World Heritage and the IUCN Red List

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World Heritage sites are home to some of the most threatened and spectacular species on this planet. The last of the four natural criteria (vii-x) that may be used for selecting natural World Heritage sites is criterion (x), which stipulates that the site must "contain the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation".

Asian elephant at the Dong Phayayen-Khao Yai Forest Complex (Thailand).

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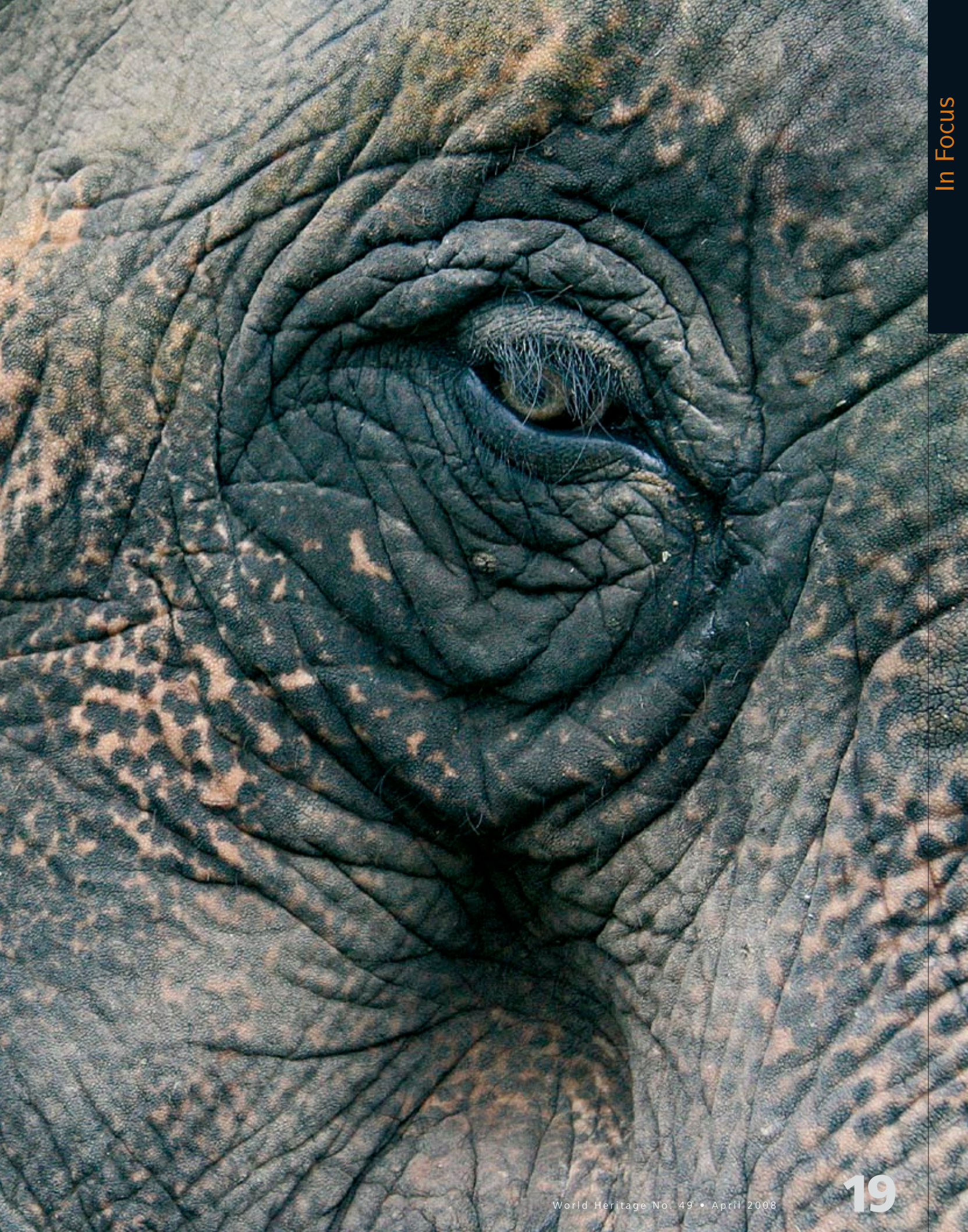

