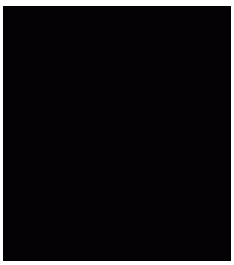
Comparative analysis methodology for World Heritage nominations under biodiversity criteria

A contribution to the IUCN evaluation of natural World Heritage nominations

Prepared by Elise Belle, Yichuan Shi and Bastian Bertzky

Final Version



The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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Introduction

One of IUCN's roles under the World Heritage Convention is to provide technical advice on natural heritage to the World Heritage Committee in relation to the evaluation of new nominations to the World Heritage List.

The IUCN World Heritage (WH) Panel, made of conservation experts, meets at least once a year to conduct an evaluation of all nominations of natural and mixed properties to the WH List, leading to a panel recommendation on the IUCN position in relation to each new nomination. The Panel also provides comments to the International Council on Monuments and Sites (ICOMOS) in relation to nominations of cultural landscapes to the WH List, provides advice in support of IUCN's contribution to the annual cycle of State of Conservation Reports on inscribed WH sites, and input to the development of IUCN's work on WH.

Only sites nominated under the natural criteria (vii) to (x) are evaluated by IUCN for inscription on the WH List. For sites nominated under biodiversity criteria, criteria (ix) and (x), UNEP-WCMC provides comparative analyses to help inform IUCN's recommendations (Figure 1 and Box 1) based on the agreed methodology developed jointly by IUCN and UNEP-WCMC and outlined in this report.

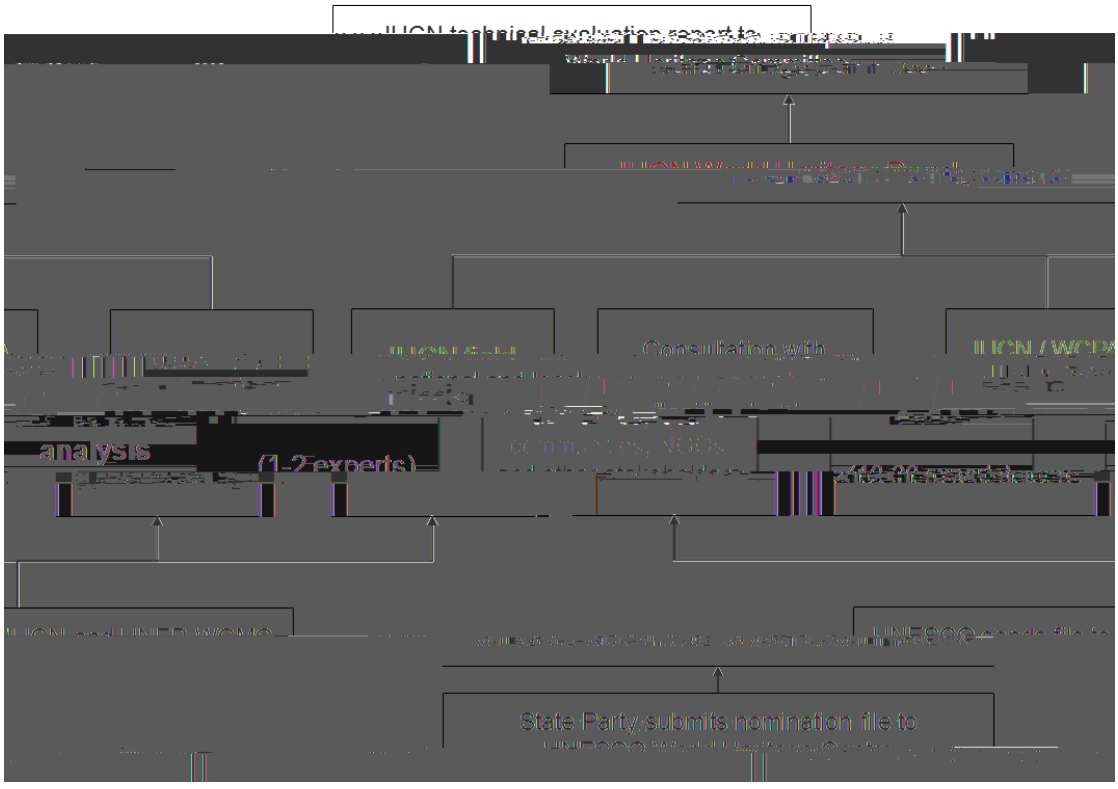

Figure 1. Flow chart illustrating the IUCN evaluation process.

