The Red List of Ecosystems (RLE)
A Summary Briefing Note of Progress to Date

IUCN Commission on Ecosystem Management (CEM) and Global Ecosystem Management Programme (GEMP), September 2014

1. Background & Origins of the RLE

It is increasingly recognized in conservation that assessing risks to biodiversity at multiple levels is required to provide comprehensive and applicable evidence for policy-making and management. IUCN pioneered the way for systematic and standardized assessment of species risk, but until recently no equivalent standard for ecosystem-level and spatially explicit risk assessment existed. An important advance for IUCN and conservation occurred in May 2014, when the Categories and Criteria underpinning the Red List of Ecosystems (RLE) were officially recognized by the IUCN Council as a global standard for assessing the risks to ecosystems.

Ecosystem assessments address important ecological processes and dependencies, and interactions among species. Ecosystem loss and degradation can precede species loss, and has impacts on ecosystem services. Society often perceives loss of biological diversity in terms of loss of benefits such as clean water, food, timber, and fuel. Ecosystem-level assessments may also be less time consuming than species-by-species assessments. RLEs can complement the policy successes of species red lists, and strengthen the case for conservation and sustainable resource use.

The RLE is a central theme of IUCN's Commission on Ecosystem Management (CEM) and Global Ecosystem Management Programme (GEMP). RLE development has been encouraged and supported by the global community at World Conservation Congresses (WCC) since 2004. Key activities in early RLE development included:

a) A proposal presented at the III WCC (Bangkok, 2004), leading to development and testing of a system for assessing the risk of ecosystem collapse based on four criteria: reduction of land cover and continuing threat, rapid rate of land cover change, increased fragmentation, and highly restricted geographical distribution.
b) In March 2008, a Working Group met in London to examine proposed protocols for a universally-accepted and globally-applicable system for quantifying the level of threat to ecosystems, and develop a work plan. Such a system was envisioned to be: easily understood; logically consistent with the species-based approach; transparent, objective, and based on sound science; applicable to terrestrial, marine, and freshwater systems; applicable at multiple spatial scales and resolutions; use historic and current data; explicit about how risk assessments can inform conservation priorities; and comprising criteria with thresholds that reflect varying levels of risk.
c) A motion was approved at the IV WCC (Barcelona, 2008; Resolution 4.020) to launch the official RLE consultation process within IUCN for "the development, implementation and monitoring of a global standard for the assessment of ecosystem status, applicable at local, regional and global levels".

2. First Steps: to WCC Jeju (2012)

CEM created the RLE Thematic Group, with two main goals for 2009-2012: 1) Develop and publish a research agenda along with preliminary categories and criteria for examination by the scientific and conservation community; and 2) Disseminate this draft at workshops around the world and encourage tests of the methodology for a diversity of ecosystem types and institutional settings. Between 2008 and 2012 the following was achieved:

a) The publication of *Establishing IUCN Red List Criteria for Threatened Ecosystems* as version 1 (V1) of the RLE Criteria (www.iucnredlistofecosystems.org/wp-content/uploads/2012/06/Rodriguez-et-al.-2011-Establishing-Red-List-Criteria-for-Ecosystems.pdf).
b) V1 comprised a new set of four proposed criteria: recent declines in distribution or ecological function, historical total loss in distribution or ecological function, small distribution combined with decline, or very small distribution.
c) Creation of a portfolio of case studies began.
d) The *Red Book of Terrestrial Ecosystems of Venezuela* (www.iucnredlistofecosystems.org/wp-content/uploads/2012/09/LREV.pdf) was the first major effort using the newly-developed criteria, which assessed the status of 18 vegetation types at national and state levels, with 10 more detailed case studies.
e) Further research and testing led to refinement of the criteria (synthesized into version 2 or V2), which were published along with a justification of the science that underpins them in 2013 in *Scientific Foundations for an IUCN Red List of Ecosystems* (http://dx.plos.org/10.1371/journal.pone.0062111).
f) This testing of the criteria highlighted challenges for the scientific theory behind the RLE and for implementing the criteria, including a). Defining ecosystems, their salient processes and differentiating them from other ecosystems; b). Defining when an ecosystem has been lost or has collapsed (analogous to extinction); and c). Assessing how spatial and temporal scales affect ecosystem threat assessments. These are ongoing areas of research, and key areas for interaction and feedback between researchers, policy-makers and those implementing the criteria.
g) International expert consultation (2011-2014): a series of 18 conceptual and practitioner workshops and 17 conferences in 20 countries and 5 continents.
h) Establishing the RLE governance structure, as a joint product between CEM and GEMP, with a globally distributed technical headquarters, a Committee on Scientific Standards (CSS), and a small steering group (CEM-GEMP) for day to day management.
Though led by IUCN's CEM and GEMP, active participation of experts from other IUCN sectors is taking place, especially from the Global Species Programme (GSP), Species Survival Commission (SSC), academics and IUCN members.

