



Application of Indigenous & Local Knowledge (ILK) in IUCN Red List assessments: White paper

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Executive Summary

Indigenous and Local Knowledge (ILK) has been developed over centuries or millennia by indigenous peoples and local communities (IPLCs) and is continuously evolving. It provides a unique and rich source of information on biodiversity and also represents an important aspect of human cultural, and behavioural diversity. There has been increasing recognition over recent years that ILK has an important role to play in environmental decision-making, management, policy, and assessments. Application of ILK into formal scientific processes increases the likelihood that these processes are comprehensive and informed by the best available information. Historically, elements of ILK have frequently been described by visiting scientists and others, but often in a piecemeal way, or with information misunderstood or synthesised, and without attribution. This situation has improved in recent years, although application of ILK in Red List assessments has been limited to date, at least as specifically accredited, although some information from ILK holders may be included within cited reports and publications. This document examines the issues and general principles surrounding the application of indigenous and local knowledge (ILK) in the IUCN Red List and outlines some key steps. The document builds on discussions that have taken place over the last decade between the IUCN CEESP-SSC Sustainable Use and Livelihoods Specialist Group and the IUCN SSC Red List Committee and draws on experience from the IPBES ILK Approach. ILK and science are different ‘knowledge systems’ that share some characteristics and should be seen as complementary. ILK has an equal value and is applied like information from other sources or knowledge systems, using the same SIS fields in the Red List process. However, the ways that ILK is accessed will vary, requiring a flexible approach. There are no *a priori* barriers in principle to applying ILK in the Red List which treats information from all knowledge systems equally. However, accessing ILK is not straightforward and a considered and sensitive approach to IPLCs is required, which poses some practical and logistical challenges. A concerted programme by IUCN (Red List Committee, SULi, CEESP, others) together with major partners, is needed to ensure comprehensive and effective application of ILK in Red List assessments.

Part 1. Background

Introduction

The aim of this document is to examine thoroughly all the issues and general principles surrounding the application of indigenous and local knowledge (ILK) in the IUCN Red List of Threatened Species and to outline some key steps to enhance this application in Red List assessments. The document builds on and draws from discussions over at least the last decade between the IUCN CEESP-SSC Sustainable Use and Livelihoods Specialist Group and the IUCN SSC Red List Committee, including an earlier unpublished draft

guidance¹ and complements this with insights gained from the development of the IPBES ILK Approach. The draft document (in English only) was subject to two rounds of consultation, each lasting two months, within IUCN and among IPLC networks.

Indigenous and Local Knowledge (ILK) has been developed over centuries or millennia by indigenous peoples and local communities (IPLCs) and is continuously evolving. It provides a unique and rich source of information on biodiversity and the environment and also represents an important aspect of human cultural, and behavioural diversity. Although some elements of ILK have long been described by visiting scientists and others, this has usually been done in a piecemeal way, with knowledge misunderstood, synthesised, misappropriated, or removed from its cultural context, very often without consent, attribution, or acknowledgement (see e.g., Mead et al. 1994). These experiences have left a legacy of mistrust among many IPLCs, due to knowledge theft and appropriation, lack of equitable benefit sharing, and heightening of power inequities on one hand, and the romanticization of indigenous knowledge and communities on another (Briggs 2005). This legacy notwithstanding, there has been increasing recognition over recent years that ILK has an important role to play in environmental decision-making, management, policy, and assessments. See e.g., Cajete (2000) and Atleo (2011) for indigenous views of global crisis and interdependence and Pieroti (2011) and Kimmerer (2013) on roles of indigenous knowledge. Building synergies between ILK and scientific knowledge systems is therefore recognized as providing opportunities to strengthen fairer and more inclusive sustainable ecosystem governance at multiple scales (e.g., the Multiple Evidence Base approach of Tengö et al. 2014). These opportunities may further empower IPLCs by increasing their capacity to inform and participate in national and international biodiversity-related deliberations and governance processes (Hill et al. 2020, McElwee et al. 2020). Application of ILK in assessments may enable fairer, ethical, and inclusive conservation actions. Application of ILK into formal scientific processes increases the likelihood that these processes are comprehensive, accurate, reflect the reality on the ground, and are informed by the best available information; in some cases, ILK may be crucial, especially when it is the principal, or only, source of information available (e.g., Ataria et al. 2018).

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), adopted in 2007, is the most comprehensive international instrument on the rights of indigenous peoples that establishes a universal framework of minimum standards for the survival, dignity, and well-being of the indigenous peoples of the world. The UN Convention on Biological Diversity's Article 8(j) states that signatory countries should preserve and maintain the knowledge of IPLCs relevant for the conservation and sustainable use of biological diversity. A Working Group on Article 8j was established in 1998 and a

¹ Cross, R., Doornbos, S., Cooney, R., Wong, P., Mead, A., Lindeman, K., Kanagavel, R., Parvathy, S., Tomasini, S., Montanari, B., Gabrys, K., Kehaulani Watson-Sproat, T. (2017). Guidance for Integrating Indigenous and Local Knowledge (ILK) in IUCN Red List Assessments. Unpublished.

programme of work in 2000. Other international initiatives to better understand and apply ILK have been taken such as by the World Bank (Mkapa 2004) and the UN Food and Agriculture Organization. The International Indigenous Forum on Biodiversity (IIFB) was established in 1996 by the indigenous peoples of seven world regions to address the relationship between natural resources, biodiversity, and indigenous territories and to facilitate the full and effective participation of indigenous peoples in the Convention on Biological Diversity (CBD). The CBD has adopted a decision on integration of Article 8(j) and provisions related to indigenous peoples and local communities in the work of the Convention and its Protocols (<https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-17-en.pdf>). The CBD Secretariat has established a series of Global Thematic Dialogues to advance this process in relation to the post-2020 global biodiversity framework.