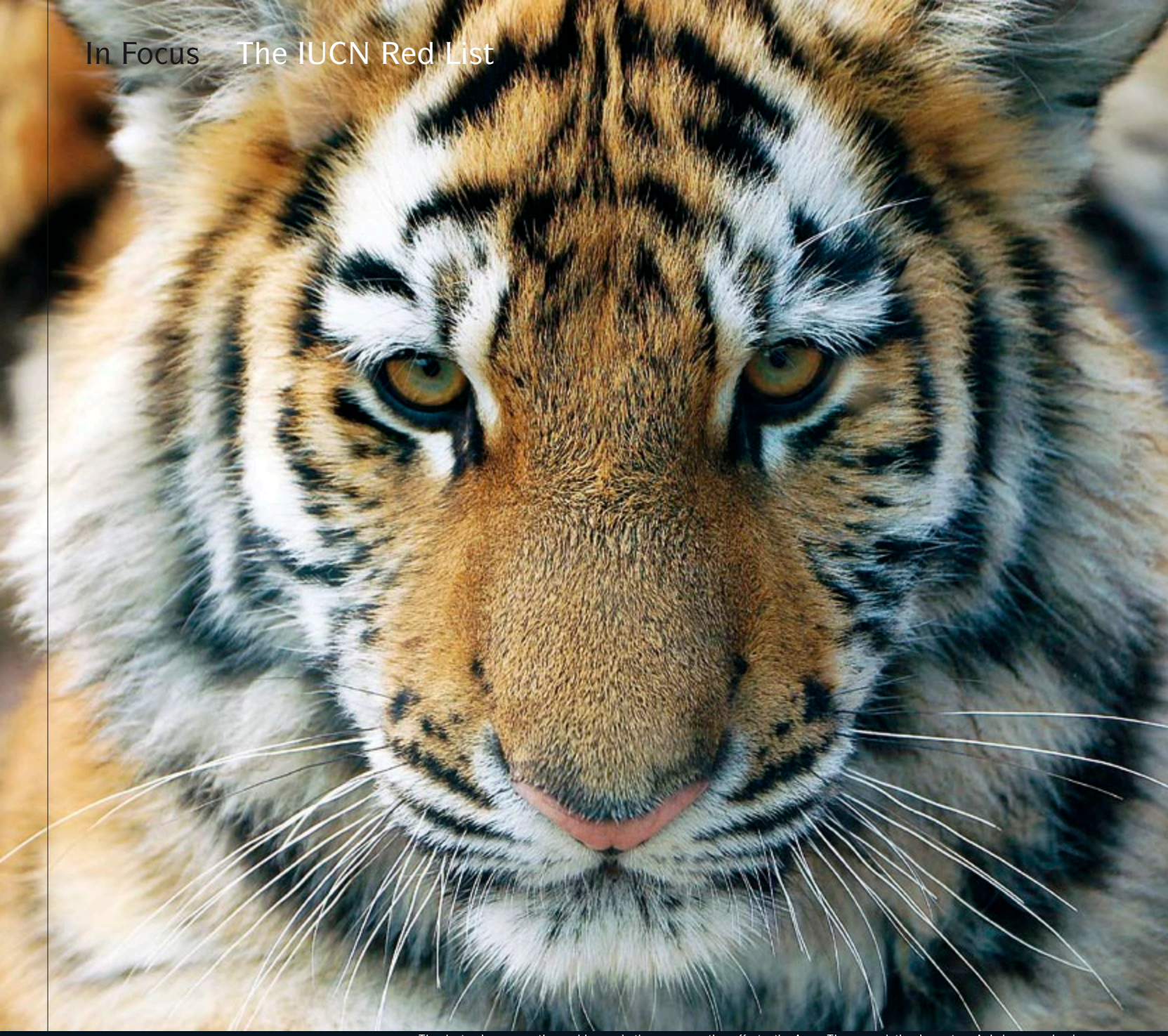

Thanks to vigorous anti-poaching and other conservation efforts, the Amur Tiger population in eastern Asia has remained stable. This cub will grow to weigh over 250 kg and measure nearly three metres from nose to tail.

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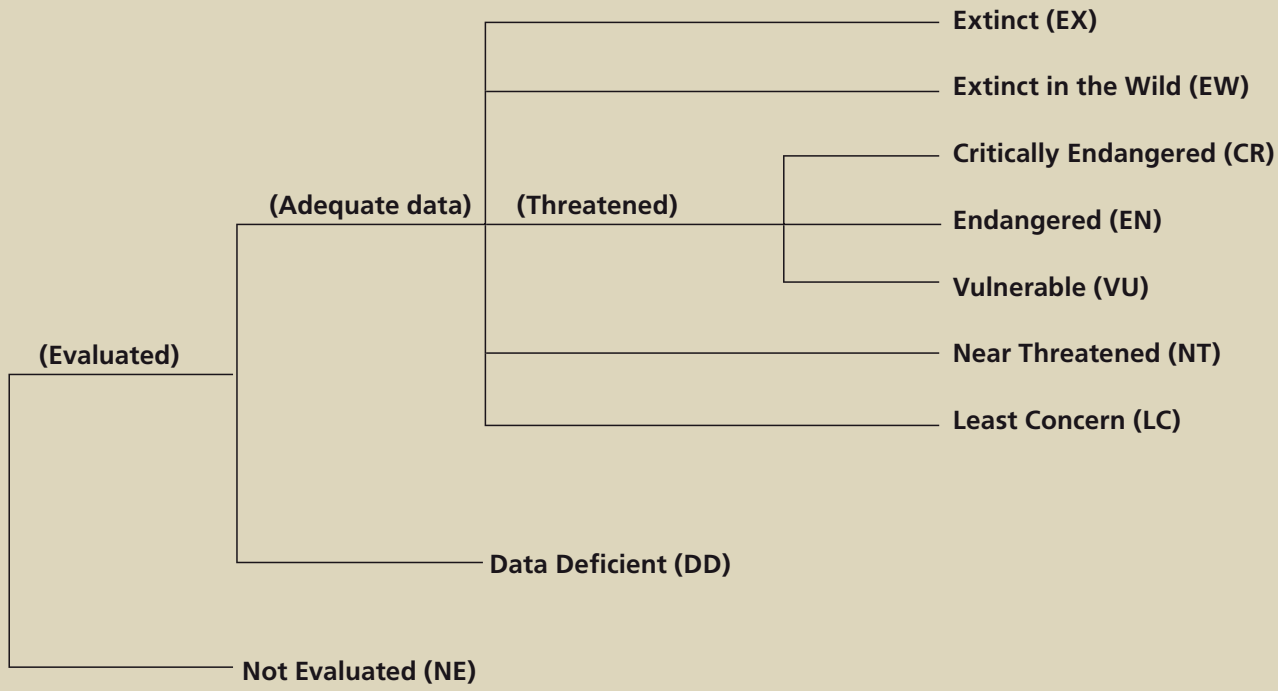
How does one identify "threatened species of outstanding universal value" in order to demonstrate whether this criterion has been met? When IUCN evaluates each nomination, a clear definition of what constitutes 'threatened' and what is 'of outstanding universal value' is manifestly needed.

