The IUCN Criteria Review:

Report of the Scoping Workshop

Report of a workshop held at the Zoological Society of London on March 2-3 1998, part of the review of the IUCN Criteria for listing threatened species.

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Introduction

1.1 Context

1. Development of the 'new' quantitative criteria

IUCN has produced Red Lists of species believed to be at risk of global extinction since the early 1960s. They are widely regarded as the most authoritative information available on the status of species and are used for planning at local, regional and global scales. In the early days threat assessments were done in Cambridge by a small group of professionals with intimate knowledge of the (qualitative) assessment system, and often of the species under assessment. In recent years IUCN have devolved the assessments to specialist networks. At the same time, the listings have increasingly been used by taxonomic specialists, regional NGOs and others for setting conservation priorities.

By the late 1980s the number and variety of organisms being assessed was increasing. Many of the assessments were being carried out by regional and taxonomic specialist groups. These developments made clear the need for a more objective assessment system which would be congruent across taxa and bypass the problem of different value judgements made by different assessors (Mace & Lande 1991). During 1991-4 several workshops were convened to address the problems of finding an objective basis for the global listing procedure. A drafting group of about 10 people put workshop recommendations into a series of drafts for new criteria and categories. This process culminated in the adoption of the new quantitative criteria in 1994 (IUCN 1994).

From the start it was considered desirable that the system be applicable to the widest variety of species possible. Another early decision was to place all the criteria together on an even footing. That is, a species need only meet one criterion at a given threshold in order to qualify for that category. It was also recognised that not all criteria would be appropriate for all life-histories, let alone all taxa. In fact it was never intended that every species be assessable by all criteria.

For each of the three threatened categories (Vulnerable, Endangered, Critically Endangered) there are now five criteria which are based on biological variables related to extinction risk. Many also have sub-criteria that are used to justify the listing of species. The five criteria are based on the following states or processes that influence extinction risk:

A: The species is declining at a specified rapid rate (past, present or future)
B: The species has a limited, specified area of distribution, is in decline and is further compromised by fragmentation or extreme fluctuations.
C: The species and a limited, specified population size and is in decline.
D: The species has a very small population size or area of distribution.
E: Quantitative analyses (such as Population Viability Analysis) suggest that the species has a specified risk of extinction.

The new criteria were originally intended to provide a reasonably accurate assessment of extinction risk. It was soon realised, however, that this goal was too ambitious for the information available, since the variety of threatening processes and various incarnations of 'rarity' are too great to be comprehensively encompassed by a few relatively simple criteria. Rather than linking each category of threat to a probabilistic statement of extinction risk, quantitative assessment was introduced as criterion E. Threshold values for other criteria were set such that they correspond roughly with the probability of extinction in the same category under E. However, since the criteria are in essence precautionary, there is no reason, *a priori*, to expect that a species qualifying for any category should also qualify for criterion E at the same level, or indeed, for any of the other criteria.

In this way the criteria act as five 'flags of threat,' any of which can indicate taxa displaying "symptoms of endangerment." criterion A is particularly useful in this respect as it picks up species under progressive threats which would otherwise only be detected when the species is reduced to small numbers which might well be too late for restorative conservation action. However, it must be

recognised that the uncertainty associated with extinction risk assessments made by criterion A is much higher than for, say, criteria C and D, whose thresholds can be better justified scientifically under the small population paradigm (Caughley 1994). The same is true of criterion B, where the figures are essentially a consensus. They are certainly not appropriate to all species, only those for which loss of habitat, for example, is responsible for expected or observed declines.

2. The 1996 Red List of Threatened Animals

About 15,000 species were assessed using the new criteria for the 1996 Red List of Threatened Animals (IUCN 1996). 5,205 were listed as threatened with extinction. The relative objectivity of the new listings has made them an excellent tool for observing changes in status over time. This new validity has attracted great interest from certain wildlife agencies and management authorities, as well as the media, which highlighted the finding that 25% of mammals were threatened, compared with 11% of birds. Not surprisingly, there were also some controversial listings in the new publication. In particular, the inclusion of some fisheries species, such as cod and haddock, which qualified by the decline rate criterion (criterion A), was seen as mischief-making by fisheries agencies and some governments, but as a serious challenge to fisheries agencies by environmentalists (*New Scientist* 11 May 1996). Other disputes focused on long-lived species such as elephants and marine turtles where the time scales make inference and estimation problematic, and over the status of some small and very narrowly distributed endemic molluscs and invertebrates.