The Convention on Biological Diversity (CBD) periodically produces a report, the Global Biodiversity Outlook (GBO), summarizing the latest data on the status and trends of global biodiversity. The fifth edition, GBO-5, was produced in 2020 (Secretariat of the Convention on Biodiversity 2020). This is complemented by Local Biodiversity Outlooks 2 (LBO-2; Forest Peoples Programme et al. 2020) which describes the contributions made by indigenous peoples and local communities to the implementation of the goals and targets of the Strategic Plan for Biodiversity 2011-2020. LBO-2 also outlines indigenous peoples and local communities' aspirations and ambitions for the new global biodiversity framework.

The basic principles and ethical considerations that guide interactions and processes with ILK holders and IPLCs are widely agreed, including ensuring that interactions take place on an equitable and respectful basis, protecting their rights, working with established community structures, and taking care over the use of language and terms.

The CBD has developed sets of detailed guidance, including the *Tkarihwaié:ri Code of Ethical Conduct to Ensure Respect for the Cultural and Intellectual Heritage of Indigenous and Local Communities Relevant to the Conservation and Sustainable Use of Biological Diversity* (Secretariat of the Convention on Biological Diversity (2011); the *Mo'otz Kuxtal Voluntary Guidelines for the development of mechanisms, legislation or other appropriate initiatives to ensure the "prior and informed consent"* (Secretariat of the Convention on Biodiversity 2019a) and *The Rutzolijirisaxik Voluntary Guidelines for the Repatriation of Traditional Knowledge of Indigenous Peoples and Local Communities Relevant for the Conservation and Sustainable Use of Biological Diversity* (Secretariat of the Convention on Biological Diversity 2019b).

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) promotes the application of ILK, has established an ILK Task Force and Technical Support Unit, and has developed an IPBES ILK Approach (<https://ipbes.net/ipbes/ilkapproach/ipbes-5-15>) to guide work. The IPBES Global Assessment (GA) was the first global scale assessment to engage systematically with ILK.

This exercise showed that the existing knowledge base is fragmented, with lack of integration between social and natural sciences, and between science and ILK and that integrating different world views in substantive ways will require increased dialogue and agreement (IPBES 2019). The IPBES exercise also showed that gaining direct participation and inputs from IPLCs was challenging, hence dialogue workshops were instituted.

The *IUCN Standard on Indigenous Peoples* (IUCN ESMS 2019) recommends that: *“Indigenous peoples are consulted and are active and effective participants in decision-making processes relevant to them and related to conservation activities supported by IUCN. Free, Prior and Informed Consent (FPIC) is obtained for any intervention affecting their rights and access to their lands, territories, waters and resources”*. In 2016, IUCN Members voted to create a new separate category of membership for indigenous peoples’ organisations, strengthening the recognition of their rights, participation, voice, and role in IUCN. Twenty-three such organisations have joined this IUCN membership category so far. In addition, membership of the IUCN Council was extended in to include an indigenous councillor, the first of whom was appointed in 2016.

Indigenous & local knowledge and science

‘ILK’ and ‘science’ are distinct types of knowledge systems: *“the agents, practices and institutions that organize the production, transfer and use of knowledge”* (Cornell et al. 2013). ILK is also referred to in the literature as traditional ecological knowledge, aboriginal traditional knowledge, local ecological knowledge, indigenous ecological knowledge, traditional knowledge, and other similar terms and ‘science’ is sometimes referred to in the literature as formal science, traditional science, or western science (the first of these modifiers is avoided as unnecessarily restrictive, the second as confusing, and the third as geographically incorrect).

Indigenous Knowledge (IK) and Local Knowledge are separate concepts or knowledge types but despite their different contexts, and some issues around an agreed definition of a local community, they are increasingly used together, e.g. by UNESCO (<http://www.unesco.org/new/en/natural-sciences/priority-areas/links/related-information/what-is-local-and-indigenous-knowledge>) and by IPBES.

Some indigenous communities object to IK and LK being linked together. For example, the Inuit Circumpolar Council (ICC) understands indigenous knowledge and local knowledge as two different concepts that should not be conflated to mean the same thing. The ICC also sees indigenous communities as different from local communities. The definition of Indigenous Knowledge used by Inuit Circumpolar Council is: *“Indigenous knowledge is a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence acquired through direct and long-term experiences and extensive and multigenerational*

observations, lessons, and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation” (Arctic Council 2016). Under this definition, IK extends beyond observations and ecological knowledge to a unique ‘way of knowing’.

The definitions used here follow those used by IPBES: ILK is defined “*Knowledge and know-how accumulated across generations, which guide human societies in their innumerable interactions with their surrounding environment* “. ILK is typically generated and maintained by IPLCs, which are defined as “*individuals and communities who are, on the one hand, self-identified as Indigenous and, on the other hand, are also members of local communities that maintain intergenerational connection to place and nature through livelihood, cultural identity and worldviews, institutions and ecological knowledge”* (IPBES 2019).

ILK can be transmitted orally, in written form, and through song, dance, paintings, rituals, ceremonies, visual manifestations, symbols, and artwork; it can incorporate aspects of culture, spirituality, and history and/or have economic, religious, and pragmatic dimensions (Hill et al. 2020, McElwee et al. 2020). ILK is verified, implemented, challenged, and applied within its own processes of validation and conceptualizations of ‘nature’ and ‘sustainability’. ILK is validated through practice, experiment, and repeatability, such as by the efficacy of plant cures or hunting techniques and knowledge of animal movements and behaviour. ILK may provide ground-truthing over vast time scales of changes in the environment. ILK methodologies and products are peer reviewed and validated by ILK holders. ILK holds its own methodologies and objectives, so it is important not to attempt to translate one source of knowledge into the other.

In many parts of the world, IPLCs and their associated ILK are recognised through formal and informal institutions at regional or national levels. In Latin America, the Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA) provides a coordinating umbrella for the indigenous organisations of the Amazon Basin (<https://coica.org.ec>) and a similar role is played in Colombia by the Organización Nacional de las Puebas Indígenas de la Amazon Colombiana (<https://www.opiac.org.co>). The Indigenous Peoples of Africa Co-ordinating Committee (IPACC; <https://www.ipacc.org.za>) is a network of 135 indigenous peoples’ organisations in 20 African countries. Further examples include the Kalahari Peoples Network (<http://kalaharipeoples>); the Russian Association of Indigenous Peoples of the North - RAIPON (<http://raipon.info/en>), and Aliansi Masyarakat Adat Nusantara (AMAN) or Indigenous Peoples Alliance of the Archipelago (<http://www.aman.or.id>), an independent social organisation composed of indigenous communities from across Indonesia. It should be noted that in most cases these institutions represent indigenous peoples. Non-indigenous local communities are less well organised and represented, although some umbrella organisations do exist such as the World Forum of Fisher

Peoples which represents over 10 million small scale fishers from all over the world (<https://worldfishers.org/>).

