# Hyperkeystone Species

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## ABSTRACT

There are species, keystone species, and umbrella species. There are also hyperkeystone species. In nature things are seldom what they may appear to be. Such things as ants, termites, mosquitos, and a vast number of microbial and fungal species are much more critical to the natural world. We humans have now elevated ourselves to the status of hyperkeystone species, where our global dysfunctions now perilously outweigh our functions.

Many people have heard something about keystone species, typically about how a few underestimated species can shape the dynamics of their local community. However, the few well known examples display only part of what it means to be a keystone, or umbrella, species – or even a hyperkeystone species.

We are now inside the *sixth mass extinction*, where about one species every five minutes forever perishes outside our everyday consciousness – and this vanishing rate is accelerating. As we humans pretend to manage the future of our global ecosphere, it is critical to learn how different species interrelate, and what it means to forever lose a unique member of Earth's web of life.

Since this massive sixth global extinction is almost entirely the result of all humans selfishly and blindly "doing their thing," it is important to place our biosphere's only global hyperkeystone species into its proper ecological perspective.

# Keystone and Umbrella Species

Even though actual **keystone species** have been around for hundreds of millions of years, it was only in the 1960s that an ecologist discovered and described the keystone role that one keystone species can play, and thereby named it as such. Robert T. Paine examined a stretch of tidal wetlands in Washington State. He removed a species of starfish, and was astonished to see the domino effects. That local ecosystem transformed as former prey species exploded, in turn transforming the aquatic neighborhood.

Whereas most species across the global biosphere simply interact with their local network, a few species can disrupt their local biodiversity out of proportion to their own biomass. A local keystone species may never be a keystone species within other local ranges. Here are just four well-documented examples:[1]

- *African elephants* have been called the engineers of the African savanna. They push down trees, eat bushes and grasses, even create paths – essentially opening space for many other types of herbivores, which in turn feed diverse meat eaters.

- *Sharks* of all types regulate their feeding zones. Large sharks eat small sharks, allowing more prey the small sharks prefer. Likewise, when large shark populations are overfished, small sharks proliferate, eating types of prey the large sharks avoid.

- *Parrot fish* are the janitors of coral reefs. They eat algae that can destroy reefs, indirectly supporting many other species.

[1] https://greentumble.com/12-examples-of-keystone-species/

- *African termites* build skyscraper-like mounds which directly and indirectly support many plant and animal species.

**Umbrella species** such as caribou are in some ways similar to keystone species:

> "Umbrella species … indirectly protect many other species in the ecosystem. Hence, umbrella species can be used to make conservation-related decisions. These species have larger habitat needs and other requirements. Furthermore, when umbrella species are conserved, it will result in the conservation of many other species. Hence, monitoring umbrella species and conserving or protecting them will result in a high quality habitat for the other species in that ecosystem."[2]

# Hyperkeystone Species

For millions of years there were few if any hyperkeystone species. Now the sixth great mass extinction will soon consume millions of entire plant and animal species, and likely our own. Climate has been unwittingly accelerated toward multiple tipping points by this blue planet's only global hyperkeystone species, *Homo sapiens*, a truly ironic scientific name.

There is precious little *sapiens* within us to justify our claimed superiority over other doomed members of our *Homo* genus. We must mention all the other highly intelligent and innocent species that will soon be challenged directly or indirectly by our myopic industrialism and rampant overpopulation.

How did modern humans so quickly build this planetary-level ecological Death Star? We must look at the critical differences between what is just "keystone" and what is "hyperkeystone."

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[2] https://www.differencebetween.com/difference-between-umbrella-species-and-keystone-species/

Whereas keystone typically refers to a web of local influence, *hyperkeystone refers to a large web of webs.* Our global climate changes will silently damage multiple webs as we eliminate in a falling-dominos fashion multiple keystone species. Only human industrialism supporting unchecked Malthusian population growth could extend our lethal "progress" so quickly to the planetary biospheric level – and still we hardly understand the permanent consequences of our individual and daily selfish actions.

The early science of Robert Paine had one flaw. His essays blindly assumed that we humans were outside the ecological webs he examined. In the 1960s scientists still unconsciously accepted that humans were somehow separate from the "lesser" species. The very day he died in 2016, at age 83 from cancer, he published a paper introducing humans as hyperkeystones. The *keystone of keystones* concept properly places human activities inside the central vortex of it all, not somewhere outside.[3]

The question remains: Is our success at influencing influencers globally a glory, or a curse? It is as if we have unleashed a curse, similar to starting a forest fire in dry timber while we are walking in the middle of that forest. Such scenarios seldom end well.

I will end this "cheerful" essay with a brief mention of the current COVID-19 pandemic:

The viral pandemic we are enduring in 2020 and beyond is with us thanks to wildlife trade. Chinese military did not need to cook up the diabolical formula for that human-infecting virus in their germ warfare lab in Wuhan. Most of the gene formula was already there in bats. It's also crazy to imagine that scientists would ever invent weapons that can destroy all humans and most other life on Earth, pushing back evolution for millions of years. Yes, and thousands of nuclear weapons don't exist.

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[3] https://www.theatlantic.com/science/archive/2016/06/humans-the-hyperkeystone-species/487985/

Oceans of irony aside, it is proper to say that our contribution was allowing natural assembly in wet markets of already present coronavirus strains in bats, as mediated by host pangolins. We brought them all together from wildlife trade that still flourishes to support superstitious appetites. After the necessary genes were naturally shuffled, the killer virus emerged to infect us all by simply crossing the so-called species barrier.

Something like this happened in 1918 when, most likely, pigs in Kansas served as another mixer bowl for that horrible H1N1 influenza pandemic. No devils were needed, as Nature easily accommodates devils and angels, and the clueless.

Human self-implosion spans all areas of arrogance. The major question we face, now that one-way devastation is accelerating, is will we learn enough, soon enough, to make a real difference? Otherwise, the story of humans on this garden planet will become just another brief episode.

It is so ironic that only two percent of all species that have ever lived are alive today; most of these we have never simply identified. We moderns are blissfully and ignorantly accelerating the destruction of our amazing biosphere, ourselves included.[4]

[4] https://www.pnas.org/content/early/2020/05/27/1922686117