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Industry guidance note

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IUCN Red List

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species™ provides an assessment of a species' probability of extinction. There were approximately 45,000 assessed species on the 2008 IUCN Red List, of which 6% are marine species. The 15,000 marine fish species, habitat forming species such as sea grasses, mangroves and corals, as well as molluscs and echinoderms, are considered priorities for future assessment.

The IUCN Red List looks at the distribution, population status, habitat requirements, reproductive biology and major threats to a species and applies this to a set of conservation criteria. The list is not legally binding, and does not confer legal protection, but Governments may use the list as supporting information to protect a species. It is unlikely to use the red listing alone.

This note uses the 2008 IUCN Red List to look at how species are evaluated under the IUCN assessment process, the criteria used and how the IUCN analysis compares to other fisheries assessments.

The IUCN assessment process

Species are evaluated by using the IUCN Red List Categories and Criteria guidelines. Evaluations are made through networks of scientific experts and then peer-reviewed. There is also a procedure for petitions against assessment. If a species has been evaluated but there was felt to be insufficient data to determine whether or not it has declined, it is listed as 'Data Deficient (DD)'.

This does not mean that there is no risk to these species and it is possible that further research may indicate a threatened category is appropriate.

Appropriate data is collated and used to assess species against five IUCN Criteria:

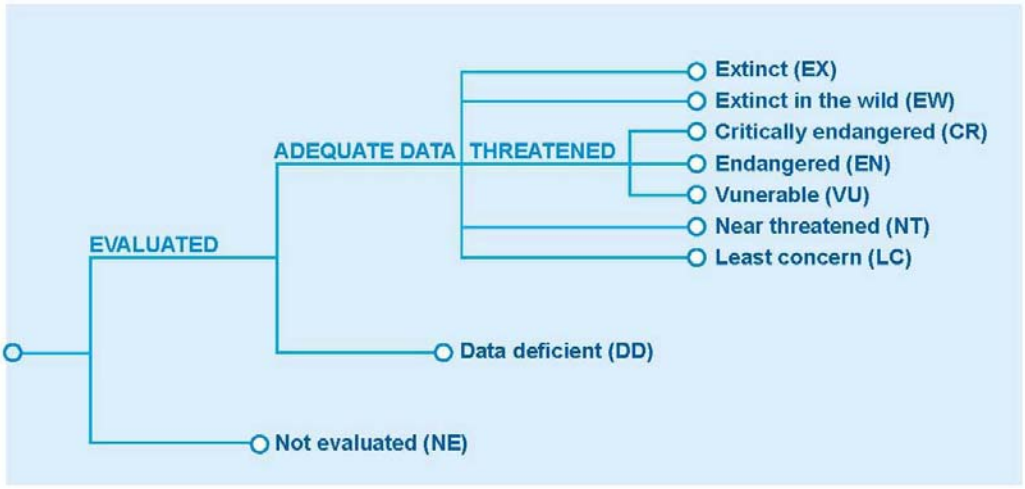
1. Declining population;
2. Geographic range size (fragmented, decline or fluctuating);
3. A small population size and fragmentation, decline, or fluctuations;
4. A very small population or very restricted distribution;
5. Quantitative analysis of extinction risk.

Under each Criterion there are specific definitions. If declining population was the main Criterion the specific definition lists the magnitude of decline, or the threshold, that would infer a threat. This decline would be measured over a decline in population size over a specific period.

Depending on the extent of the decline, a species or stock can be listed the categories;

- Threatened, within which it may be Critically Endangered (CR), Endangered (EN) or Vulnerable (VU).
- If there is no evidence of a significant decline, the species or stock is listed as of Least Concern (LC).
- If there has been a decline, but not of a sufficient amount to confer a threat listing, but it is considered to be close to the point of listing, then it can be listed as Near Threatened (NT).

See figures below.



IUCN analysis in relation to fisheries assessments

An important issue concerns the relationship between IUCN assessments and routine fisheries assessments carried out for fisheries management.