An important tool in identifying the threat is the *IUCN Red List of Threatened Species*, which catalogues and highlights species at risk of global extinction. Note that the word *global* is important here, as proposals often cite species that are threatened locally, but will not disappear across their entire range. The IUCN Red List is therefore an essential reference in helping to determine whether or not species found in a proposed World Heritage site have the potential to meet criterion (x).

How did it begin?

The concept of the Red Data Book originated with Sir Peter Scott in 1963, with the first two volumes (on mammals and birds) published in 1966. IUCN Red Data Books were conceived as evolving registers of wildlife assigned different categories of threat (note that these categories are capitalized in order to differentiate them from common usage of the same terms). The original categories (Extinct, Endangered, Vulnerable,

Figure 1. Structure of the categories



Rare, Indeterminate and Not Threatened) were used with minor changes for some 30 years. However, with the increasing importance of threatened species lists in legislation and policy, the IUCN Species Survival Commission (SSC) requested that more objective categories be developed, so that people could demonstrate why they had classified a species as threatened. The idea was to base the category on the risk of extinction, and not merely say that the species was threatened because of their small number. Following a long series of meetings and consultations, IUCN adopted the new Red List Categories and Criteria in 1994, with the following aims:

- to provide a system that can be applied consistently by different people;
- to improve objectivity by providing clear guidance on how to evaluate different factors that affect the risk of extinction;
- to provide a system to facilitate comparisons across widely different taxa; and
- to provide a rationale on how the species were classified.

This 1994 system provoked a minor revolution during its transition period, when people used to the 'old' categories had to move on to the 'new'. To further complicate matters, IUCN members then requested a review of the 'new' 1994 system, which underwent further modifications, resulting in the adoption of the IUCN Red List Categories and Criteria (ver. 3.1) in 2001. While this system was developed for assessing threat at a global level, guidelines for using the IUCN Red List Categories at national and regional level have also been produced. The IUCN Red List Categories and Criteria are now the international standard for assigning levels of threat, and are also widely used at the national and regional levels. The Categories and Criteria as well as detailed information on the entire process can be found at www.iucnredlist.org.

What is meant by 'threatened'?

The IUCN system defines any species assessed as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) as threatened (see Figure 1).

This means that in order to be categorized as threatened, a species must first be evaluated using these criteria. Note that only a very small proportion of the world's described species have been evaluated, hence there are many more threatened species in the world than those currently listed in the IUCN Red List. Moreover, even though a species may be evaluated, in the absence of sufficient information it is difficult to determine its conservation category. In these cases, the species is categorized as 'Data Deficient' (DD), and it is recommended that a precautionary approach be taken when using such listings – thus a DD-listed species may be just as threatened as one listed as CR. Another category of 'Near Threatened' was also included for those species that do not qualify for the threatened category, but are close. While neither DD nor NT species fall within the threatened categories of IUCN, a number of them are listed in World Heritage proposals as 'threatened', and they must certainly be kept on the radar screen.

Modern infrastructure development, particularly within India's Chambal River basin, has precipitated the irreversible loss of the riverine habitat of the critically endangered Gharial.

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Large eyes and wet noses

It is a sad fact of life that, in general, the world relates more to species with large eyes and wet noses than to those that are squishy or contain chlorophyll. This is clearly apparent in the IUCN Red List, which has very good coverage of most mammals, birds and amphibians, but patchier information for reptiles, fish, plants and invertebrates (not to mention fungi and lichens). However, World Heritage criterion (x) does not distinguish between these groups. To meet criterion (x), the site must merely protect "biological diversity ... including threatened species of outstanding universal value". The question of what constitutes outstanding universal value (OUV) for species is entirely subjective. Nonetheless, as for the IUCN Red List, most World Heritage proposals tend to list spectacular mammal and bird species. However, as both the Convention and the IUCN Red List mature, increasing emphasis on other taxonomic groups has become apparent.