3. From Jeju to the Present (2014)

Since the adoption of Resolution 4.020 in 2008 and Resolution 5.055 at the V World Conservation Congress in Jeju in 2012, RLE consultations have reached hundreds of experts in 20 countries. Primary outputs include:

a) A published manuscript on the *Scientific Foundations for an IUCN Red List of Ecosystems* which summarizes the

scientific advances of the consultation process, presents a broad portfolio of case studies, and introduces the most recent version (V2) of the categories and criteria (http://dx.plos.org/10.1371/journal.pone.0062111),

b) Development of the *IUCN Red List of Ecosystems: Categories, Criteria and Guidebook* (in review), to guide RLE assessments at national, regional and global levels.

c) A website (www.iucnredlistofecosystems.org) with a range of resources available in English, Spanish and French, including reference documentation (guidebooks, scientific articles), a portfolio of case studies, and a series of remote training resources (coming soon). Social media is also used to raise public awareness.

d) Active uptake at the regional level, with national RLEs underway or completed in 14+ countries and several regions: a). under V1 – Norway, Venezuela and case studies in China and New Zealand; b). under V2 – Continental Americas, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Madagascar, Morocco, Paraguay, Peru, Senegal, Uruguay, plus 20+ case studies from Australia, Canada, France, Germany, New Zealand, South Africa, USA, Venezuela, Aral Sea, Caribbean, Europe and more. These efforts mark an important contribution toward achieving global coverage of RLE assessments.

e) An important meeting in Cambridge (Jan 2014) brought together nearly 30 species and ecosystems experts to explore and address some of the challenges and concerns facing the RLE. Most of these concerns were addressed, though some still remain (http://cmsdata.iucn.org/downloads/cem_ssc_rle_workshop_jan2014_final_report_web.pdf).

f) A Committee on Scientific Standards (CSS) was constituted in 2014 with over 25 ecosystem specialists. The first meeting of this group will be held in early 2015.

g) A major project funded by the Australian Research Council (ARC) is leading on the RLE research and development agenda.

h) Additional leverage funding has been obtained for further national-level work in the Americas.

4. The Route Forward

By 2025, we aim to assess the conservation status of the world's terrestrial, freshwater, marine and subterranean ecosystems, create the first *IUCN Red List of Ecosystems of the World*, and contribute to multiple CBD Aichi Biodiversity Targets (most notably Target 5). There are three major, overlapping challenges: 1) strengthening technical and scientific capacity; 2) achieving global coverage of assessments; and 3) mapping the ecosystems of the world.

a). Strengthening capacity: Two parallel strategies are needed to: a). develop the capacity to carry out periodic global RLE assessments; and b). respond to stakeholder groups at the national and regional levels. We aim to meet the first by building technical capacity within IUCN. National and regional assessments require a flexible, deployable task-force of assessors. To date, we have carried out trainings in Spanish, English, Portuguese, French and Dutch, operating from Venezuela, Australia, Chile, Netherlands, France, the UK and the United States.

b). Achieving global coverage of assessments: The IUCN Red List of the Continental Ecosystems of the Americas will be completed by 2015, providing a series of baselines, assessments of land cover change against these baselines, analyses of the drivers of change, and application of the RLE criteria to ecosystems at both continental and national scales. Engagement with national governments is establishing the foundations to inform and influence regional and international economic, social and environmental cooperation organizations, land use and macro-economic planning, and biodiversity science and policy. In addition to the national efforts we currently support, we are building partnerships to implement this model in Africa; regional assessments are underway in Europe; and we are looking to expand to Asia, Oceania, and the marine, freshwater and subterranean realms.

c). Mapping the ecosystems of the world: Although a global taxonomy and classification of ecosystems is not essential for risk assessment, it will strengthen the consistency, comparability and transferability for nesting of sub-global assessments, and provide a common field for linking databases on species and ecosystems. Using the IUCN Red List of Threatened Species Habitats Classification Scheme (www.iucnredlist.org/technical-documents/classification-schemes) will be a starting point to establish a single classification scheme, applicable to species, ecosystems and areas, spanning terrestrial, freshwater, marine and subterranean ecosystems.

The RLE is a spatially inclusive product that can form a base from which to integrate/overlay other IUCN knowledge products to better understand the drivers of change and relationships between e.g. conservation action, better governance and improved ecosystem health. The RLE team will work with other key knowledge products of the Union – The IUCN Red List of Threatened Species (RLTS), World Database on Protected Areas (WDPA), Key Biodiversity Areas (KBAs) – so that these databases can be seamlessly integrated. Another focus is developing the RLE for application in land use planning (including macro-economic and fiscal) at the national and regional levels, and with different governance structures, especially at the ecosystem level. This will bring biophysical elements and insights into the drivers of ecological change as an important complementary tool to the Natural Resource Governance Framework and HDN (work on the interrelationship between people and ecosystems) as they evolve. In addition, RLE can play a very important role in how we identify and map ecosystem changes and risks linked to climate change.

5. Conclusion

Several decades of experience with risk assessment of threatened species, combined with an increased availability of data and analysis tools, has provided the backdrop for the creation of the IUCN RLE. Just as the IUCN RLTS has taken decades of research, assessment and remodeling to arrive at its present form, the RLE will continue to be refined through research, testing and implementation, along with the collaboration between scientists, policy-makers, managers and the public that these processes entail. Together with other key IUCN knowledge products, RLE is part of a diverse toolbox for spatial and temporal analyses of biodiversity attributes at multiple scales. Precisely how these fit together will evolve as the RLE is further developed and the tools linked through global and regional assessments. Ultimately, we aspire to support the creation of national, regional and global RLE that are readily accessible and available to inform conservation decision-making by all sectors of society.