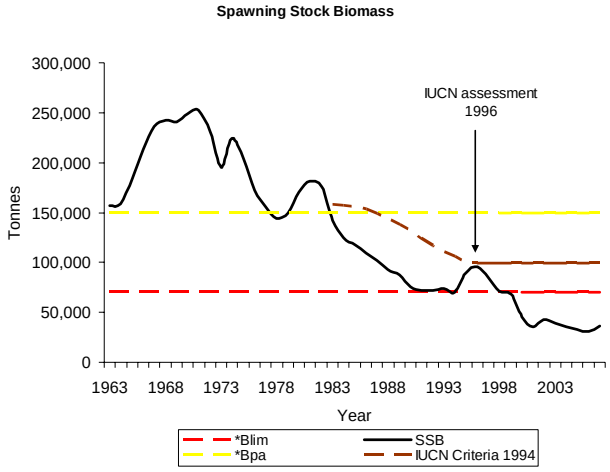
Scientists at CEFAS and the University of East Anglia (Dulvy et al 2005) compared the current IUCN assessment (2001 Categories and Criteria Version 3.1) with those obtained by the ICES scientists in their own assessments. Under the precautionary approach ICES classifies stocks as being either; inside safe biological limits, at risk of being outside safe biological limits or outside safe biological limits (i.e. over fished).

- The results indicate broad compatibility between the Criteria used in the latest IUCN assessments and the assessments made by ICES for 76 stocks of 21 exploited marine fish and invertebrate species, although there are important differences in their terminology and definitions.
- Where the ICES assessment indicated stocks were outside safe biological limits, IUCN also indicated a risk of population collapse. The IUCN approach did not tend to overstate the case and therefore risk a species being designated as threatened with extinction.
- However, these assessments used the IUCN list 2001 Criteria, which require the species to be at lower levels before they can be classified as being in the ‘Threatened’ category. There are assessments under the 2001 Criteria for the world’s known species of Groupers (161 species) and cartilaginous fish (1046 species of sharks, skates and rays).
- Using the earlier IUCN Criteria (1994 and 1996 ver. 2.3 1994) it was more likely for a species to be assessed at a higher risk of extinction. The 1994 Criteria had different Categories and higher thresholds, and was therefore likely to result in listing of species at relatively high levels of abundance.

Comparisons drawn with the 2008 IUCN Red List

To draw a comparison between IUCN assessments and routine fisheries assessments carried out for fisheries management this note looks at three of the fish stocks considered by IUCN to be subject to high actual or potential levels of exploitation. This includes Atlantic cod (*Gadus morhua*), Barents Sea cod and haddock (*Melangrammus aegiformes*). All were assessed under the old 1994 Categories and Criteria and their classification has not been updated.

Example 1: Atlantic North Sea cod (*Gadus morhua*)



Graph shows: North Sea cod stock (ICES Subarea IV, Divisions IIIa and VIId) Spawning Stock Biomass and fishing mortality in relation to ICES precautionary limits and IUCN criteria. Precautionary limits set in 1998. Dotted lines represent retrospective limits. *Source:* ICES 2008.

2008 IUCN Red List: Under the 1994 Criteria cod was listed as 'vulnerable' because the stock had seen a reduction of at least 20% in its breeding population over the previous 10 years or three generations. The assessment was carried out in 1996 under the IUCN 1994 Criteria. Under this Criteria 'vulnerable' corresponds to a spawning stock biomass just above biomass limits.

But under the 2001 Criteria to be listed as 'vulnerable' IUCN requires a population size reduction of 50% over the past 10 years or three generations. The IUCN assessment would have been carried out on the whole North Atlantic cod population. However cod stocks are assessed separately.

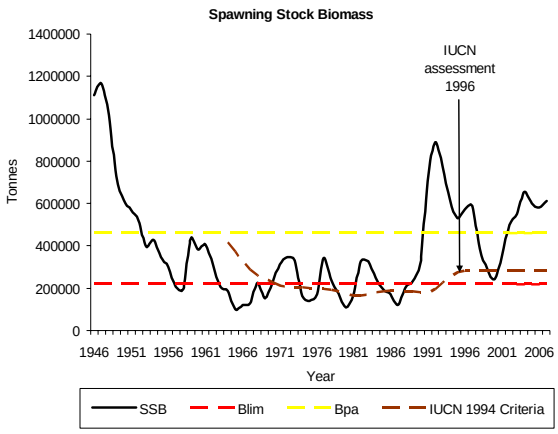
ICES: Under ICES individual stocks are assessed. The **North Sea** cod stock has declined since 1983 and the spawning stock biomass is considered to be outside safe biological limits. Fishing mortality was outside safe biological limits from 1973 to 2005 but has since decreased. The European Union put in place a 'cod recovery plan' in an effort to conserve this stock and this has shown dividends. New ICES advice in June 2009 showed that the biomass of mature cod in the North Sea was 40% higher than their lowest level in 2001, and the proportion of cod being killed by fishing has also decreased by around 15% during the period 2000-2008.