Currently, the 2007 IUCN Red List contains information on 41,415 species, with varying levels of documentation (see www.iucnredlist.org). This includes 29,354 animal and 12,043 plant evaluations (without forgetting a few algae and fungi). As so many plants still need to be evaluated (there are an estimated 300,000-400,000 described plant species), it is useful to know that there is a separate list of some 34,000 threatened plant taxa (the *1997 IUCN Red List of Threatened Plants*) compiled using the 'old'

IUCN categories. While the most current IUCN Red List should be used as the 'gold standard', if the plant species in question is not on the Red List, then the 1997 plant list may still provide some useful information.

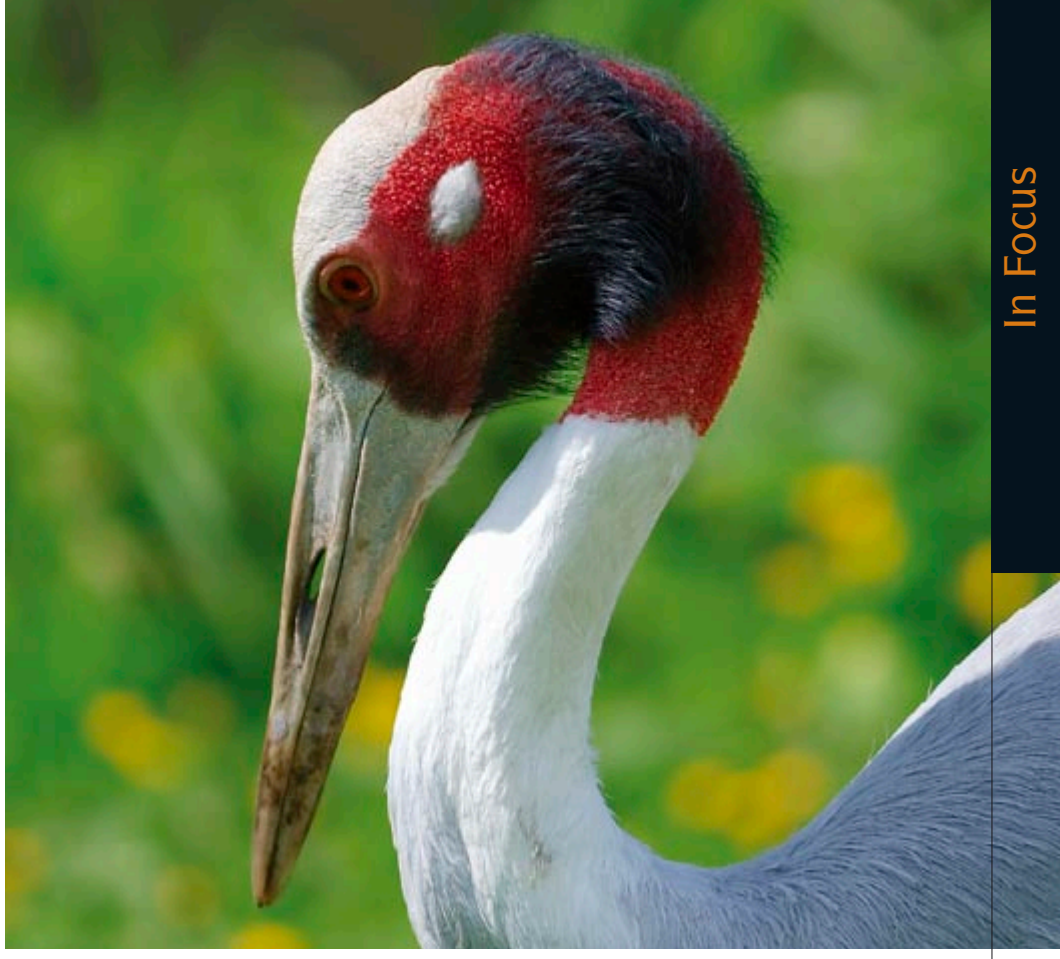
World Heritage and biodiversity

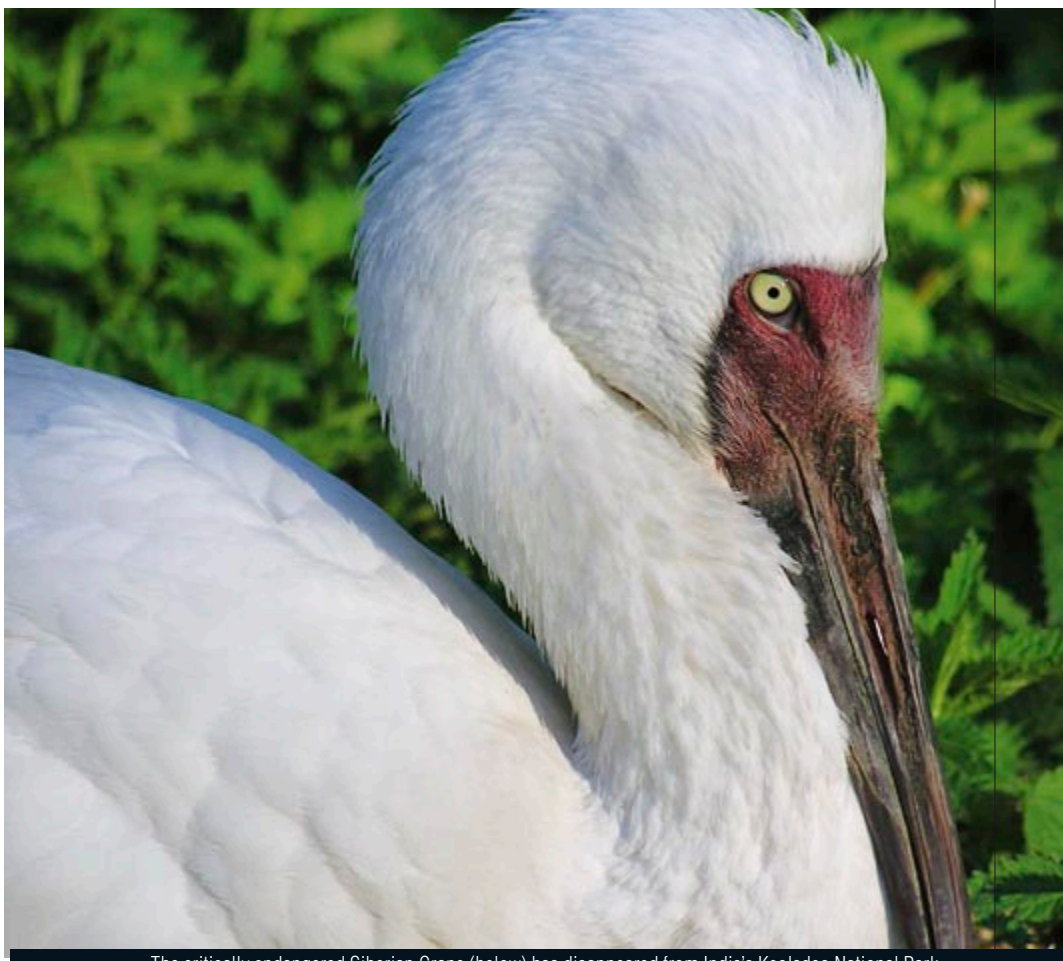
Of the 191 World Heritage mixed and natural properties designated to date, almost two thirds (i.e. 120 properties) have met the 'biodiversity' natural criterion (x), either alone or in combination with other criteria. This clearly indicates that *World Heritage sites are enormously valuable* for conserving outstanding examples of biodiversity. Of the remaining 71 properties that either were not nominated for or did not meet criterion (x), it is possible that with improved information an argument could be made that some of these sites do in effect also meet criterion (x). For example, Salonga National Park (DRC), inscribed under criteria (vii) and (ix), is home to the Endangered Bonobo or Dwarf Chimpanzee. At the time of nomination, the importance of the Park for this species was not known, and the species was also then classified as Vulnerable. With the advancement of science as well as changing conditions, some sites currently not inscribed under criterion (x) may merit renomination.

It is interesting to note that the properties inscribed on the basis of this criterion tend to fall into four broad categories:

1. Areas of high biodiversity with large numbers of species that are excellent examples of their ecosystem (e.g. tropical rainforests), often containing charismatic megafauna.
2. Moderate to low biodiversity but excellent examples of their ecosystem (e.g., temperate zones and deserts, islands), and containing some flagship species.
3. Moderate biodiversity but outstanding due to the site's importance for vast concentrations of waterfowl, and containing some flagship species.
4. Marine areas of moderate to high biodiversity, containing charismatic megafauna and flagship species.

This raises questions about whether 'charismatic megafauna' and 'flagship species' can be defined, and whether these equate to species of 'outstanding universal value'. Glibly, charismatic megafauna has been





The critically endangered Siberian Crane (below) has disappeared from India's Keoladeo National Park. The Sarus Crane (above) can still be found in the Park, although it is classified as vulnerable.

© Chen Wu

The Wollemi pine, already known through fossil remains dating from the Mesozoic, was discovered in 1994 in Wollemi National Park (Australia). There are currently fewer than fifty mature specimens of the Wollemi pine growing there.

