EXPLORING HOW MINERAL PROVISION ACTS AS A DRIVER FOR AFRICAN ELEPHANT MOVEMENT (*LOXODONTA AFRICANA*), AND CONSIDERING HOW THIS COULD BE USED TO REDUCE HUMAN-ELEPHANT CONFLICT (HEC)

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Abstract

African Elephant incursion into the Phalaborwa mine, South Africa has resulted in human-elephant conflict (HEC), elephant and human injury and income loss. It is proposed that free-living elephants are attracted to the region surrounding the mine due to the unique mineral provision resulting from the geochemistry of the soil (and plants) in the area. Initial soil analysis data supports the hypothesis that the soil (and plants) within the mining area is higher in minerals such as phosphorus than the soil outside of the mining area. Due to an increasing human population and global intensification of agriculture, African elephants' face increased contact and conflict with humans. Habitat reduction and fragmentation have forced elephants into increasingly smaller geographical areas, often restricted by fencing or encroaching anthropogenic activities. This causes increased pressures on these areas to meet the animals' resource needs, presents nutritional challenges to elephants and forces elephants to adapt their movement patterns to meet their needs for specific minerals, potentially bringing them into conflict with humans.

During the first phase of this project, methods were validated by measuring mineral levels in biological samples (plasma, toenails, tail hair, urine and faeces) from UK zoo elephants alongside soil, food, and water consumed. Advanced inductively coupled mass spectrometry (ICP-MS) was used to determine mineral concentrations in the samples and identify the optimum biomarkers for mineral status in elephants.

The second phase of this project (in progress) applies these validated methods to samples collected from elephants living around the mine to determine if soil and plant mineral levels from the local environmental geochemistry influenced the elephants' movements. The results from this study will aid in understanding drivers for specific elephant movement. This

information could be used to reduce HEC around the mine and applied to other similar conflict situations internationally. This work combines environmental geochemistry, wildlife nutrition and health, and human-wildlife conflict, and it demonstrates how samples from captive animals can assist with research to benefit their free-living counterparts.