1.2 The Criteria Review

1. The WCC Resolution

Since the publication of the 1996 IUCN Red List of Threatened Animals guidelines have been produced for application of new criteria to trees, bryophytes and marine fishes as well as a general set of guidelines for all species. Although largely a response to the controversies outlined above, the criteria review was also motivated by this wider application of the criteria to taxa with very different biology and life-history. At the World Conservation Congress (WCC) in Montreal in October 1996, SSC was mandated under WCC Resolution 1.5 to:

"within available resources, urgently to complete its review of the IUCN Red List Categories and criteria, in an open and transparent manner, in consultation with relevant experts, to ensure the criteria are effective indicators of risk of extinction across the broadest possible range of taxonomic categories, especially in relation to:

- ***marine species, particularly fish, taking into account the dynamic nature of marine ecosystems;***
- ***species under management programmes;***
- ***the time periods over which declines are measured"***

A review process has been developed by the SSC Steering Committee, and IUCN has submitted proposals to a number of governments to fund the process. The first stage, seeking information and viewpoints from IUCN and SSC members, has now been completed. A number of issues have been raised. Some of these are of broad relevance, while others are very specific to particular species or circumstances. Some concerns are highly technical whereas others relate to policy implications of the Red List. The issues are listed in 141 comments in Appendix B, and the 51 correspondents are listed in Appendix A of this report.

2. The criteria scoping workshop

Participants were chosen to represent firstly those with knowledge and experience in the development of the criteria, and secondly people with wide experience of applying to criteria to entire taxonomic or regional groups of species. In addition, the aim was to have experts from a broad range of taxonomic groups (mammals, birds, fish, invertebrates, trees and flowering plants).

The aim of this workshop was to identify the important and relevant points raised in the correspondence, and to provide a commentary on these. Participants were provided with preliminary

papers summarising the issues raised in correspondence. After a general discussion, selected topics requiring further work were assigned to 3 working groups for further discussion. Conclusions were drawn where possible. If this was not possible the working groups attempted to define the questions more clearly, and to suggest approaches to answering them. Working group reports were presented back to the whole group at the conclusion of the workshop.

It was not anticipated that all issues would necessarily be resolved at this workshop. Rather, the aim was to decide a mechanism for ultimately resolving all the issues, possibly at future workshops. It is intended that the recommendations of the criteria review process will be completed by the time of the next World Conservation Congress, in the year 2000.

1.3 The future of Red Listing

The Red List project has been upgraded to a full programme of SSC, with an overall plan and clear goals. A Red List Officer is currently being recruited to oversee this process. Amongst these goals are:

- To produce, via the Red List, a global index of the status of the degeneration of biodiversity by the year 2000,
- a global Red List of vascular plants by the same date,
- update the animal Red List each year on the world wide web and to publish it in hard copy every five years,
- the formation of specialist projects for regional, national and subnational red listing processes (WCC Resolution 1.25).

SSC is also working to ensure the procedures for assembling the Red Lists are robust and that certain standards are maintained. Membership of SSC is currently voluntary and on the increase. One recurrent theme from the SSC membership is over the accountability of those involved in the listing process. In response to these concerns, listing authorities covering all taxa included in the Red List are planned. This will ensure that an identifiable and authoritative source is accountable for listings. An appeals process will re-examine controversial listings, and future Red Lists will be accompanied by documentation to back up the listings. This represents the next phase in the gradual evolution of the Red List.

2.

