

EDGE species: ambassadors for biodiversity and the tree of life

Our global biodiversity is in crisis, with a million species at risk of extinction¹. We need biodiversity for a healthy and liveable planet, for human well-being now and in the future. But, our current approaches to biodiversity conservation are limited – we typically focus on a small number of unrepresentative species², often because they are perceived as more appealing³; and with an increasing emphasis on ecosystems rather than biodiversity. There are a host of little-known, overlooked, and threatened species that represent major unique contributions to our planet's evolutionary heritage – the rich diversity of life that is a storehouse of potential benefits for future generations. These are Evolutionarily Distinct and Globally Endangered (EDGE) species and this is a call to action for their conservation.

Box 1: Evolutionarily Distinct and Globally Endangered species: these weird and wonderful organisms have few or no close relatives, and they are all at risk of extinction. Their uniqueness means that the loss of one EDGE species can mean the loss of an entire branch of the tree of life. They are an irreplaceable part of the world's evolutionary heritage; if they disappear, there will be nothing like them left on the planet. Many of these species possess extraordinary looks, behaviours and traits not seen in any other species; yet the majority are little-known and receiving insufficient conservation attention. The scientific protocol⁴ identifying EDGE species was founded and is led by the Zoological Society of London's EDGE of Existence programme⁵. Lists of priority EDGE species are updated annually, and used to develop locally-led conservation action. These lists are publicly available and currently exist for mammals, birds, amphibians, reptiles, sharks and rays, corals and gymnosperms⁶.

Conserving the tree of life

Biodiversity means the variety of life on earth, in all its forms, and the tree of life represents the evolutionary relationships between all life on earth. Yet, existing conservation action is insufficient to safeguard so many threatened species. Protecting EDGE species provides a unique opportunity to more effectively conserve the breadth of global biodiversity. EDGE species lists are a ready-made biodiversity prioritisation scheme which can be used to help direct limited resources⁷, identifying approximately 10% of species that represent much of the threatened evolutionary heritage present in each assessed taxonomic group.

EDGE priority lists include not only these little-known species, but also unique better-known species such as the panda, elephants, and koalas, demonstrating the complementarity of this prioritisation approach to existing conservation efforts.

Overlooked and under threat

All EDGE species are threatened with extinction, with 25% being Critically Endangered⁸. Yet nine out of ten priority EDGE species are today receiving insufficient conservation attention⁹, typically because relatively few better-known species have captured most attention. Overlooked by conservationists and the public, these species and their unique evolutionary heritage are at risk of being lost forever.

Value to humanity

EDGE species are highly distinctive, meaning they have many unique evolutionary features – some of which are yet to be discovered. As recognised by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services¹, the planet's evolutionary heritage is a form of biodiversity that ensures options for future generations. The tree of life is a storehouse of potential benefits for humanity, and EDGE species make significant unique contributions to this variety of life and its promise of future benefits. One example is discovery of regenerative healing abilities in *Ambystoma* salamanders, several of which are EDGE species such as the Lake Lerna salamander. The critical value of EDGE species in maintaining these benefits to society complements our fundamental appreciation of the existence value of these unique species.

Campaigning for weird and wonderful EDGE species

In our public campaign, we've showcased a small selection of weird and wonderful EDGE species, exploring how our innate preference for charismatic animals results in so many less attractive species being overlooked by us all - the public, conservationists, scientists and policy-makers. This bias in conservation choices results in inequitable treatment of species and the interests of future generations, which parallels wider societal issues around diversity, equity and justice¹⁰.

Policy Action

We call for the UK Government, MPs and the UK delegation to the CBD COP15 to raise and support the conservation of EDGE species as an underutilised approach for tackling the loss of the full diversity of life on our planet, making them ambassadors for overlooked, threatened biodiversity.

On the EDGE Conservation is a charitable foundation that seeks to promote and protect Evolutionarily Distinct and Globally Endangered (EDGE) species, as a key mechanism for addressing the biodiversity crisis. Find out more at www.ontheedge.org and for more information please contact nishaowen@ontheedge.org

Box 2: The Science: Based on decades of scientific research, prioritising EDGE species in conservation efforts is a practical way to conserve *phylogenetic diversity*¹¹. Phylogenetic diversity (PD) measures the evolutionary history captured by a set of species on the tree of life, describing a fundamental aspect of biodiversity. By conserving PD, we conserve feature diversity and future options for humanity. Current extinction rates imply unprecedented losses of billions of years of evolutionary history¹² across numerous taxonomic groups. We need to incorporate PD in both species-focused and spatial conservation strategies. One way to effectively do this is by conserving EDGE species as a complementary conservation approach.