Example 2: Barents Sea (Arctic) cod

2008 IUCN Red List: For most of the period 1966 – 1986 this stock fluctuated around the level where it would be considered 'vulnerable' under the IUCN Criteria. Since this period the biomass of this stock has substantially increased to the point where it would no longer be considered vulnerable.

ICES: The **Arctic cod** stock's fishing mortality and Spawning Stock Biomass fluctuated around safe biological limits between 1956 and 1986. Since then the stock levels have improved dramatically with

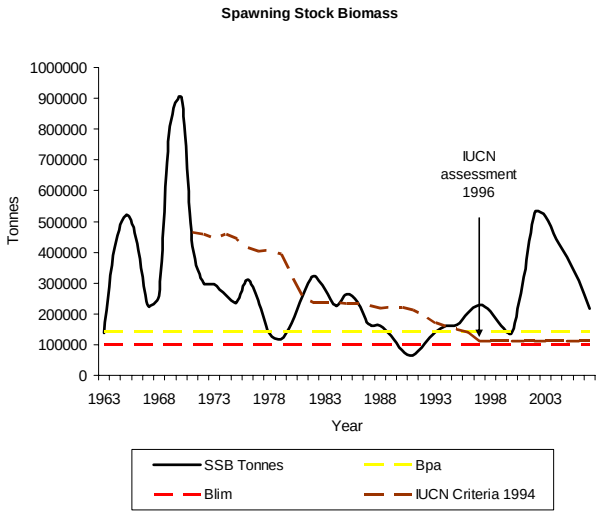
the Spawning Stock Biomass being above biomass limits and inside precautionary levels since 1991. Fishing mortality has been curbed and has been substantially decreasing since 1996. In June 2009 ICES classified the stock as having full reproductive capacity and harvested sustainably. The spawning stock is up by 18% in 2008 compared with 2007.



Graph shows: Arctic cod stock (ICES Sub Areas I & II) Spawning Stock Biomass and fishing mortality in relation to ICES precautionary limits and IUCN criteria. Precautionary limits set in 2007. Dotted lines represent retrospective limits. *Source:* ICES (2008).

Example 3: Haddock (*Melangrammus aegiformes*)

2008 IUCN Red List: Under the 1994 Criteria haddock was listed as 'vulnerable' because the breeding population was predicted to decrease by at least 20% over the next 10 years (the assessment was carried out in 1996). Under the 2001 Criteria to be listed as 'vulnerable' IUCN requires that the predicted reduction would have to be greater than 30% over the next 10 years or three generations.



Graph shows: North Sea haddock stock (ICES Subarea IV and Division IIIa) Spawning Stock Biomass and fishing mortality in relation to ICES precautionary limits. Precautionary limits set in 2007. Dotted lines represent retrospective limits. *Source:* ICES 2008.

ICES: The North Sea haddock stock has clearly fluctuated widely over the time series; this is largely due to the very variable year class strengths resulting in large variations in the population. Rather than a 20% decrease in the population in the period 1996-2006 there has been a substantial increase in the spawning stock, which continues to fluctuate. In June 2009 ICES concluded spawning stock biomass is above precautionary levels and the stock is being harvested sustainably.

Comparison between ICES and IUCN methods

- **There is broad compatibility between the Criteria used by the IUCN and ICES assessments.**
- Both are risk assessments of the state of the stock. Although ICES uses language concerned with sustainable harvesting and IUCN uses extinction risk language, both provide a valuable insight into stock status and indicate the need for mitigating measures to control fishing mortality.
- The IUCN Red List in particular highlights the real need to manage fisheries on these stocks.
- The IUCN Red List is based on species rather than stocks. Stock status can be variable between populations; this is as expected, but it also means that the IUCN categories should not be considered valid for all stocks of the species, and in fact the IUCN list can obscure stocks such as the Arctic cod which are inside biological limits.
- Where are available, more credence should be given to the ICES reference points, because they are based on time series of stock and recruitment, rather than the IUCN method Criteria based on percentage reductions in parent populations.
- The detailed ICES stock assessments often include analyses of large data sets of the most commercially important species in northern Europe. One benefit of the IUCN system is that species of low commercial importance can still be addressed. Although these evaluations are less robust than would be undertaken in an ICES stock assessment, they make best use of the data that are available, and can help identify those species that are potentially at risk.

References

- Dulvy N K, S Jennings, N B Goodwin, A Grant and J D Reynolds (2005). Comparison of threat and exploitation status in North East Atlantic marine populations. Journal of Applied Ecology 42 883-891.
- IUCN. (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK. ii + 30 pp.
- IUCN Red List: www.iucnredlist.org
- ICES: www.ices.dk

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