Output from the Meeting

2.1 Working Group 1: Listing procedure and documentation, The categories

Chair: Alison Stattersfield, Asst: Nick Isaac

Ulf Gardenfors, Charlotte Lusty, Larry Master, Sanjay Molur, Jon Paul Rodriguez

1. Summary

The group considered issues which fell into five broad categories. The following points were identified as deserving of further consideration:

Procedural:	Power of listing authorities	1,4
Documentation:	Guidelines for listing	2,3,14,16-18
Documentation:	Declines as fluctuation	64-5
Regional Issues		26-9
Sub-categories of Lower Risk		30-40
Information accompanying listings		132-40

2. Procedural issues

Several points directly related to the way in which the listing procedure is carried out. We agreed with Keiichi Kasawe's point (#1) that SSC should consult management agencies during the listing process. However, it was felt that allowing specialist groups to supersede listings made by the criteria (#4) would be a retrograde step; returning in a sense to the subjective assessment of the threat categories used prior to 1994.

It was felt that the proposed appeals procedure is a positive step in the direction of making the listing procedure more accountable. However, the group envisaged much wider usage of the process than is likely; so far few appeals have been registered, most of which involve commercially exploited species. Generally, though, it was agreed that wider documentation and description of the listing process was desirable.

One of the great strengths of quantitative criteria for assessing threat status is that it encourages scientists to go out and collect more and better data (#12). However, there are clearly problems in collecting data of adequate and comparable quality for all taxa in all countries (#21). This point was developed by Alison Stattersfield, who called for a mechanism to be put in place for checking the consistency with which the criteria are applied across taxonomic groups. A survey of the submissions from specialist groups indicates that those working on large animals are extremely reticent to quantify a decline rate or population figure, whilst invertebrate specialists seem much more happy to use inference. Sanjay Molur and Charlotte Lusty noted similar differences between plants and animal specialists. Discrepancy of listing also occurred in cases where a species was only known from a single location in an area where no potential threats were known to be operating: birds in this situation were usually considered DD, whilst comparable trees were listed as VU (Vulnerable). A related point was made by Nigel Collar in the group discussion: that background data such as climate and habitat change are not always interpreted uniformly, particularly with reference to threats and projected population declines.

Recommendations:

- *For the attention of the Red List officer, listing authorities and appeals procedure.*

3. Documentation of background and criteria

A large number of the comments falling into this heading can be solved by redrafting the booklet IUCN Red List Categories (IUCN 1994). Whilst the booklet provides a concise introduction to the categories and criteria, the comments indicate that it is lacking in the following areas: the purpose of

the Red List and how a listing status should be interpreted (#2-3), the relationship of the criteria to one another (#11), their background in theoretical biology (e.g. Mace & Lande 1991), and what they are and are not intended to say (#14, 16-18). The difference between measuring threats and assessing conservation priorities also needs to be expanded as there are still many people who interpret the red list as a means of priority setting. Although this distinction is drawn in the red booklet (page 7, point 10; IUCN 1994), further explanation is needed and an example would help. The group also believe that the booklet does not give adequate guidance on the use of inference or the kind of data which needs to be collected (#21). Neither does it go far enough in explaining the background and history to the current listing procedure, why a "one size fits all" system has been adopted.

At first the group thought it was important to keep text and background information in the Red List Categories down to a minimum because the first reaction of many assessors has been hostile, believing the system to be far too complex. However, so far, few assessors have had the opportunity to learn how to use the Red List system at workshops, rather than alone with the booklet, and so it is desirable that the booklet be as comprehensive as possible in order to act as a reference. The Nature Conservancy (TNC) uses a comparable document of some 40 pages. The consensus view emerged that a more thorough explanation of the criteria was desirable (#10), that the booklet should be expanded to include many worked examples of listing assessments (particularly relating to the Lower Risk categories and Data Deficient), that simple tables and figures could be helpful for clarity. Also, a much shorter "students" version could also be developed (of the order of 2 sides A4) outlining the type of information required to make an assessment in order to overcome the initial reluctance of many assessors to tackle the system.