© Tony

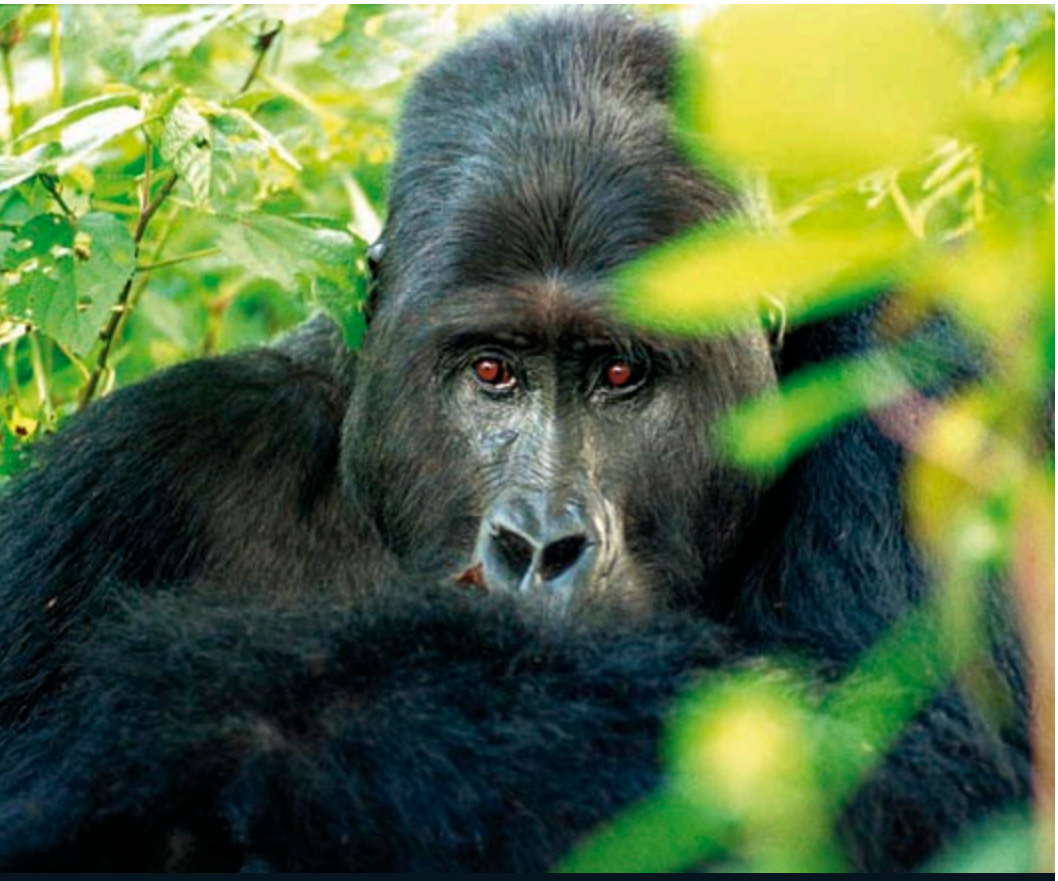
said to be the 'big grey things' (elephants, rhinos and whales), in addition to threatened species such as pandas, gorillas, lions and tigers, all of which have widespread popular appeal. After these, there are a number of what can be termed as 'flagship species' (e.g. various antelopes, primates, and bears). In many World Heritage nominations, mammals are most frequently referred to, although birds (usually large, such as condors, ostriches, rheas, albatrosses and cranes) are also often cited. In some cases, reptiles (such as marine turtles and crocodiles), fish (e.g. sharks) and amphibians have been used as examples of species of outstanding universal value (OUV), although these cases are rare. Charismatic megaflora also exist – again, if the plants are large (such as Giant Sequoias or cacti) or very old such as the Wollemi Pine. While increasing numbers of 'flagship plants' (such as the Dove Tree in the Sichuan Giant Panda nomination) are appearing in more nominations, plants are more often referred to where there are vast concentrations of endemic species (meaning that they are found nowhere else in the world), such as in the Cape Floral Kingdom. In future, plant species that are important medicinally or economically may be increasingly used as examples of OUV.

It must be stressed that this analysis of what species are particularly important to science and conservation is very subjective, and varies according to the observer. For example, a lichenologist may have an entirely different idea of what is of outstanding universal value than the average person who relates more easily to the 'big grey things'. As the Convention continues to develop, it is probable that less charismatic – albeit no less important – species will be recognized as such, and the IUCN Red List will be able to provide information to help make decisions as to which natural areas merit World Heritage status.

It is important to note that the goal of conservation is to move species off the threatened list. This means that in future, one may hope that some threatened species for which sites have been inscribed will no longer be threatened, although of course the site will still be needed for the continued conservation of that species. Therefore, emphasis on having 'threatened' status should be balanced with other criteria to determine the OUV of a species. For example leopards are a very charismatic species, although they are currently regarded by IUCN as of 'Least Concern'. But can one say that they are not of outstanding universal value? Try telling that to the hordes of photographers in the Serengeti trying to find the elusive leopard!

Specialized sites

It is interesting to look at the 13 World Heritage properties that have been inscribed using only criterion (x). Sadly, one has the dubious distinction of being the only World Heritage site to be delisted. The loss of the Arabian Oryx Reserve in 2007 was attrib-



Eastern Lowland Gorilla in the Kahuzi-Biega National Park (Democratic Republic of the Congo).

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uted to Oman's decision to reduce the size of the protected area by 90%, thereby destroying the outstanding universal value of the site, which was inscribed in 1994. Note that in 1996, the population of the Arabian Oryx in the reserve numbered 450, but due to poaching and habitat degradation the population dwindled to 65, with only about four breeding pairs. The Arabian Oryx is now listed as Endangered on the IUCN Red List and its population continues to decline. The only hope remaining from this sad situation is that it has highlighted the importance of the site for conserving the Arabian Oryx, a species that seems doomed for extinction unless increased conservation measures are urgently taken in this and other protected areas in the Arab region.

