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Northern White Rhino Lament

Synopsis: The photo of a 'dejected' looking Sudan (last male Northern white rhino) and his subsequent death, made the extinction of a species a reality for many. The loss of any species is a worry to ecologists since each organism has a part to play in the food web of the habitat in which it lives. However, some species are key to that habitat and their loss could affect the stability of the whole ecosystem. The prose below highlights the importance of the rhino within its natural environment.

Each year on one of my undergraduate courses, I ask my students to choose a species at risk for a case study paper they will write; the paper will cover the threats and mitigation in place to protect and attempt to reverse the decline of the species. Every year the same species crop up – sea otter, turtles, kakapo, and so on. One year however a student selected a species which for the first time I had to say: 'There is no future for that species, you will have to choose another'. The student had chosen the Northern White Rhino.

In March 2018 it was announced that the last male Northern White Rhino, had died leaving only two females who have struggled to breed. The last photos of Sudan brought home to many what the threat of extinction looks like. All species have developed and evolved to play a part in its ecosystem; some have key roles and when they disappear the whole food web can collapse. These keystone species are essential to the resistance and resilience of the environment when facing ecological stress, whether natural or anthropogenic.

The rhino is the third largest African animal, after the elephant and the hippo. The Northern White Rhino can grow to be a two-tonne specimen, and the population reached 2000 individuals in the 1960s. The stark reality is that almost sixty years later (and at an average loss of 40 animals per year) there are now only two remaining: Najin is in her late twenties and is the mother of Fatu, seventeen. Neither females have been found to be capable of breeding naturally.

This species (*Ceratotherium simum cottoni*) once roamed huge swathes of central Africa; from southern Chad, through southwest Sudan, northwest Uganda, northern Democratic Republic of the Congo, to the Central African Republic. Today, the remaining two live in the Ol Pejeta Conservancy in Kenya with round-the-clock armed guard protection – this is far away from their natural territory.

Humans have caused the decline: the hunters, the poachers, and wars. This large charismatic animal prefers to stand their ground when threatened, to face the threat, and to give the impression of power and confidence. It's all an act – their sight is poor – and standing still, trying to intimidate the threat, makes them a perfect target for any weapon.

A rhino's horn can attract a payment of many thousands of US dollars – a significant amount of money for an indigenous family that could be the difference between life and death. As my students write in the case study papers about other species at risk: surely it is better to demonstrate to these local people how they can benefit from the animal being alive - through tourism, being involved in protecting them, and through the ecological services the rhino provides to the savannah biome?

Nevertheless, the tragedy of the situation with the Northern White Rhino is that it is so much more than the simple loss of this species – it's the loss of their niche (their 'profession' within

the habitat), their ecosystem engineering (changing the environment to benefit themselves and others), as well as their charisma (they are indeed a charismatic species hence the reason for my student selecting it). This animal is a keystone species on the African savannah due to its allogenic engineering of the ecosystem; changing the environment by their own activities and transforming materials from one state to another. Consequently, I use rhinos as a case study on my ecology course to illustrate the importance of these megafauna in the ecosystem.

Most of the grasses found on these vast areas are poor in nitrogen – only the sweet grasses have relatively higher levels of this nutrient. When available, herbivores will consume as much of the sweet grass as they can; ruminant species can obtain even more nitrogen from their food through the process of chewing the cud. Without rhinos, these sweet grasses will probably decline. This is because, to obtain enough nitrogen to sustain themselves, rhinos will consume large quantities of grass – this inevitably results in large amounts of dung! This nutritious dung is the key component in the allogenic ecosystem engineering role of the rhino since sweetgrass proliferates near these piles of dung. Consequently, as the area becomes rich in sweet grass the other herbivores benefit.

This role is an ecosystem service. How do you put a value on this provisioning role to make humans understand its importance? The rhino provides food, raw materials, genetic resources, while contributing to the supporting services such as nutrient recycling. The last poignant photograph of Sudan doesn't just show the world a picture of extinction, it also shows a world where our own human life support systems are slowly being eroded away by our actions.

My student subsequently chose another species instead, the outlook for which is a whole lot more promising than their first choice. Nevertheless, their selection of the Northern White Rhino, although distressing, enabled our class to have a frank discussion about the effects of the loss of species when we considered rhinos as a case study later in the course.

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