In Canada, the government Committee on Status of Endangered Wildlife (COSEWIC) is legally required through the Species at Risk Act to include ILK in species assessments. COSEWIC has established an Aboriginal Traditional Knowledge Subcommittee and an ATK Process and Protocol Guidelines Working Group to develop guidelines for including Aboriginal knowledge in species assessments. In Aotearoa-New Zealand, environmental and conservation legislation requires government representatives to “give effect to” or “take appropriate account” of the Treaty of Waitangi/Te Tiriti o Waitangi, however interpretation and actioning of these directives is often highly variable.

In many other countries, customary rights-holders are represented by national organizations or networks of indigenous peoples, livestock-holders, fishers, etc. Regional or thematic bodies include the World Forum of Fisher People, the Community-based Interdisciplinary Observatories in Sweden and Siberia, *amchi* (Tibetan medicine practitioner) associations in the Himalaya, and other fisher, hunter, and trapper associations. In some regions, IPLCs may be more fragmented across extensive areas.

There are other several instances where national governments, institutions, and certain sectors of society may refuse to recognise indigenous peoples, remain unsympathetic to their needs, discriminate against them, and discourage their organization.

‘Science’ is defined by the Science Council as “*the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence*” (<https://sciencecouncil.org/about-science/our-definition-of-science/>). Scientific methodology includes objective observation, measurement and collection of data, evidence, experiment and/or observation for testing hypotheses; reasoning to establish general rules or conclusions drawn from facts; repeatability, critical analysis, testing, exposure to critical scrutiny, and peer review.

There are undeniable differences between the two knowledge systems, which derive from their individual epistemological contexts. For example, ILK has an explicit belief component, which science -- being "objective" -- does not have (Berkes 2018). However, they both share some characteristics such as collection of data, observation of empirical changes, and use of experiments to test ideas (Raymond et al. 2010). Both knowledge systems are dynamic and complementary; neither is static and both kinds of knowledge evolve in their own way.

Science is often held to be neutral and objective, consisting of ‘hard facts’, whereas ILK may be perceived as more subjective, less rigorous, or intuitive (Berkes, 1999, Armitage and Kilburn 2015). However, it is helpful to distinguish between the ‘scientific method’ (a formal process) and scientific information, which, when reported, is influenced by personal perspectives, ideologies, or institutional contexts (Evely et al. 2008, Raymond

et al. 2010). Science encompasses divergent views and multiple interpretations of analyses and evidence. Science includes fuzzy logic (where the where the assigned values are qualitative and not quantitative) and competing concepts: for example, there is no universally accepted definition of a ‘species’, despite the fact that this is perhaps the fundamental currency of biodiversity, with over 25 species concepts proposed (De Queiroz 2007).

Application of ILK in scientific assessments

The IPBES ILK Approach formally recognises ILK as part of the global knowledge base and is committed to *“recognize and respect the contribution of indigenous and local knowledge to the conservation and sustainable use of biodiversity and ecosystems”* as one of its eleven operating principles. In 2017, the IPBES 5th Plenary meeting adopted the *“Approach to recognizing and working with indigenous and local knowledge in IPBES”* (IPBES 5/15/Annex II to Decision IPBES-5/1).

The IPBES ILK Approach builds on the work of several multilateral processes in which IPLCs and scholars working in partnership with them have called for recognition of the value of ILK, including the Millennium Ecosystem Assessment (MEA). IPBES has invited IPLCs to participate as key rightsholders, stakeholders and contributors to its products, which have so far included methodological, thematic, regional, and global assessments (Hill et al. 2020). The Millennium Ecosystem Assessment (Reid et al. 2006) and the IPBES Global Assessment (GA) were the first global scale assessments to engage systematically with ILK. The IPBES Global Assessment showed that bringing ILK and IPLCs into the assessment processes requires a deliberate framework and approach from the start that facilitates recognition of different knowledge systems, identifies questions relevant at various scales, mobilizes funding, and recognizes time required and engages networks of stakeholders with diverse worldviews (McElwee et al. 2020).

Another example of an assessment involving ILK is Local Biodiversity Outlook 2, which complements the Global Biodiversity Outlook by presenting the perspectives of IPLCs to the implementation of the goals and targets of the Strategic Plan for Biodiversity 2011-2020, the Sustainable Development Goals (SDGs), the Paris Agreement, and the Convention on Biological Diversity. Over 50 IPLCs contributed their perspectives and experiences in the assessment of progress towards global biodiversity goals.

Within IUCN, the *Guidelines for gathering of fishers’ knowledge for policy development and applied use* (Cowie et al. 2020) provide practical and theoretical guidance on how gathering Fishers’ Knowledge can be utilised in policy development and assessment. Red List assessments conducted by the IUCN SSC Snapper, Sea Bream and Grunt Specialist Group have applied local fishers’ knowledge, and local fishers have been invited to become members of the group, complementing the scientific knowledge of other members (Cowie et al. 2020).

There are numerous other examples of the application of ILK in scientific publications, reports, and assessments, for example in enhancing knowledge of species' ecology, use, population trends, and threats; collaborative work to create inventories and document the use of plants; and involvement in species status reports and action plans through formal government structures (Box 1). In some contexts, certain species may be lumped into a single group (i.e. not allocated separate names) and ILK holders and communities may have limited knowledge about them.