A number of more specific points concerning the booklet have been raised. One is that dispersal and colonising ability should be accounted for in the definition of 'severely fragmented' (#15), as different organisms experience habitat separately (see also page 13. We felt that more consideration should be given to other specific life history attributes. A second complaint concerned the definition of continuing decline (#64-5). There is a provision for this on page 10 of the booklet (IUCN 1994) that it is to be assumed that declines are not part of a natural or environmental fluctuation unless evidence suggests that it is. However, inclusion of worked examples would be helpful (see also page13).

Finally, the group identified a clear need to expand with worked examples the definitions of area of occupancy (AOO) and extent of occurrence (EOO (#21) (see also page 16). The discussion ranged more widely over provision of variable scales and thresholds for organisms occurring at finer scales and with patchy distributions (e.g. many tropical trees species) where the eventual figure for AOO is extremely sensitive to the size of the grid square employed (page 16).

Recommendations:

- *Comprehensive redrafting of red booklet, including examples, as well as a brief "student's guide."*

4. Regional Issues

1. *Information transfer*

The first (#28) was a regret of the lack of a mechanism for transferring information from a regional to global scale, especially since most information on the status of many species will be of higher quality when information generated at local level is used. One possible solution would be the creation of a National/Regional Red Listing Specialist Group (NRRLSG) which would encourage and develop liaison between the regional data providers and SSC's taxonomically-based specialist groups. It was agreed that the nested nature of TNC's system was a desirable characteristic.

Recommendation:

- *Consider mechanisms for encouraging flow of information from local sources, including by the development of a National/Regional Red Listing Specialist Group.*

2. *Thresholds*

Requests were made for separate criteria and/or thresholds to apply at a regional level (#26, 29), although it is important to bear in mind that the Red List system is designed to assess extinction risk on a global scale. It would be most advantageous to have a system which is applicable at all levels. In this way global information may be used on a regional scale, and vice versa. An assessor at local level is free to adapt and apply the criteria *for their own purposes* as they wish although this will compromise the efficient flow of information between the regional and global level.

3. *Assessment of non-endemics*

This last point hints at the greatest issue in regional application, namely the difficulty in assessing extinction risk of taxa which cross national, political, biogeographic or other boundaries (#27). This should be the focus of the Regional Application Working Group (RAWG).

Recommendations:

- *A better mechanism for regional to global information transfer.*
- *Priority must be given to the development of the RAWG.*

5. Categories of Lower Risk

1. *Conservation dependent*

The category of conservation dependent (cd) provoked considerable debate. It was agreed that it does not fit naturally or logically into the dendrogram of categories (#31). The threat level being faced by species in this category will in fact be equal to or usually less than that of species in LR(nt) but the status of cd species can deteriorate rapidly once conservation actions cease to be effective. There were several comments on the topic, most of which raised this problem in one form or another (#32,33). The inclusion of the sub-category and its definition clearly needs some attention.

Two alternative views emerged from the discussion. One was to remove the category altogether, in a sense putting the onus on conservation action plans to indicate that a reserve was of particular importance in maintaining the status of that species. However, it is beneficial to have a record of species which are benefiting from conservation action, especially species which do not fall into any of the three higher categories. If cd were removed altogether, it is possible to imagine an extreme scenario in which a conservation project becomes a victim of its own success without this formal recognition of the importance of their work, since reserves are often ranked by the number of threatened species they contain.

The second option comes from the 1996 Red List (Intro. 22, #30 in this workshop). Baillie and Groombridge (IUCN 1996) suggested that each category of threat could have its own sub-category of cd. This view found favour with Sanjay Molur, who cited the examples of the tiger and the gharial, both of which are globally threatened, but would be extinct without the extensive network of reserves which protect them. Others felt that this kind of categorisation could be open to widespread abuse/misuse as reserve managers might be keen to show the importance of their reserve in protecting the species under assessment. It was also pointed out that a case could be made that almost all threatened species would be worse off without the reserves in which they currently exist, and that this approach may be unhelpful and indeed judgmental of conservation action plans. Clearly, adoption of this approach would require extremely strict guidelines to be enforced, which may lead to an extra mountain of data to be collected. However, there was not unanimous agreement on this last point.

