individual reproductive health. In this study, we analysed longitudinal fecal progesterone metabolite (fPM) concentrations in all breeding female eastern black rhinos at OI Jogi (n = 17) and compared the prevalence of irregular estrous cycles (longer or shorter than 20–40 days) and anestrus periods (interluteal period

more than twice the length of a normal follicular phase, i.e. > 10 days) between optimal (inter-calving interval < 3 years) and sub-optimal (>3 years) reproducing individuals. Ten rhinos were pregnant during at least part of the study period. A total of 12 complete cycles were observed in seven females with an average length of 36 ± 3 days and equal numbers of regular and irregular cycles. Single anestrus periods averaging 67 ± 13 days were observed in five females. Surprisingly, a majority of cycles in optimal reproducing individuals were categorized as irregular based on fPM profiles. Overall, results suggest that irregular ovarian activity and isolated bouts of anestrus do not have negative impacts on reproductive performance in this subpopulation at OI Jogi. A high priority is to continue using noninvasive hormone monitoring to evaluate how ecological or other variables influence reproductive success in this and other eastern black rhino subpopulations in Kenya.

Keywords: Eastern black rhinoceros, hormone monitoring, ovarian activity, progesterone metabolites, reproductive performance

5.2.9 Assessment of Heavy Metal Contaminants in Nkenye Stream in Meru South-Kenya

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Abstract

Heavy metals are metals with high densities and atomic weights or atomic numbers. Heavy metal contamination can be observed in soil, water (rivers), air (atmosphere), etc. Heavy metal contamination in surface water may pose a health risk and can be very harmful if present in drinking water and in consumed

food. Contamination of stream water can be detrimental to hydrophytes, animals as well as human beings. A significant number of serious animal and human health problems have been reported to have occurred among people who depend on contaminated water sources. Nkenye stream which is

located in Chuka Tharaka Nithi County is not an exception. Metals that exist in Nkenye stream are in colloidal, particulate, and dissolved phases. Nkenye stream is a critical resource for the local inhabitants yet little attention has been accorded to its water quality. Studies on major rivers such as the Tana River have been conducted to determine water flow and volumes. This study therefore analyzed water samples drawn from Nkenye stream in order to determine the relationship between water quality and wildlife health. Samples were collected at designated locations based on several criteria using ecological surveys. Samples were analyzed in Chuka University laboratory. Macrophyte roots were cleaned and dried then powdered and digested using nitric acid. The sediment was dried, ground to

pass a 2 mm non-metal sieve, digested samples were diluted and analyzed using atomic absorption spectrometry model PG990. The concentration of anions was determined by ion chromatography. The statistical analyses were done using a general linear model (GLM) in the Statistical Analysis System (SAS) version 9.4 and differences in means tested for significance using the Least significance difference (LSD) test with, $\alpha = 0.05$. The results showed that the Nkenye stream is definitely polluted with iron, copper and lead. This highlights the critical and urgent need for the Tharaka Nithi county government to seriously consider providing sustainable waste management disposal systems to minimize river water pollution and its deleterious effects on human, animal and ecosystem health.

Keywords: Animal health, contaminants, heavy metals, pollutants, water quality,

5.2.10 A One Health approach to engaging communities better in long term African elephants (*Loxodonta africana*) conservation in Sagalla, Kenya

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Abstract

Human wildlife conflict often creates negative attitudes and perceptions towards elephants and conservation players in local communities living with wildlife or near protected areas. Our work highlights the benefits of community engagement and accountability in identifying and addressing causes of conflict and discontentment, tackling hidden costs and vulnerabilities that are typically not factored in human wildlife conflict management strategies, with a One Health approach. By providing timely, relevant and actionable information and services based on community questions and concerns, and mainstreaming conservation actions across all sectors of society, we are able to capture attitudes and perceptions on wildlife that can hinder conservation progress. We present a holistic and comprehensive approach that considers the needs

and perspectives of all stakeholders. This approach enhances cost-effective information sharing forums, facilitating cross messaging to dispel myths and misconceptions. It encourages innovative ideas that both efficiently and humanely mitigate human elephant conflicts, along with other underlying health problems. Additionally, it involves behavior change communication strategies to address the major cause of people's opposition to conservation, aiming to minimize the undue burden on marginalized people. We explain how the multidisciplinary approach has broadened the conversation, engaging more people to address confounding factors. Through coordinated interventions, we find that individuals become more open and willing to listen and learn about conservation priorities once their personal health and wellbeing needs are met.

Keywords: Human-wildlife conflict, community engagement and accountability, One Health, cross messaging, behavior change communicatio