BOX 1: Examples of application of ILK in scientific assessments

- An interview survey in the regional vernacular showed that indigenous knowledge of the ecology of four rock kangaroo species in Australia (*Petrogale brachyotis*, *P. concinna*, *Macropus bernardus* and *M. robustus*) both complemented and extended that reported in the scientific literature (Telfer and Garde 2006).
- Joint surveys in Ulug National Park, Australia, demonstrated that information from Aboriginal people could enhance, and in some instances provide an alternative perspective on habitat classifications, recognition of habitat preferences and knowledge of the effects of drought and fire (Baker and Community Mutitjulu 1999).
- In the Solomon Islands A study used ILK to build much more accurate assessments of abundance of crocodiles based on indigenous people living and fishing continually in these waterways and converted the ILK findings to quantitative results (van der Ploeg et al. (2018).
- Long-term historical ILK data were analysed to retrospectively model the historical abundance of depleted green turtle (*Chelonia mydas*) populations in Baja California, and hence the extent of decline (Capistrán et al. 2018).
- ILK holders in three villages in Guizhou province, China, revealed that the Critically Endangered Chinese giant salamander *Andrias davidianus* was rarely sighted by villagers in two nature reserves, despite being predicted through modelling approaches to survive there, and was being inadequately protected due to local harvesting pressure (Pan et al. 2016).
- A systematic social survey of Kadar communities in the Western Ghats of India revealed that their extensive knowledge of two chelonians showed that *Indotestudo travancorica* was more abundant, contradicting recent scientific surveys; later field work supported this assertion (Kanagavel & Raghavan 2012, 2013).
- Surveys including ILK of Anamalai gliding frog *Rhacophorus pseudomalabaricus* extended the known range of the species and suggested a change in its Red List status from Critically Endangered to Endangered (Harpalani et al. 2015).
- ILK on migratory bird species in the Canadian and Greenland Arctic provided information on population declines that had previously been undetected

- (Gilchrist et al. 2005). In 2004, Inuit hunters from Ivujivik, Québec, were the first to detect avian disease outbreaks among Northern Common Eiders *Somateria mollissima borealis* nesting in the Hudson Bay area (Henri et al. 2018).
- In Canada, documentation of indigenous knowledge has increased knowledge of polar bear *Ursus maritimus* habitat, dietary preferences, body condition, behaviour, distribution, population size, movement patterns, denning behaviour, interactions with other animals and humans, responses to environmental change such as loss of sea ice, delineation of subpopulations, interchange among subpopulations, impact of habitat changes such as the deterioration of sea ice conditions (Joint Secretariat 2017, Wong et al 2017). The draft guidelines of a new government status report on polar bear were shared with Aboriginal elders and knowledge holders for review and approval. ATK Subcommittee members also identified qualified individuals and established a network of Aboriginal knowledge holders and related experts from approximately 35 eco-regions of Canada. The ATK substantiated many documented scientific claims.
 - The New Zealand Kiwi Recovery Plan engaged many *tangata whenua* (legally recognised community organizations) at each stage of development and in the authorship (Germano et al. 2018).
 - Differences in harvest rates of tītī *Ardenna grisea* between successive years in New Zealand allow Rakiura Māori to significantly predict the direction and intensity of El Nino Southern Oscillation in the following 12 months. Rakiura Māori have also used these data to track the decline in tītī populations over the past 50 years (Lyver et al. 1999; Humphries and Moller 2017).
 - Bolivian biologist Erika Cuellar has worked with indigenous ‘parabiologists’ in conservation of the guanaco *Lama guanicoe* in the Chaco Ecoregion <https://whitleyaward.org/winners/conservation-chaco-bolivia-paraguay/>
 - Interviews with beach mollusc gleaners in Kenya revealed that more than 150 species were harvested and showed a temporal decline of gleaned species, and perceived drivers, suggesting that local ecological knowledge helps to understand historic changes in fisheries lacking long-term scientific data (Mwakha et al. 2020).
 - Collaborative work between botanists and ILK holders has extended the knowledge of medicinal plants and their distribution, status and use in Yunnan, China (Liu et al. 2009), Northwest Himalaya (Vidyarthi et al. 2013) and New Guinea (Cámara-Leret and Dennehy 2019).
 - The IUCN SSC Indian Sub-Continent Plants Specialist Group works with local communities in southern peninsular India and Sri Lanka who use the endemic arogyapacha *Trichopus zeylanicus* in herbal health tonics, to assess the local impacts of extraction by pharmaceutical companies.
 - The IUCN Cycad Specialist Group has conducted monitoring of queen sago *Cycas circinalis* in partnership with local communities in the Nilgiri Hills, India. Local community members provided information on illegal harvests to the local authorities who took necessary action.

The IUCN Red List

The IUCN Red List of Threatened Species™ (hereafter Red List), based on the IUCN Red List Categories & Criteria, is the accepted global standard for assessing the extinction risk of all species of flora, fauna, and fungi. Red List assessments and their supporting documentation on species status, ecology, and threats are used widely (Rodrigues et al. 2006), for example: to inform listings on the appendices of the Convention on International Trade in Endangered Species (CITES) and the Convention on Conservation of Migratory Animals (CMS), in IPBES assessments including the Global Assessment to determine species trends, by the World Heritage Convention and Ramsar Convention for information on sites, by national governments in their National Biodiversity Strategy and Action Plans, and in conservation policy and planning. Changes in species' Red List status are analysed and tracked through the Red List Index (RLI) which is used as an indicator of progress towards the Sustainable Development Goals and the targets under the UN Convention on Biological Diversity.

The Red List is governed and managed by the IUCN Species Survival Commission (SSC) Red List Committee and maintained by the IUCN Secretariat's Red List Unit. At the core of the Red List are the categories of extinction risk (Figure 1). When first developed in the 1960s, these categories were subjective in nature. They were revised in 1994 and further developed into a standardized, objective process to ensure transparency and comparability across taxonomic groups (Mace et al. 2008). There are nine categories (Fig. 1) and five criteria, each with quantitative thresholds that are underpinned by mathematical modelling and population viability analysis (IUCN 2001, 2012).