Charlotte Lusty reiterated her point (#31) that assessors tended to use cd for obviously threatened species, meeting threatened criteria, but which occur in a National Park, whilst Jon Paul Rodriguez said that that while developing the Red Data Book of the Animals of Venezuela, cd was often interpreted as indicating taxa that were undergoing national harvesting programmes. (The editors consider that the misuse of the category would be limited if a phrase was added to the definition

which indicated that in order to qualify as conservation dependent, reasonable certainty must exist that the species in question would have qualified for a higher category of threat in the recent past. Most animals listed in the 1996 Red List as conservation dependent are recovering from serious declines or population bottlenecks and would therefore satisfy this condition.)

2. *Least Concern*

The definition of least concern (lc) was agreed to be sufficient, but the status of the categorisation was questioned (#35). It was generally agreed that lc should be separated out from nt and cd on the dendrogram. Expansion of the definition of lc was requested (#34), but the group believed this was only necessary in the context of a lower limit to near threatened.

3. *Near Threatened*

"Taxa which do not qualify for cd, but which are close to qualifying for VU" (IUCN 1994). This definition of near threatened (nt) is exclusive rather than inclusive. It seems to have caused confusion amongst assessors and, we suspect, not only a lack of congruence across taxa but also a considerable degree of variability in application. A number of correspondents requested specific criteria for near threatened or more comprehensive guidelines for assignment (#36-9).

Specific criteria for nt have already been developed, at least in draft form. Larry Master presented a set of criteria for 4 categories as part of his work to fuse IUCN and TNC evaluation mechanisms, and Yahara *et al*. (unpublished) (#40) used a threshold of 0.1% probability of extinction in 100 years for the Japanese Red List of vascular plants. However, other members of the group felt that explicit criteria for near threatened were symbolic of the continuum of extinction risk, and that there was a requirement to make cut-offs at some point. Developing nt criteria may therefore simply indicate that the current threshold levels for Vulnerable (threatened) are set too high. A related problem is that it may become difficult in practice to make population and range estimations (EOO) above the current cut-off levels of 10,000 individuals and 20,000 sq. km respectively.

Near threatened is inherently a subjective assessment, but it would be desirable if it were assigned on a comparable basis in all cases. To compromise the conflicting views outlined above, it was suggested that quantitative criteria could be used as a guide, rather than to be strictly applied. The category is often used as a basket for common species showing declines, whilst in India it is used by the precautionary principle in any case of restricted distribution, or where a threatening process is perceived. Once again, the solution to this problem may lie in providing a set of examples and allowing flexible use of this category by assessors.

Recommendations:

- *Further consideration of the role and definition of conservation dependent.*
- *Consider how and whether to dissociate least concern from other sub-categories of Lower Risk.*
- *Develop clearer guidelines for the use of near threatened.*

6. Listing issues

The amount of information included alongside a listing in the Red List prompted much debate (#134-5, 137-9). In many ways this is part of an on-going process: the logical progression from the adoption of quantitative criteria is to include information to justify the listing. However, the group concluded that a minimum of a paragraph of explanatory text should accompany each listing, and if possible, a published source of data. Birdlife International hopes to include a full page of justification in its next Red List of birds, even for those listed as least concern.

Other issues raised in the submissions include provisions for assessment of certainty (#132-3). This is in fact a two-dimensional problem; some listings are made with low quality data but a high degree of certainty that the final answer is correct, and the converse is also common. IUCN could learn from systems for assessing certainty being developed by TNC and Birdlife International.

The inclusion of a taxonomic reference (#140) was more contentious. Whilst it is desirable to list published taxonomies, these only exist for well-studied vertebrate groups. Charlotte Lusty pointed out that plant taxonomy is ever-changing and supplying authorities is not the solution to ensuring good taxonomy.

Recommendations:

- *Consider carefully the content of recommended documentation for supporting Red Listings.*
- *Consider methods for scoring data quality and certainty.*

7. Other issues

The group gave brief consideration to the prominence given to the caveat for marine fish (#136). It was generally felt that caveats in general were undesirable, and that modification of criterion A would remove the need for this one in particular.

