

Lessons from Norse mythology

Past diversity, ecology and evolution have significant roles in conservation



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Though almost all people sensitive to the environment agree on the need to conserve biodiversity — particularly endangered species — one finds little consensus on what species ought to be conserved, and why. Biologists claim that they have come up with objective methods of categorising species in terms of their priority for conservation. One such method is used to prepare the International Union for Conservation of Nature's Red List, which categorises species on basis of the basis of their extinction risk. However, this list can be criticised because it treats all species as equal, when in fact, they are not so — for a variety of reasons. For example, some consider the coelocanth to be of great importance because it is the sole surviving representative of its group, a living fossil. Others lay much store on conserving species such as tigers because of their key role as top predators. On a different note, many biologists have recently suggested that conservation efforts should be directed towards protecting processes, and not genes, species or ecosystems.

In 1999, US-biologist Brian Bowen wrote an interesting commentary in the journal *Molecular Ecology*. He revisited the piece in *Conservation Biology*, August 2005 as 'Gaia's handmaidens: the Orlog model for Conservation Biology'. Bowen, a PhD student of the famed John Avise — a pioneer in conservation genetics and phylogeography — made significant contributions to our understanding of sea turtle biology. His early work resolved the decade-old question of whether sea turtles return to their natal beaches to nest. In 'Gaia's handmaidens', Bowen argues that conservation can be divided into three tem-

poral domains, analogous to the Norse worldview, Orlog. In this worldwide, three sisters — Udi or past, Verdandi, the present and Skuld, future — tend the tree of life and fend off a dragon gnawing at its roots. Bowen suggests that phylogenetics, ecology and evolution have similar roles in conservation.

The three sisters

Phylogenetics, which identifies past species divergences, can help preserve species of yore. There are species that are representative of past diversity such as coelocanths, tuataras, and giant tortoises. Only a few of these left today, but they are carriers of evolutionary history. They are taxonomically unique, but their role in maintaining ecosystems is debatable. In contrast, there are other

likely to play a key role in ensuring the quality of these services. There are, however, other groups critical for future diversity. These groups, in fact, hold the key to complex and stable ecosystems in the future. In such groups, such as the cichlid fishes of Africa, the individual species might not be of much importance, but the evolutionary potential of the entire group might impact the future adaptations of their ecosystems.

It's quite likely that conflicts over prioritisation and conservation value assessments are results of looking at issues through the different lenses of phylogenetics, ecology and evolution. But as in the Orlog, where all three sisters need to work together to preserve the tree of life, all three temporal domains need to be addressed for conservation to be truly successful.

What does this mean in practical terms? It impels us to ask a critical question: what do our conservation efforts imply for the preservation of all the three temporal domains of diversity? It also drives us to consider, more carefully, the conservation benefits of cloning, cryo-preservation and charismatic mega-vertebrates. The Orlog also makes us look at protected areas, afresh. These areas can serve as repositories of rare and unique species, and for somewhat unhampered evolutionary processes. While we certainly need these repositories to protect past and future components of diversities, a majority of human-dominated areas can be used to safeguard less taxonomically distinct, but ecologically important, species — those that contribute significantly to ecological diversity and to ecosystem services.

Thus, the current emphasis on inviolate areas needs to be complemented with emphasis on restoration and management of artificially altered landscapes. This would ensure holistic environmental conservation ■

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groups phylogenetically less unique, but significant in maintaining ecosystems. From an ecologist's perspective these are central to the preservation of habitats and ecological processes. Quality of ecosystem services, such as water and air, has become a key prop in shoring up support for environment conservation. The ecologically-significant species are