The Red List Process

The Red List assessment process for all species is formalized through Rules of Procedure that are approved by the IUCN Red List Committee and SSC Steering Committee (IUCN 2016). The core process in developing a Red List assessment is the standardised documentation of parameter estimates (population size, range size, rate of decline, etc) which underlie the application of the thresholds across the criteria to derive the Red List category, which must be accompanied by a clear and transparent justification. Assessments may involve a measure of expert judgment, where accurate information is lacking, and encourage documentation of uncertainty. Detailed guidelines for the application of the categories and criteria are produced and updated regularly (latest version: IUCN Standards and Petitions Committee 2019). Each assessment contains supporting information on taxonomy, geographic range (including a distribution map), population, habitat and ecology, trade and use, threats, conservation actions, and a bibliography. Some of these data fields are 'required' (mandatory) and others are 'recommended' (non-mandatory). A conflict-of-interest policy is in place to further safeguard the independence of the assessment.

Accurate and robust assessments are founded on comprehensive information from all biodiversity knowledge-holders. Assessments include peer-reviewed articles, unpublished 'grey' literature, and oral reports. Information from different sources and from different parts of a species' range is considered before the appropriate category of threat is determined. Species are primarily assessed at global level, but assessments can be made for subpopulations, subspecies, and varieties; in some cases, the Red List includes assessments conducted at a regional level. The Red List categories and criteria can also be applied at national level. These assessments are not published on the Red List website, but they may help to show differences in status, trends, or threats across different parts of a species' range.

The coverage of the Red List is continually expanding, and reassessments of some taxonomic groups are carried out in regular cycles, supplemented by *ad hoc* assessments responding to significant changes in status. The Red List Strategic Plan sets out priorities over a 10-year time scale.

Red List data are submitted through, and stored in, the IUCN Species Information Service (SIS) database which is managed by the Red List Unit in Cambridge, UK. Assessments are published on the Red List website (www.iucnredlist.org), formalised with a digital object identifier number (doi) and are openly accessible to read or to download. A formal appeals process is in place to deal with any objections to an assessment.

At the operational level, the Chair of SSC appoints 'Red List Authorities' (RLA) who are responsible for assessing the species within their remit. RLAs comprise (i) a taxonomic Specialist Group (e.g. Mollusc SG), (ii) a stand-alone RLA (e.g. Caucasus Plants RLA), or (iii) a Red List partner (e.g. BirdLife International). An RLA may cover a single species (e.g. Polar Bear SG) or several thousand species (e.g. Orchid SG). Each RLA has a named Coordinator who organises the assessment process for those species. Assessments may be conducted at a workshop or by RLAs working independently, collecting data and consulting experts as appropriate.

In addition to the RLA coordinator, four roles are explicitly acknowledged in making a Red List assessment, two of these are required and two are optional:

1. *Assessor (required)*: leads production of an assessment and is listed as the 'author/authors'. Assessors or assessor teams are approved by the RLA coordinator.
2. *Contributor (optional)*: provides information to one or more parts of the assessment, at any scale (*if relevant*).
3. *Facilitator (optional)*: organises or assists with an assessment workshop or otherwise facilitates production of an assessment (*if relevant*).

4. *Reviewer (required)*: makes an independent evaluation of an assessment (similar to peer-review of a journal article). Reviewers are approved by the RLA Coordinator).

The principal steps in making a Red List assessment are:

- (i) Baseline data are compiled by the assessor or assessor team (or reviewed and updated in the case of a reassessment);
- (ii) the appropriate category of threat is assigned, with a clear and explicit justification, preferably based on an automated criterion calculator embedded within the Species Information Service (SIS);
- (iii) the assessment is verified by at least one independent reviewer to ensure the correct category and criteria have been assigned and are adequately supported by the data;
- (iv) the reviewed assessment is submitted online by the RLA coordinator through the SIS portal, or sometimes via a Red List partner;
- (v) the assessment is validated by the IUCN Red List Unit;
- (vi) the assessment is published on the Red List website.

