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*Can the Vulnerable Humboldt Penguin be Saved? Deciphering Heavy Metal Offloading*

The Humboldt penguin is a Vulnerable species (IUCN) that undergoes annual population declines of 10% or more, attributable to anthropogenic activities occurring throughout the species' range of Peru and Chile. Due to recent mining expansions near the largest Peruvian rookery, located at the Punta San Juan (PSJ) Reserve, the exposure of breeding birds to high concentrations of heavy metals (e.g., mercury, lead, arsenic, copper) is of preeminent concern, since chronic exposure can cause severe detriment, including endocrine dysfunction, neurological disruption, and immunohematological complications. In a previous study, we identified heavy metal contaminants in the egg components (yolk, albumen, and eggshell) of managed care Humboldt penguins. The egg yolk had significantly higher heavy metal contaminant concentrations; this is critically important because a chick's development is reliant on yolk for survival. Now, this proposal seeks to provide a comprehensive assessment of heavy metal offloading pathways through the analysis of prey (i.e., contaminant source), and penguin blood, egg components (yolk, albumen, and eggshell), feathers, and excreta from birds under managed care at the Brookfield Zoo. Since it is not advisable to collect whole, viable eggs from declining wild penguin populations, the managed care penguin data will allow us to identify concentration relationships among sample types (e.g., blood and egg yolk) and model heavy metal concentrations in wild eggs. Sound cohesive strategies for conservation of wild penguins rely on evaluations of population health and assessment of toxicant impacts, and the present study will significantly contribute to management initiatives in place for this species.