Of the 12 remaining sites designated by criterion (x) alone, 5 fall within the first group of having high diversity and charismatic megafauna (see Table 1). Regrettably the first three of these are currently on the list of 'World Heritage in Danger', mainly due to poaching. This is thereby reducing the species values for which the property was inscribed.

The Thai Khao Yai property nomination of 2005 provided a long list of threatened

Table 1. High diversity properties and species of OUV listed in the nomination.

Property	Country	Size (ha)	Date	Charismatic megafauna	Other species
Kahuzi-Biega National Park	Democratic Republic of the Congo	600,000	1980	Eastern Lowland Gorilla (EN) African Elephant (VU)	Chimp (EN) and other primates
Okapi Wildlife Reserves	Democratic Republic of the Congo	1,372,625	1996	African Elephant (VU)	Okapi (NT), Chimp (EN) and other primates
Niokolo-Koba National Park	Senegal	913,000	1981	African Elephant (VU), Lion (VU)	Chimp (EN), Leopard (LC), Western Giant Eland (EN)
Dong Phayayen-Khao Yai Forest Complex	Thailand	615,500	2005	Asian Elephant (EN), Tiger (EN)	Many other species
Sichuan Giant Panda Sanctuaries	China	924,500	2006	Giant Panda (EN)	Red Panda (EN), Snow Leopard (EN), Clouded Leopard (VU), Dove tree *Davidia involucrata* (LR/cd)

Table 2. Properties with lower biodiversity and species of OUV listed in the nomination.

Property	Country	Size (ha)	Date	Flagship fauna	Other notable species
Central Sikhote-Alin	Russian Federation	1,553,928	2001	Amur Tiger (CR)	Birds: Scaly-sided Merganser (EN); Blakiston's Fish-owl (EN)
Golden Mountains of Altai	Russian Federation	1,611,457	1998	Snow Leopard (EN) (although note that the nomination says it has almost died out in the area).	A number of northern Asian montane plant (some endemic) and animal species (mostly locally rather than globally threatened)

species occurring in the reserve, including the Malayan Sun Bear and Marbled Cat, both of which had been assessed by IUCN as DD. Subsequently, both species have been assessed by IUCN as VU and are hence threatened, indicating that in cases where the species is evaluated as DD, a precautionary approach must be taken.

The second group of properties includes areas of lower diversity due to the nature of the ecosystem, but that still represent outstanding biodiversity as well as flagship species (see Table 2).

Note that if you search only under 'Amur Tiger' on the IUCN Red List, you will not find it immediately unless you remember to tick the 'subspecies and varieties' box. This is because many 'species' listed in World Heritage nominations are considered to be subspecies by international experts, and the Red List default search is by species. It is often difficult to link species names listed in World Heritage proposals to the conservation listing in the IUCN Red List, due to the different common names used and differences in taxonomic opinion. In order to facilitate comparison, it would be useful for all World Heritage proposals to include the Latin name of the species and any commonly-used synonyms, and for the Red List to also include as many synonyms and common names as possible.

The third group of properties were all inscribed principally for their importance for conserving extraordinary waterfowl biodiversity (see Table 3). Unfortunately, the first two were also on the List of World Heritage in Danger for 10 and 11 years respectively, but have been removed from it due to improved management of the areas. However, concern over Keoladeo (India) is now mounting due to the disappearance from the reserve of the Siberian Crane, one of the 'flagship' species for which it was inscribed. The danger of inscribing a

Table 3. Properties inscribed for waterfowl importance and species of OUV listed in the nominations.

Property	Country	Size (ha)	Date	Flagship fauna	Other notable species
Ichkeul National Park	Tunisia	12,600	1980	White-headed Duck (EN)	Waterfowl
Srebarna Nature Reserve	Bulgaria	638	1983	Dalmatian Pelican (VU), Red-breasted Goose (EN), Ferruginous Duck (NT), White-tailed Eagle (LC, was VU)	Waterfowl and some rare plants, although not listed in the nomination.
Keoladeo National Park	India	2,873	1985	Siberian Crane (CR) (but which has now disappeared from the Park, fortunately the Sarus Crane (VU) still occurs here.	Waterfowl as well as high diversity of vertebrates and plants.

It is estimated that the White-headed Duck population has undergone a very rapid decline of over 50 % over the last ten years. Ichkeul National Park in Tunisia is a primary habitat for the species.

© Douglas Allen Deacon

site solely on the basis of outstanding species means that if the species disappears from the site, so too does the reason for inscription. However, some species may become increasingly threatened after a site is inscribed, although there is no connection to the protected status of the area. For example, in Ichkeul, the status of the White-headed Duck was changed from Vulnerable to Endangered due to the introduction of the Ruddy Duck from North America to Europe, which hybridizes with this species. Likewise, Srebarna (Bulgaria) provides winter roosting grounds for the now Endangered Red-breasted Goose, which was classified as Vulnerable when the property was inscribed. On the other hand, the White-tailed Eagle was classified as Vulnerable when the property was inscribed, but has since been downlisted to Least Concern following a large recovery in many European countries – although this does not mean that the population in Srebarna is out of danger.