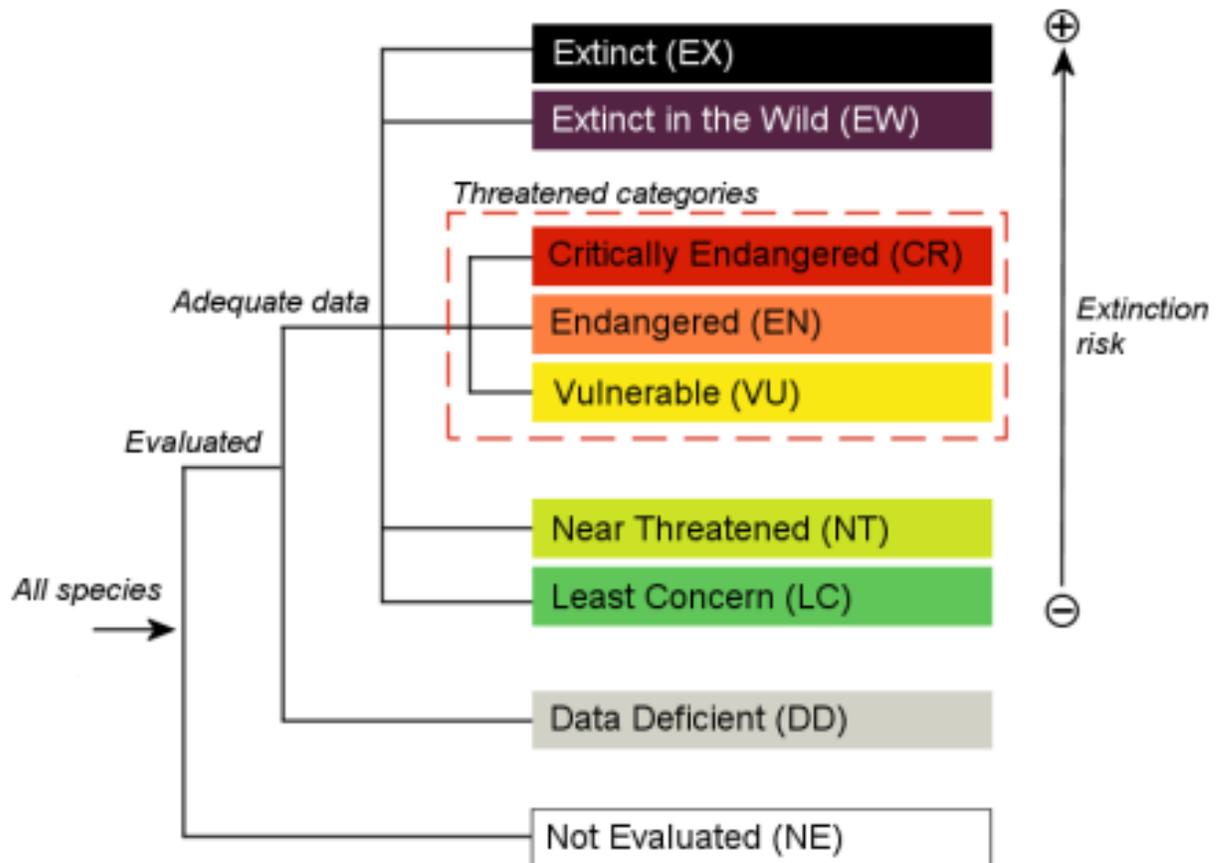


Figure 1. Structure of the Red List categories (IUCN 2012)

Part 2. Applying ILK in the Red List: Key questions

How often is ILK applied in the Red List?

Application of ILK in Red List assessments has been limited to date, at least insofar as it has been specifically accredited, although information from ILK holders has been included in some assessments within cited reports and publications (e.g. several published studies on bushmeat in Central Africa include data collected with IPLC). ILK may also have been recorded informally as part of routine conservation and community development work but not fully or appropriately acknowledged.

Why has ILK not been applied more frequently in the Red List?

There are several possible reasons for the low level of application to date, such as: failure to recognize the importance of ILK, or even that ILK exists; lack of capacity and experience of working with other knowledge systems or IPLCs; absence of established communications channels with IPLCs; lack of indigenous participation in SSC specialist groups and SSC more widely; Red List Authorities accustomed to working with the biological and ecological literature and unfamiliar with the social sciences; language barriers; time and resource constraints. In a few cases there has been direct resistance by RLAs to engaging with ILK. On the other hand, IPLCs may sometimes be reluctant to share some kinds of ILK due to cultural sensitivities, suspicion of the motives of external researchers, previous interactions with researchers, or concerns about the potential ramifications of Red List categorisation.

What is the role of ILK in the Red List?

The assessment process guidance stipulates that “all assessments must be based on data currently available for the taxon across its entire global range; and assessors must take full account of past and present literature (published and grey) and other reliable sources of information relating to the taxon”. Applying ILK ensures that assessments are comprehensive and informed by the best available information. ILK can also improve the quality of assessments by enabling a greater breadth, depth, and representation of information to be included. ILK holders often have intimate, local, and temporally specific knowledge of species and environments. This knowledge is typically obtained through long-term, repeated observations of the natural world over multiple generations. ILK holders are frequently highly attentive and reliable observers, particularly where livelihoods are critically dependent on such knowledge. One challenge is that Red List Authorities often do not know how to find out if that ILK exists, and how to access.

Will ILK always be applied in a Red List assessment?

Not necessarily. ILK can be applied to any species if relevant knowledge is available. The relative importance of ILK will be higher (i) where it is a major or the only source of information on the species; (ii) A species' range falls wholly within the territory of an IPLC; (iii) a species has high economic or cultural significance to an IPLC. ILK may be especially valuable as a source of data on subpopulations, recent fine-scale spatial and temporal changes, and/or temporal variation over extended time frames. In all cases, ILK will be interpreted in the broader context of the species' overall range, along with all other knowledge.

When may it not be possible to apply ILK in Red List assessments?

IPLCs may not wish to share information: (i) if the information sought is considered sacred by IPLCs not to be shared with others; (ii) if there is a perception that the information shared could cause a detriment to an IPLC such as threat of a legal ban on harvest when IPLCs disagree with the assessment or have other implications for use of a species. (Note that the official IUCN "*Guidelines for Appropriate Uses of IUCN Red List Data*" <https://www.iucnredlist.org/resources/guidelines-for-appropriate-uses-of-red-list-data> make clear that this is not an appropriate use of Red List data, but some national legal systems nevertheless make an automatic link between a threatened category and inclusion on protected species lists); (iii) to maintain confidentiality over sensitive locations (the Red List already has procedures for dealing with such cases); (iv) to protect traditional or territorial rights and access to a natural resource; (v) where involvement in such a process might put individuals or communities at risk of reprisals from governments or other interests.

What are the benefits to ILK holders and IPLCs of contributing their ILK to the Red List?

Applying ILK ensures that the assessment is based on the best and widest possible range of sources, which in turn supports the most appropriate category; indeed, applying ILK might in some cases prevent a species being miscategorised. For species that are harvested for food by indigenous people, assessments of changes in abundance within traditional living memory, are a far more accurate measure of status across vast tracts of indigenous lands than extrapolations made from more focussed monitoring in a small number of areas and can highlight regional differences. Applying ILK in the Red List promotes and gives formal recognition to that knowledge, and its inclusion in a global process can itself be empowering to IPLCs and further support their role as key rightsholders and stakeholders in decisions and conservation actions. Applying ILK will also contribute to continuing inter-generational transmission of knowledge.

Where can ILK be applied in an assessment?

ILK is applicable to any part of a Red List assessment, including the information (parameters or variables) used in determining the extinction risk category and criteria, and the supporting documentation fields (taxonomy, geographic range, population, trends, threats, use and trade, habitat and ecology, conservation measures). Indigenous

names for a species can also be recorded. Indigenous taxonomies, where they differ, can be recorded in the Taxonomic Notes field in the assessment.

How is ILK applied in an assessment?

ILK has an equal value and is applied like information from other sources or knowledge systems, using the same SIS database fields in the Red List process. However, the ways that ILK is accessed will vary, requiring a flexible approach (see below for recommended approaches to ILK and IPLCs).

How are differences between ILK and other knowledge resolved?

