

# IUCN Red List of Ecosystems

## *Biodiversity and forest monitoring*

by Marcos VALDERRABANO

***In 2014, the IUCN Red List of Ecosystems defined the criteria for assessing risk and threats. This article presents: the use of the Red List as a tool for monitoring the risks and threats to ecosystems; information about trends in forest ecosystems; and the List's current utilisation and potential applications.***

Monitoring forests is carried out for a variety of reasons, given that current technology offers numerous possibilities, from informing policy agreements to influencing management decisions. Forest monitoring is often focused on technical challenges (data access or computation power, for example), but is equally relevant to selecting and refining adequate methodologies and protocols necessary for exacting useful information.

In 2014, the International Union for Conservation of Nature adopted the Red List of Ecosystems (IUCN RLE) criteria as the global standard for assessing risks to terrestrial, marine, and freshwater ecosystems. RLE is not an isolated tool but, rather, is part of a growing toolbox for assessing risk and support conservation planning and setting priorities.

During the previous Mediterranean Forest Week, IUCN presented the methodology used for planning restoration activities, the Restoration Opportunities Assessment Methodology<sup>1</sup>. In this paper we will explore the use of the Red List of Ecosystems as a tool for monitoring ecosystem risk, inform on trends in forest ecosystems, and explore its current application and potential uses.

Can the Red List of Ecosystems provide methodology useful in providing information for forest management? Can RLE be used for setting priorities and planning? Could it be a tool for monitoring forest evolution over time? At what scale(s) could it be applied?

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1 - <https://www.iucn.org/theme/forests/our-work/forest-landscape-restoration/restoration-opportunities-assessment-methodology-roam>

To answer these questions we need to understand the aims and functioning of the ecosystem assessment process that leads to inclusion on the Red List of Ecosystems.

The Red List of Ecosystems is inspired by the principles and terminology used in the Red List of Threatened Species<sup>TM</sup> (IUCN RLTS<sup>2</sup>) that measures the risk of extinction of individual species. Some of the RLTS assessments are quite useful for forest management, e.g. the recently-published “*The conservation status and distribution of Mediterranean saproxylic beetles*”<sup>3</sup>, since it provides useful information on species that are very relevant in maintaining forest’s functions. The main difference between the two methodologies is that Red List of Ecosystems assesses entire ecosystems and the result is a measure of the risk of collapse of an ecosystem.

The aim of a red list of ecosystem assessment is to evaluate the risk of ecosystem collapse, collapse being the theoretical threshold beyond which an ecosystem can no longer maintain its defining features.

The RLE methodology proposes the use of five criteria that together evaluate the main pathways of collapse. Results are expressed following a growing level of risk in standard categories (growing risk from Least Concern, Vulnerable, Endangered and Critically Endangered, or even Collapsed).

But often the challenge of conducting concrete monitoring protocols lies in the capacity of teams to gather, organize and structure the data to facilitate its application. For this reason, there is a growing set of tools to support data analysis and allow the Red List of Ecosystems to be drafted. We will highlight:

–The Remote Ecosystem Monitoring and Assessment Pipeline (Remap) utilizes the geospatial data storage and analysis capacity of Google Earth Engine (<https://earthengine.google.com>), a cloud-based analysis platform, to allow users to develop classified maps of land cover. Additionally, the Remap application allows monitoring and analysis of land-cover change by enabling users to map ecosystem distributions at two points in time (<https://remap-app.org/remap>)

– R package for spatial analyses. Is a set of tools suitable for calculating the metrics required for making assessments of species and ecosystems against the IUCN Red List of Threatened Species and the IUCN Red



List of Ecosystems categories and criteria<sup>4</sup>.

– Excel tools for change metrics (rates of decline, summary of assessment)<sup>5</sup>.

– Conceptual models are very useful for representing the complexity of ecosystems with simplified processes and interactions. The existing tool to represent Ecosystem conceptual models can be found at <https://iucnrle.org/resources/capacity-building/>

**Photo 1:**

Degraded cedar and holm oak forest in Anfou, Morocco.  
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## Uses and application of RLE for Mediterranean Forest

Since the adoption of the standard, 2,821 ecosystems have been assessed in 100 countries (BLAND *et al* 2019). Some of these assessments have been conducted systematically (ie all the ecosystem types within an area), these are called systematic assessments; others are detailed diagnostic assessments targeting one or a few ecosystem types to develop management strategies, these are called strategic assessments.

In the context of Mediterranean forests there have been several systematic assessments that are worth mentioning.

The Red List of European Habitats evaluated in 2016 European forest habitats with a methodology inspired by the Red List of Ecosystems. Several countries in Europe have also conducted their own national

2 - [www.iucnredlist.org](http://www.iucnredlist.org)

3 - <https://portals.iucn.org/library/node/47967>

4 - <https://cran.rproject.org/web/packages/redlistr/index.html>

5 - <https://iucnrle.org/resources/capacity-building/>

6 - <https://www.foretpriveefrancaise.com/n/ibp-indice-de-biodiversite-potentielle/>

assessment e.g. Finland, Norway or the Czech Republic.

France has recently finished the Red List of Mediterranean Forests in metropolitan France (IUCN France 2018). This study, available on the web at <http://uicn.fr/lre-france/>, may inspire other initiatives leading to systematic assessments in other countries. Similar studies have started in other Mediterranean countries such as Morocco and Tunisia.

The final outcome of a Red List of Ecosystems assessment provides a level of risk for ecosystem collapse. Often more important, the interpretation of ecosystem risk of collapse is also powerful tool for designing conservation strategies or forest management options for the forester. To do so, most assessment requires a careful interpretation of results that describe the evaluated ecosystem and their scope, explain the main threats and how they affect the ecosystem, and suggest management options. As an example, the presence within a forest of old adult trees containing hollows is crucial for the nesting and habitat of certain forest species. This is well known and taken into consideration in many forest biodiversity habitats, e.g. the Index of Potential Biodiversity<sup>6</sup>. The Red List of Ecosystems assessment has made it possible to quantify the effect of removing old hollow trees on a forest's likelihood of collapse. This has influenced and changed. The quantification of this risk has led to concrete forest management practices to preserve old grown trees in Finland and Australia.

The Red List of Ecosystems appears to be a very powerful tool that can inform forest management and provide useful information for setting priorities and forest planning. Furthermore, it permits monitoring the evolution of forests over time and can be applied at multiple spatial scales.

**M.V.**

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Marcos  
VALDERRABANO  
IUCN  
Centre for  
Mediterranean  
Cooperation  
Marcos.  
VALDERRABANO@  
iucn.org

For further  
information  
[www.iucnrlc.org](http://www.iucnrlc.org)