The request for consideration of different morphs (#141) in the Red List was not deemed important on a global scale since they are numerous for each species, exist symmetrically with one another, are extremely poorly known and liable to periodic natural extinction anyway.

Finally, a number of concerns were deemed to be outside the remit of the workshop and to be dealt with by other processes: the congruence of IUCN criteria with TNC (#25) and concerns for generic and ecosystem approaches to Red Listing (#20).

2.2

Working Group 2: criterion A and Generation Length

Chair: Simon Stuart, Asst: Sue Mainka and Theresa Jones

Bob Irvin, Nigel Leader-Williams, E.J. Millner-Gulland, Howard Powles, Andre Punt

1. Summary

This pair of topics are closely associated in the correspondence, and generated a large number of comments. The approach of this group was to identify the broad issues, then to tackle the major ones simultaneously. Suggestions for possible amendments to criterion A and the definition of reduction are presented.

2. Synthesis of the issues

1. *Species under management*

This issue has mainly been raised in the context of marine fish (#5-8, 68-9, 72), but is relevant to any population which has been reduced to (e.g.) 50% of carrying capacity in order to increase or maximise the sustainable yield (#68, 71-2). A related point (#63) requested separate criteria which used trade figures as data. This issue was discussed in the 1996 Red List (IUCN 1996), Intro. 23.

2. *Guidelines for projection into the future*

Baillie and Groombridge (#56) suggested in the 1996 Red List of Threatened Animals (IUCN 1996) that a 'shifting time window' might be adopted in order to overcome the rigidity imposed by the separation of the two sub-categories of the decline criterion. This issue was of particular concern to those interested in the African elephant (#54-5) since the species is very long-lived, and obtaining appropriate data for the entire period of either A1 or A2 was difficult. A separate but related point (#53) argued that rather than consider past declines, criterion A should consider the cause of a decline and, crucially, whether that decline was likely to continue into the future.

3. *Thresholds and taxa-specific considerations*

A number of correspondents claimed that the criteria were not appropriate for the taxa they had assessed (#16-8), particularly in relation to declines (#41-3). Several were of the opinion that certain life-histories were inappropriate for the criteria (#45, 67), or that there was no basis for universal thresholds. All of these points stem from the misunderstanding of what the criteria set out to achieve; no taxa are expected to be appropriately assessed by all criteria.

4. *Long-term depleted species*

An interesting phenomenon (known as the 'ski-jump trajectory;' letter 45) in which a species has declined from high previously high numbers, yet may be stable but with no prospect of recovering to it's former levels (#19, 62) is a problem for managers attempting to prioritise using the Red List; species listed as threatened may in fact be safe.

However, this is not really an issue for the Red List since these species (notwithstanding their current range, population size and probability of unpredictable reductions) are no longer declining and therefore not at risk of extinction (see page 12). A separate but related issue is that of species which are in long-term deterministic decline, not rapid enough for qualification under A1-VU (#46).

5. *Generation length and the reduction time window*

This problem has been recognised for some time, and solutions suggested (#90). It has become much more acute since the criteria have been used to assess long-lived species such as trees (#47-8, 88-9, 91), when the declines registered over three generation lengths are both hard to assess and potentially

of little relevance (#49, 91). The problem is also found in long-lived animals groups. The absence of a maximum limit on the time-frame over which declines are measured means that population trends have to be inferred and/or projected well beyond the reasonable confidence limits of the data (#92-3). This can become absurd, considering the expansion of human enterprise in recent decades.

6. *Recent versus long-term past*

Related to the last point, a number of correspondents have requested a mechanism be incorporated into criterion A which gives precedence to recent and current population trends over historical declines (#50-3).

7. *Linking past and future declines*

As pointed out in section 2, the current structure of criterion A does not allow for a 'shifting window' (#54, 56). There was much support for amalgamating A1 and A2 in order to rectify this.