Finally, the fourth group includes the two mostly marine properties inscribed mainly on the basis of charismatic megafauna (i.e. whales), even though the Southern Right Whale and Grey Whale are no longer classified as threatened by IUCN. However, both were classified in 1996 using the 1994 category of 'LR/cd' (=Lower Risk/conservation dependent"), meaning that they would be threatened if conservation measures were not in place. This category was dropped in the 2001 version of the categories. The IUCN SSC Cetacean Specialist Group is currently reviewing new assessments of all the whales, including those previously listed as LR/cd. This is not an easy task as many whale species are very widespread and not at risk of disappearing entirely but are made up of distinct subpopulations, many of which are threatened, which will all be listed separately.

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Once highly prized for its fur, the Snow Leopard's total effective population is now estimated at below 2,500. It has almost died out in the Golden Mountains of Altai (Russian Federation).

A Green Sea Turtle in the Galápagos.

© Lilac-breasted Roller

In summary, these 13 sites inscribed solely on the basis of criterion (x) show how threatened mammal and some bird species have to a large degree been the main drivers for demonstrating that the site harbours biodiversity of outstanding universal value. While using charismatic megafauna is obviously easier to communicate, in future the Convention will need to refine its view of what really constitutes OUV for this 'biodiversity' criterion, as an increase in arguments for using other species are going to be made.

Although a review of the other 107 natural and mixed properties nominated using criterion (x) as well as one or more other criteria is not possible here, the same trends are apparent, with some notable exceptions such as the Cape Floral Region of South Africa and the Greater Blue Mountains of Australia, which were inscribed on the basis of their extraordinary endemic flora. Moreover, a smaller percentage of sites nominated with criterion (x) and one or more other criteria, as opposed to nomination on the basis of criterion (x) alone, are on the List of World Heritage in Danger.

What now?

The IUCN Red List of Threatened Species is an essential tool in ensuring that criterion (x) is properly applied when reviewing nominations for World Heritage properties. While nominations will list important and threatened biodiversity, the IUCN Red List can be used to indicate which species are globally threatened, providing an impor-

tant justification in identifying threatened species of outstanding universal value. The IUCN Red List should also be used as a tool for helping to establish future priorities, and as a source for identifying scientists who can provide expert species and area advice.

The World Heritage Convention uses the terms 'endangered', 'rare' and 'threatened' in many different ways, and their sense is often different from that used on the IUCN Red List. It would therefore make sense for the Convention to try to standardize the terms it uses and, if possible, align these with the IUCN Red List terms. This standardization would both help in the selection of sites and determine whether they are in danger or might even be delisted.

Some additional steps could be taken to improve the synergies between World Heritage and the IUCN Red List.

The guidelines for preparing World Heritage nominations should include instructions to follow the IUCN Red List Categories and Criteria. When opinions in the proposals differ with information on the IUCN Red List (as not all scientists will agree on what a species is called, or on the degree of threat to it), they should require that these be explained in the proposal. This applies to the use of data from national and regional Red Lists, particularly for taxonomic groups that are not comprehensively covered in the IUCN Red List (such as plants, fungi and invertebrates). If this principle is adhered to, both World Heritage nominations and the IUCN Red List will be strengthened.

Rigorous control should ascertain that species cited as threatened and of OUV are in fact threatened at a global level, as there are many examples of species listed in the proposals that are locally but not globally threatened. However, if the species is listed as 'Data Deficient', every effort should be made to ascertain the conservation status of the species. This will also improve the information contained in the IUCN Red List. In cases of doubt, the precautionary principle should be used, i.e. a species should be treated as threatened unless proven otherwise.

The list of species in the documentation for World Heritage sites should cross-reference both Latin and common names with those found on the IUCN Red List. In this way, the conservation status history of species listed in the proposal can be easily followed, even if a synonym for the same species on the Red List was used in the proposal.

The more subjective decision on what constitutes 'species of outstanding universal value to science and conservation' should be reviewed, especially as increased emphasis is paid to the 'non-flagship' species, and will need to be grappled with by the Convention.

Ranomafana National Park (Madagascar) is part of the Rainforests of the Atsinanana World Heritage site, which holds more than 1% of the planet's biodiversity, including the Madagascar Giant Day Gecko.

© Martha de Jong-Lantink

Table 4. Marine properties inscribed for charismatic species

Property	Country	Size (ha)	Date	Flagship fauna	Other biodiversity
Whale Sanctuary of El Vizcaino	Mexico	370,950	1993	Blue Whale (EN) Grey Whale (LR/cd). Marine turtles Leatherback (CR), Green (EN), Hawksbill (CR), Olive Ridley (VU)	Non-threatened California Sea Lion, Northern Elephant Seal, Harbour Seal
Peninsula Valdés	Argentina	360,000	1999	Southern Right Whale (LR/cd), Orca (LR/cd), Dusky, Peale's and Commerson's Dolphin (all DD)	Non-threatened Southern Elephant Seal, Southern Sea Lion, Magellanic Penguin (NT), Lesser Rhea (NT)