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Integrative Conservation Research Brief
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Understanding how to conserve Grevy's zebra on lands shared with people

By Sara Heisel

Grevy's zebra are one of Africa's most threatened large mammals. Populations have declined by 85% in the last 40 years, leaving only about 2,500 individuals worldwide. Ninety percent of those animals live in a small region of north-central Kenya experiencing rapid environmental change. Zebra persistence may be threatened by a growing human population, and the impacts of the livestock humans depend upon for survival.

My research uses methods from biological science to investigate the impacts of a changing environment on Grevy's zebra at a physiological level. I also use social science methods to assess local perception and valuation of wildlife.

The goals of the project are (1) to understand what aspects of environmental change are most harmful to Grevy's zebra and (2) to find ways to limit those changes in a way that minimizes negative impacts on the human-livestock system in the area.

As recently as 1970 an estimated 15,000 Grevy's zebra (*Equus grevyi*) were spread across 5 countries in the Horn of Africa. Today, due in part to pressures from an increasing human footprint, Grevy's zebra are only found in north-central Kenya and small pockets of Ethiopia.

Within the Grevy's zebra range in Kenya, livestock husbandry is the main economic activity and is the basis for subsistence. The area is comprised of commercial ranches, and traditional pastoral communities where herders move across the landscape with their livestock in search of grazing areas and water.

As the region where the core population of Grevy's zebra is found undergoes increasing levels of environmental change, understanding how differences in human land use will influence zebra health is critical for conservation of the species.

Significance

- Only 2,500 Grevy's zebra remain
- 90% live in north-central Kenya
- Less than 1% of habitat is officially protected for wildlife
- Grevy's zebra primarily exist on lands shared with humans
- Different ways people utilize the land – different land-use types – can have varying effects on zebra health
- My research aims to uncover how environmental context – such as density of livestock and human settlements – impact zebra
- I will then try to use this information to enhance existing conservation initiatives.

Measuring the response of wildlife to different environments

Stress hormones (cortisol) can be used to assess how much stress an animal experiences in its environment. Persistently elevated levels of stress hormone are harmful to animals, because they can suppress immunity and reproduction – so that individual animals get sick more easily, and population numbers may not increase in stressful environments.

Counting the number of parasites per animal can tell us how healthy animals are in a certain environment. Because elevated stress hormones reduce immunity, we might expect that in stressful environments, Grevy's zebra will have more parasites as well as elevated levels of cortisol.

Preliminary results and determining what aspects of the environment cause stress

Preliminary results show that Grevy's zebra in non-protected areas (areas with higher livestock densities), have more parasites than animals in areas protected for wildlife (no livestock). Stress hormone levels are currently being assessed. Once we have both measurements, we will determine particular environmental characteristics that are correlated with high parasite counts and elevated levels of stress hormones.

Determining perceptions of local populations to endangered wildlife species

Wildlife conservation initiatives, guided by threat classification systems such as the IUCN red list, often focus their work on rare species with a high risk of extinction. These threat classifications are largely produced by international organizations that may be geographically and culturally distant from the area of implementation.

Local people, who are critical to the success of conservation programs, may have different perceptions of wildlife in their region, and this disconnect between local communities and conservation organizations has been implicated as a factor in conservation success. Thus, to improve conservation initiatives, it is imperative to understand local human-wildlife relationships and the level of awareness surrounding endangered wildlife. I conducted one-on-one interviews with members of communities in Samburu, a northern region of Kenya which harbors 51 species of large and mid-sized mammals, many of which are threatened, in order to assess local perceptions of wildlife abundance and diversity, extinction threats, and why people believe wildlife should be valued. The results indicate that people are more likely to care about a species if it is rare, however, generally lack awareness about the rarity of Samburu's wildlife. Almost all participants indicated that wildlife abundance and diversity have decreased over their lifetime; however, the majority of interviewees felt that extinction is not possible. This view was largely attributed to the protection of local wildlife by recently established community-led conservancies. We will use these results to understand how conservation narratives in the region can be improved.

Examples of how areas within the Grevy's zebra core range vary in quality and availability of forage - potentially representing different levels of environmental stress.

Sara E. Heisel is a PhD candidate in the Odum School of Ecology & Integrative Conservation program. Her primary interest is understanding how to preserve fragile wildlife species on lands shared with humans.

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The Integrative Conservation PhD Program (ICON) trains agile scientists to address 21st century socio-ecological challenges. ICON is currently a degree option in the Department of Anthropology, Department of Geography, Odum School of Ecology, and Warnell School of Forestry & Natural Resources.