Box 1. World Heritage selection criteria, with natural criteria in italics, including biodiversity criteria in bold characters.

(i) to represent a masterpiece of human creative genius;

(ii) to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;

(iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;

(iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;

(v) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;

(vi) to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The

ecosystem values, biological/ecological patterns or processes, richness or rarity)?

2) Which existing WH sites, Tentative List sites and other protected area are included in the comparative analysis because they support similar values and/or share a comparable biogeographic context (e.g. same ecoregion or same biome and realm combination)?

3) How does the nominated site compare to these existing sites in relation to its biodiversity values (e.g. in terms of irreplaceability, vulnerability, representativeness and integrity)?

Spatial analyses and interpretation

Evaluation under criterion (ix)

"Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals"

Question 1: Does the nominated property represent ecosystems/communities that are currently underrepresented or not represented on the World Heritage List?

GIS analyses are carried out to determine the number of existing WH sites and Tentative List sites found in the same biogeographical unit as the nominated property (Table 1), namely the same:

Udvardy biogeographical province;
Terrestrial realm/biome/ecoregion; and
Marine province/ecoregion (for marine sites).

The GIS boundary of the nominated property is overlaid on top of the above layers to determine its presence within these units. Having identified where the nominated property is located, a reverse step is employed to look at existing natural WH sites that may or may not be present in the same biogeographical units.

The same process is then repeated using Tentative List sites[1].

A map is also included, showing the nominated property, existing biodiversity WH sites and other existing natural WH sites in the context of Udvardy's biogeographical provinces (Udvardy 1975). Similar maps could also be included in relation to other classifications, such as terrestrial ecoregions or marine provinces if required.

[1] Note that due to poor Tentative List data, results identified through this process are manually checked using best available references to ensure findings are reliable.

Table 2. The nominated property in the context of broad-scale global conservation priorities.

	Nominated property	World Heritage sites in same priority region (biodiversity sites in bold)	Tentative List sites potentially in same priority region (biodiversity sites in bold)
Terrestrial biodiversity hotspot (Mittermeier et al. 2004, Williams et al. 2011)			

Table 3. Species richness and endemism in the biodiversity hotspot where the nominated property is found and in the nominated property (Conservation International 2013 and nomination files)

Taxonomic Group	Species in

subspecies) by States Parties in order to give more weight to

Regarding the number of threatened species, if the nomination file provides a list of globally threatened species, this list is checked against current data on the IUCN Red List website. However, the nomination file often lists only species that are nationally threatened; in this case, these species are again checked against the IUCN Red List data to determine whether or not they are also globally threatened.

In addition, like for the total number of species, we also look at the indicative number of threatened species that may be found in the property based on their geographic ranges (globally assessed species on the IUCN Red List of Threatened Species) (Table 5).

Again, it is important to note that the numbers of threatened species are generated by overlaying the GIS boundaries with the recorded species ranges in the IUCN Red List of Threatened Species as being Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). The numbers are only indicative due to data limitations and should not be confused with confirmed threatened species numbers for these sites.

Finally, GIS analyses are carried out to determine whether the nominated site belongs to one of the following site-scale global conservation priorities:

Alliance for Zero Extinction sites (AZEs); and

Key Biodiversity Areas (KBAs) other than AZEs (e.g. Important Bird Areas / IBAs)

This analysis follows the same steps used in determining biogeographical representations (see Table 1) and identifying gaps for broad-level conservation priorities (see Table 2). Both current natural WH sites and Tentative List sites are cross examined against the nominated property (Table 6).