8. *Linking criterion A to population size*

A number of correspondents have argued that abundant species are not at risk from extinction, even if they are declining fast enough to qualify as threatened (#57, 59-61, 66). This complaint, however, betrays a misunderstanding of the purpose of the Red List. Firstly, listing does not constitute a prediction for future extinction (#60). Secondly, continuing or severe declines do constitute good evidence of a species' diminishing status. Rather, the Red List is designed to flag species which "exhibit symptoms of endangerment." The example of the passenger pigeon has shown us that common species can go extinct, and so IUCN feels it is desirable to list species as threatened *before* they have declined so far that they qualify for criteria B-D, by which time it may be too late to do much about saving the species. However, there was not universal agreement in the group on this matter.

9. *Separating short-term trends from natural fluctuations*

Scott Parsons has argued that several species of marine fish have been listed as they exhibit long-term cycles in abundance, either natural or environmental in cause (#64-5), and that they should therefore be de-listed. However, the definition of reduction (see below) includes reference to natural fluctuations. The precautionary principle dictates that in cases such as these, the burden of proof lies with the managers to show that population changes reflect reversible reductions rather than directional downward trends.

10. *Definition of generation length*

This technical point is worthy of consideration. Cases have been put forward that the definition take account of variation in generation length under different conditions, such as harvesting (#94), growth (#96), variability with environment (#97), between the sexes (#96) and in reproductive success (a function of age, #95). It has also been implied that body mass could be a more reliable measure, and noted that the uncertainty of generation length in many species can cause difficulties (#99). However, body size is generally a poor predictor of generation length in plants.

11. *Guidelines on relationship between population decline and loss of habitat*

This is a complex point which cannot be dealt with easily. In the absence of abundance data, loss of range/habitat has often been used as a surrogate (A,c). However, this relationship is not straightforward or linear, and guidelines must be developed to account for spatial variation in habitat quality or variable population. (Jon Paul Rodriguez has a paper on this topic which will be made available).

12. *Confidence limits on declining population data*

It has been pointed out that population size and declines are often difficult to measure accurately (#58). By strict application of the precautionary principle one would use the lowest estimate of population size and the highest estimates of decline rate. However, extreme interpretations of precaution may lead to species being listed under high threat levels that are quite inappropriate. Guidance is required on the use of an appropriate precautionary confidence limit (see source #50 in Appendix A for more detail).

3. Process recommendations

The group spent a great deal of time discussing the A criterion in the light of the above points. This led to a rough re-formulation of the definition. Clearly more work is required, but the new structure is felt to deal with many of the concerns about the criterion, without compromising its general role within the Red List system.

1. *Suggested new formulation for the definition of criterion A*

Continuing decline *in the population in the form of an observed, estimated, inferred,* ***projected****, or suspected* ***reduction*** *of at least __% over 10 years or three generations****, (up to a maximum of __ years****) whichever is the longer, based on (and specifying) any of the following:*
(a)
(b)
(c) ***the effects*** *of a decline in area of occupancy, extent of occurrence and/or quality of habitat.*
(d)
(e)

This refinement incorporates both the shifting window (point 1) and the time cap on generation length (point 5). The change of term from 'reduction' to 'continuing decline' in the main part of the criterion will exclude populations where a past decline is not expected to continue. Part (c) is of particular relevance to the problem of how population habitat loss should be translated into population reduction, which the group agreed was very important consideration.

The idea of incorporating the potential for decline to some level was also discussed and Andre Punt believed that consideration should be given to defining the A criterion in terms of whether the population is projected to be depleted to a state in which it might be listed using one of the criteria in say, 10 years or three generations.

2. *Suggested new formulation for the definition of reduction:*

A reduction (criterion A) is a decline in the number of mature individuals of at least the amount (%) stated over the time period (years) specified ***(where the time period must include the present****). A reduction should not be interpreted as part of a natural fluctuation unless there is good evidence for this. Downward trends that are part of natural fluctuations will not normally count as a reduction.*

This change in emphasis excludes species which declined historically but are now stable.