A fundamental part of the assessment process is to carefully evaluate the relative importance, geographic scope, or relevance of each item of information. Balancing differing views can be difficult, especially when these are incompatible or contradictory. This applies to differences within a single knowledge system (e.g., scientific disagreements occur frequently) or between two different systems. In 2020 the New Zealand Environmental Protection Authority published the Mātauranga Framework (www.epa.govt.nz/te-hautu-matuaranga) to help decision-makers understand, test, and probe Māori traditional knowledge when it is presented as evidence.

Where the range of a species overlaps more than one IPLC, ILK from multiple knowledge holders will need to be considered, and differences resolved, in the same way as differences in scientific opinion or in the published literature. Each IPLC group will have its own processes, context, and circumstances so ILK should not be considered homogeneously.

In which formats can ILK be applied?

Red List assessments incorporate a wide range of data types, including published articles, unpublished reports, and verbal information, which encompass several types of ILK. Other manifestations of ILK such as pictures and song may need more creative solutions, but one option is to use an appendix attached to the assessment, which is already accepted practice. All global assessments are submitted in English, French, Spanish, or Portuguese (see <https://www.iucnredlist.org/assessment/supporting-information>).

How are Intellectual Property Rights protected?

Protecting Intellectual Property Rights is a fundamental issue. The provenance of all information included within a Red List assessment, from all knowledge types, should be cited (even if simply as “personal communication” from a named individual or group), so attribution of the source of all information is explicit. The copyright of each assessment belongs to IUCN, but this applies to the final document in its entirety, and it does not affect the rights of individual knowledge holders in relation to knowledge they have shared. IPLCs or ILK holders will therefore retain ownership of, and copyright on, all knowledge shared in an assessment, in the same way as any other knowledge holders. If an item of information is later shown to be inaccurate, the assessment can be amended, and an ‘erratum’ version published. However, once knowledge has been shared and

published it remains in the public domain and cannot be withdrawn, nor its use restricted. In the event of consent to use knowledge being rescinded in a later assessment, the earlier version remains available as a 'published' document. Some IPLCs may want to verify that the information they have provided has been used appropriately.

It is therefore crucial to discuss and resolve all data issues between RLAs and IPLCs at an early stage to ensure that all parties understand and agree what knowledge will be shared and how it will be used, and to navigate the needs of different national and traditional legal systems (see e.g., Reid et al. (2006). A formal IPR agreement is the most effective way to ensure clarity and fairness. Since the 2000s, international ethical guidelines have been in place, including the International Society for Ethnobiology's 'Code of Ethics' (<https://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics>) and the 2010 Nagoya Protocol on Access and Benefit-sharing (<https://www.cbd.int/abs>). A growing number of specific IPR agreements with IPLCs have been developed over the last 10 years or so and these offer a framework, avoiding the need to start from the beginning with every new circumstance. It would be helpful to collate these agreements centrally and make them available for reference. For an example of the transfer of traditional healers' knowledge to scientists in Burundi, see Janssens de Bistoven et al. (2017).

How can ILK holders be accredited?

Assessors, facilitators, and contributors are normally named individuals, but may also be an organization or a group (as done by e.g., Amphibian SG, Antelope SG, BirdLife International). An IPLC organization, community, or group can therefore be accredited in the same way. Assigning credit appropriately should form part of the discussions between IPLCs and RLAs.

How does the Red List deal with sensitive data?

Publication of precise location details or distribution maps could put heavily harvested or very rare species at risk and similar considerations apply to species occurring in sacred natural sites if publication encouraged visitors or drew attention to them. Annex 7 of the Rules of Procedure for IUCN Red List Assessments 2017–2020, *The Sensitive Data Access Restrictions Policy*, states that location data may be withheld for highly threatened species that: a) are listed under certain criteria; (b) have high economic value; (c) are threatened by trade; and (d) have important sites that are generally not well known (such that Google or other internet search engines cannot find the sites). These provisions apply equally to ILK as to any other type of knowledge.

How is information stored in the Red List?

Assessments are stored in the SIS database, which has limited access. However, ILK is not retrievable separately and it can only be accessed or cited as part of a completed assessment, where it has already been attributed. Published assessments are openly available on the Red List website, where they can be read or downloaded in pdf format.

Assessments are archived like other journal publications under the Red List's ISSN (International Standard Serial Number).

Which Red List roles can be filled by ILK holders?

All roles in an assessment are open to ILK holders. ILK holders may most often fill the role of 'contributor' or 'assessor'. The role of 'facilitator' would be appropriate to individuals or a IPLC group assisting in the organization of an assessment workshop, or to intermediaries who facilitate contacts between the RLA and IPLC. 'Reviewers' are encouraged to follow a training course and pass an exam. The Red List training course is open to anyone, including ILK holders and members of IPLCs. The course is free and is available online (<https://www.iucnredlist.org/resources/online>), currently in English only. It has been proposed to consider a fifth named role in a Red List assessment for "ILK specialist" or similar, but the roles of all individuals or institutions who contribute to or facilitate application of ILK into a given Red List assessment can be fully encompassed by the existing roles. Membership of an SSC Specialist Group or Red List Authority is at the discretion of the group's Chair. ILK holders are members of some specialist groups, but likely very few. There is a growing number of high capacity IPLC/ILK organizations around the world and application of ILK into Red List assessments would benefit by extending invitations to such organizations to propose individual members to engage in this way.

How can ILK be accessed?

ILK may have sometimes been accessed through informal routes, but IPLCs recommend avoiding direct contact with individuals because the most effective and ethical channel of communication is through established IPLC organizations or networks for ILK holders and indigenous resource users. These organisations can indicate the most appropriate contacts who are authorised to speak on behalf of the IPLC and share ILK. They will also advise on how best to reach out to customary rights-holders for particular species, and on issues of data ownership, accreditation, and language.

Where such organizations are not well established or do not exist, a process will have to be developed. Working with IPLCs is especially challenging where the political environment is unsympathetic or hostile to their organization. Where such circumstances are known or suspected to exist, the greatest possible care should be exercised, and advice sought, before preliminary contacts are initiated.

How should IPLCs be approached?