Table 6. The nominated property in the context of site-scale global conservation priorities.

	Nominated property
Alliance for Zero Extinction sites (AZEs) (Alliance for Zero Extinction 2010)	
Key Biodiversity Areas (KBAs) other than AZEs: e.g. Important Bird Areas (IBAs) (	

Literature review

Three types of documents are used to complement the spatial analyses:

- Nomination file
- External references
- IUCN/UNEP-WCMC thematic studies

Nomination file

The data provided in the nomination file are used throughout the comparative analysis document, both under criteria (ix) and (x), but caution is used when interpreting these data. When possible, the data provided are also checked against other relevant publications.

External references

An independent search for relevant external references is carried out (both of peer reviewed journal articles and the grey literature) to complement the comparative analyses.

IUCN/UNEP-WCMC thematic studies

Over the past 30 years, IUCN and IUCN/UNEP-WCMC have produced a series of global thematic studies on natural WH. In some cases, these provide additional information that is relevant for the evaluation of existing and candidate biodiversity sites.

Table 7 summarizes relevant clues from these studies in relation to the nominated property. IUCN recently published a series of global gap analyses, two of the most recent being on Terrestrial Biodiversity and the WH List (Bertzky et al. 2013) and Marine Natural Heritage and the WH List (Abdulla et al. 2013).

In addition, the results of the irreplaceability analyses (Le Saout et al. 2013) are also considered in this section. Here we assess whether the nominated site overlaps with a PA with a high irreplaceability score, that is to say amongst the 100, 500 or 1,000 most important PAs overall according to the study.

Table 7. Overview of clues from global thematic studies.

Global thematic studies	References to the nominated property
World's Greatest Natural Areas (IUCN CNPPA 1982)	
Forests (Thorsell and Sigaty 1997)	
Wetlands & Marine (Thorsell et al. 1997)	
Biodiversity (Smith and Jakubowska 2000)	
Mountains (Thorsell and Hamilton 2002)	
Biogeography, Habitats and Biodiversity (Magin and Chape 2004)	

Kelleher, G., C. Bleakley and S. Wells (1995) A Global Representative System of Marine Protected Areas. Volume IV: South Pacific, Northeast Pacific, Northwest Pacific, Southeast Pacific and Australia / New Zealand. Great Barrier Reef Marine Park Authority, IUCN and The World Bank, Washington DC, USA.

Kormos, R. and C. Boesch (2003) Regional Action Plan for the Conservation of Chimpanzees in West Africa. Conservation International, Washington, DC, USA.

* Le Saout, S., M. Hoffmann, Y. Shi et al. (2013) Protected areas and effective biodiversity conservation. Science 342: 803-805.

Magin, C. and S. Chape (2004) Review of the World Heritage Network: Biogeography, Habitats and Biodiversity. IUCN, Gland, Switzerland and UNEP-WCMC, Cambridge, UK.

Mittermeier, R.A., C.G. Mittermeier, P. Robles Gil et al. (2002) Wilderness: Earth's Last Wild

Williams, P. (2008) World Heritage Caves and Karst: A Thematic Study. IUCN, Gland, Switzerland.

Williams, K.J. et al. (2011) Forests of East Australia: The 35th Biodiversity Hotspot. In: F.E. Zachos and J.C. Habel

Annex. Details of GIS Analyses

therefore contain false intersections due to inconsistent boundaries between different datasets. This is largely mitigated by manually checking the resulting table. It is envisaged in the future to include an automatic fact checking process to resolve this issue, for example by examining the percentage overlap with regard to the size of the nominated property.

Species richness

A script based on the ‘Select By Location’ function in ArcMap is used to intersect each nominated property with all species that have been assessed globally for the IUCN Red List (RL) of Threatened Species. Higher taxonomy and RL category information are appended to the attribute in the spatial data. Number of species, number of threatened species and these stats by each taxon are worked out by