- PD is recognised by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) as part of Nature's Contributions to People, as an indicator for medicinal, biochemical and genetic resources (NCP 14) and the maintenance of options (NCP 18)¹³; and phylogenetic variation is included in their definition of biodiversity.

- IUCN's resolution 19 (2012) on halting the loss of evolutionarily distinct lineages, recognised that many distinct branches of the tree of life are irreplaceable, at significant risk of extinction, and overlooked by conservation efforts.

- The new IUCN SSC Phylogenetic Diversity Task Force (PDTF) is the global expert group on this subject, aiming to produce policy submissions, guidance documents, and creating a database of stories of unanticipated benefits from features of species¹³.

Biodiversity funding for EDGE species

The UK government leads the world in providing funding for global biodiversity conservation, some of which could be dedicated to projects that include the conservation of EDGE species. Existing dedicated funds already identify some key EDGE species¹⁴ (e.g. the Illegal Wildlife Trade fund for pangolins, elephants and rhinos), but funds that prioritise EDGE species would redirect conservation attention to many currently overlooked species. In addition, EDGE species in the UK and UK Overseas Territories could be prioritised for government conservation funding.

Convention on Biological Diversity (CBD) Conference of the Parties (COP15), Beijing

The CBD Vision for 2050 calls not only for halting the loss of biodiversity but also recognising its value. There is an opportunity for policy to more clearly recognise biodiversity as variety, and the core value of variety as maintenance of options. Option value is an investment in future benefits to humanity and reflects our intergenerational responsibility. IPBES and others already recognise that a biodiversity measure based on the tree of life - phylogenetic diversity - is a good indicator of this value.

The explicit focus on EDGE species in biodiversity conservation represents an opportunity for policy action to avert the impending loss of billions of years of evolutionary history. **The UK Government can support the adoption of phylogenetic diversity and EDGE focused indicators**, as well as acknowledging the value of variety, into the CBD post2020 framework as outlined in the *PDTF's submission to the CBD*¹⁵.

The two indicators are:

- (1) the existing IPBES Phylogenetic Diversity indicator for expected PD loss over time, representing predicted loss of the maintenance of options;
- (2) changes in extinction risk of EDGE species over time, tracking the effectiveness of conservation efforts.

In addition, the current zero-draft of the post2020 framework is not a strong enough commitment to species conservation. IUCN's current position¹⁶ is that the drafted "Goal (b) on species is weak and perverse: the goal could be achieved by extinction of all currently threatened species, and by increases in abundance of widespread species"; the proposed 2030 action targets 1-6 on reducing threats to biodiversity "do not add up" to what is required to deliver this goal" and lacks a species-focused action target.

The UK should lead in supporting a stronger global commitment to biodiversity conservation.



¹ Diaz, S. *et al.* 2019 **Summary for policymakers of the global assessment report on biodiversity and ecosystem services**. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

² Sitas *et al.* 2009 *Animal Conservation*; Smith *et al.* 2012. *Cons. Letters*

³ Verissimo *et al.* 2017. *Biol. Cons.*

⁴ Isaac *et al.* 2007 *PLoS One*

⁵ www.edgeofexistence.org

⁶ Collen *et al.* 2011 *Phil Trans Roy Soc Lon B*; Isaac *et al.* 2012 *PLoS One*; Jetz *et al.* 2014 *Curr. Biol.*; Curnick *et al.* 2015 *Anim. Cons.*; Gumbs *et al.* 2018 *PLoS One*; Stein *et al.* 2018 *Nature, Ecol. & Evol.*; Forest *et al.* 2018 *Sc. Reports - Nature*

⁷ EDGE species lists available at www.edgeofexistence.org

⁸ IUCN Red List status summarised across EDGE lists from www.edgeofexistence.org

⁹ Summary data from reported conservation attention measures (using Sitas *et al.* 2009) from www.edgeofexistence.org

¹⁰ Chan & Satterfield (2013). *Encyclopedia of Biodiversity Vol 4*

¹¹ Faith 1992 *Biol. Cons.*

¹² Davis *et al.* 2018 *Proc. Natl. Acad. Sci. U.S.A.*

¹³ www.pdtf.org

¹⁴ **Darwin Initiative, Defra**

¹⁵ **PDTF Submission to the CBD**

¹⁶ **IUCN Post2020 Resources**