For the Red List, the primary responsibility for engaging formally with IPLCs and signing IPR agreements rests with the RLA, although individual assessors will ultimately apply ILK in a species assessment. RLAs that have established contacts with IPLCs or contain ILK members among their members can work through and develop these links. Establishing and maintaining appropriate and respectful relationships between IPLCs and the Red List governance and operational structures is essential. Representatives of ILK holders and IPLCs stress that it may take several years to build a full level of trust, so

this task should be seen as a long-term enterprise. However, this process also has to take into account the established Red List assessment cycles and strategic priorities, and the need to accommodate assessments in response to rapid shifts in species' status.

Approaching IPLCs will likely require a variety of approaches in different communities. This should be done with an understanding of national laws, local governance, the community's cultural practices, gender considerations, language(s) and traditions, in order to ensure any approach is undertaken in a respectful, culturally appropriate manner, recognising that ILK holders are equal partners in the information sharing process: see for example the San people's ethics code (Callaway et al. 2017) and the Mo'otz Kuxtal Voluntary Guidelines (Secretariat of the Convention on Biological Diversity 2019a). Ideally, knowledge would be co-produced by ILK holders and scientists. It is important to build trust with knowledge holders, be open and transparent about how the information will be used and consider issues relating to ownership of the information and permission to use the information (see below). The principle of Free, Prior and Informed Consent (FPIC) is fundamental.

IPLC representatives propose that in many cases IPLCs should be engaged through an intermediary who is specialised in ILK and can provide insights into local culture, customs, and legal systems, as well as assist with language needs. In parallel, training and capacity building for all sides on application of ILK in Red List and other IUCN assessments can developed.

Language is a potential barrier to effective communication and data exchange. This barrier may be easier to overcome where IPLCs and ILK holders are located in countries where e.g., English, French, Spanish, or Portuguese are official languages, and ILK is expressed in only a small number of indigenous languages. In language-rich environments such as the Amazon region or New Guinea (around 1,100 indigenous languages), coping with communication issues will inevitably become more complex, again underlining the desirability of collaborating with local organisations.

How is engagement with ILK holders and IPLCs documented?

All consultation and contacts with IPLCs and knowledge-holders, including the provisions made for FPIC, should be documented by the RLA. This documentation should provide enough information for the IPLC, RLA, and Red List structures to see and understand what was done and agreed.

How can ILK holders access the Red List process?

If IPLCs wish to initiate contact with the Red List, the most appropriate channel of communication would be between partners. IPLCs and RLAs for the species in question: contact details are available on the SSC website:

<https://www.iucn.org/commissions/species-survival-commission>

Conclusions

1. There are no barriers in principle to applying ILK in the Red List which treats information from all knowledge systems equally. There are, however, specific requirements for accessing ILK and working with IPLCs.
2. IPLCs have recommended a process to ensure ethical and equitable interactions in engaging with ILK holders which involves building relationships and gaining trust over time, involving an intermediary in many cases, and negotiating an IPR agreement with ILK holders on what can be shared and published and how it will be accredited.
3. The time and effort involved will vary according to several factors, such as the number of species covered by an RLA, the extent and importance of ILK available on a species, the number of IPLCs within the range of each species, and whether the RLA has financial support and paid staff. The time and effort needed would clearly be magnified considerably where (i) a single RLA is responsible for a large number of species in several different regions of the world (e.g. orchids; 25,000 species); (ii) a widespread species requires application of ILK from multiple sources, e.g. the lion (*Panthera leo*) which occurs across more than 40 countries of Africa. Both cases would involve accessing, consulting, and negotiating data-sharing agreements with multiple IPLCs, potentially working in several different languages.
4. Lack of time and resources are constant constraints in conducting Red List assessments, especially for RLAs that receive no funding or administrative support and where RLAs work on a voluntary basis. Any additional demands inevitably impact on workloads and have implications for existing and planned assessment and reassessment schedules. There is therefore a need to ensure that RLAs are equipped and resourced to engage with ILK when they should, but do not become deterred from engaging because the time and costs become too demanding.
5. In biodiversity-rich regions of the world, multiple RLAs may need to engage with the same IPLCs on different taxonomic groups (e.g., the Cameroon Highlands which harbour endemic species of plants, invertebrates, amphibians, reptiles, birds, and mammals). There is currently no directory of IPLCs nor an established structure within IUCN to facilitate or coordinate contacts between IPLCs and the Red List or other IUCN Knowledge Products.
6. Developing a strategic, operational way forward to ensure comprehensive and effective application of ILK in Red List assessments and other knowledge products will require a concerted programme in IUCN and key partners – beyond the Red List

Committee or SULi alone – perhaps in collaboration with the IPBES ILK task force (<https://ipbes.net/ilk-task-force-members>). Suggested key initial steps include:

- Development of practical guidelines for RLAs on engagement with ILK and IPLCs (to cover scoping the availability, extent, and importance of ILK for the species within their remit; identifying appropriate IPLCs and contacts; developing IPRs, and other specific points mentioned above). RLAs for taxonomic groups with particular significance for ILK due to economic or cultural reasons could further facilitate this process through inviting ILK holders to become members of the RLA.
- Development of a mechanism within IUCN to identify and support contacts between IPLCs and the Red List and a central database to list regional and national IPLCs, store contact details, and collate examples of IPR agreements. A way of identifying the appropriate IPLCs where no national or regional organisation exists is a specific requirement.
- Training for IPLCs and ILK holders, where needed, to provide the capacity to engage with the Red List, data agreements, and an understanding of the Red List process, and how data will be used.
- Recording all lessons learned and case studies (e.g. on the IUCN Panorama platform of solutions, mechanisms, and tools <https://www.iucn.org/resources/conservation-tools/panorama>; and/or on the CEESP <https://www.iucn.org/commissions/commission-environmental-economic-and-social-policy> or SULi <https://www.iucn.org/commissions/commission-environmental-economic-and-social-policy/our-work/sustainable-use-and-livelihoods> websites)
- Investing the resources needed to facilitate appropriate engagement between IPLCs and RLAs and IUCN governance structures

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