3. *Future workshops*

It was agreed that the first workshop will concentrate on marine organisms generally. It will investigate how extinction risks may be assessed and examples of how the criteria have been applied. A wide species range should be included to ensure that as many different taxonomic groups are represented, which will be identified prior to the workshop. These groups would also be chosen on the basis that good life history and range data is available. Experts will be chosen to represent the taxonomic groups. A simple model will be presented to assess how well different taxa fit into the current criteria. In addition, some experts will present other models within their specific areas.

A second workshop would then be held (drawing in part on the results of the first workshop) with the aim of creating a recommendation for a revised definition of criterion A. The workshop would aim to examine the relationship between declines and extinction risk and discuss projections and uncertainty. This workshop would consider all taxa. This workshop would cover all the questions outlined above, except 4, 10, 11 - see below.

4. *Remaining issues*

Questions 10 and 11 are not addressed by these workshops, are technical and can be addressed via email and other informal means. The results should be incorporated into guidelines.

Question 4 is addressable, but not within the framework of a workshop, and not as part of the Red List process.

5. *For the future*

The relevance of global listings to widespread numbers of species under different management conditions should be examined, perhaps by a separate workshop.

An introduction at the start of the book describing in more explicit detail what the criteria actually do is needed.

2.3 Working Group 3: The Categories and criteria: Definitions

Chair: Georgina Mace, Asst: Jonathan Baillie

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1. Summary

Topics in this area were grouped into and discussed under eleven general headings. Most issues can be dealt with by amendments to the red booklet "IUCN Red List Categories" (IUCN 1994), and suggestions for these amendments are made. However, the area/scale issue requires special attention.

2. Purpose of the Red List

There seems to be a clear need for a more explicit account of the role of the Red List (#1-3; this is also covered by Working Group 1, see page 7). It should be made clear in the preamble to the red booklet (IUCN 1994) that the Red List is not designed to be directly translated into national legislative schedules and the setting of conservation priorities, nor is every species supposed to be assessed by all criteria (#130).

The assessment process also needs to be made more user friendly. IUCN needs to develop a clear and readable system for applying the criteria (#76, 126-7, 129, 131) that leads the assessor to all relevant criteria and explains the role of non-relevant criteria.

Recommendations:

- *Produce a flow chart to help people walk through the criteria. Tetsukazu Yahara has one suggestion which might be applicable in modified form.*
- *Look at the progress of the "Expert System" assessment software.*
- *Draft new Preamble to Categories booklet.*

3. Range area thresholds and problems of scale

Several correspondents (#79, 112-115) have complained that range thresholds are set too high, and include too many lower risk or safe species. This is actually several different points:

1. There has been confusion about the role of the Red List, so that it has been seen to be a problem that very many species in a region qualify for Red Listing (e.g. Seychelles #115), and thought that extent of occurrence (EOO) may be too inclusive a measure so that, for example all Jamaican endemics qualify as threatened.(#112). This has led people to suggest that threshold values should be adjusted downwards as the size of the region under investigation becomes smaller. The group rejected this suggestion because the thresholds are set explicitly to reflect the global status of species, and are also based upon biologically relevant measures. In these cases, the solution will be for the local managers to identify other methods for distinguishing threat level and conservation priority between species within a region.

2. It has been suggested that maintaining a single set of thresholds for area in criterion B is undesirable as they are inappropriate for some taxa (#78), and that variable thresholds for different taxa should be adopted (#111). There are two aspects to this problem. In the first place, all the criteria are not intended to be appropriate for all species, so this objection is based on a misapprehension (see also page 4). However, this problem and the one above are also related to problems of scale. The scale at which a range is measured affects the area estimated, since grids are scale dependent. This becomes a problem for species measured at fine scale (#113, 117), which will always have extremely small area of occurrence (AOO). Some assessors are finding the thresholds too inclusive or not inclusive enough because interpreting AOO thresholds measured at

a biologically appropriate scale (as indicated by the definition in IUCN (1994) page 12) means that the thresholds are inappropriate (for example, too large for the scale grid). Variable range thresholds are one solution to problems of scale, although this is difficult to incorporate into the IUCN system which is intended to be appropriate for all taxa at the global level. This is a difficult problem in a complex area, and more exploratory work along the lines of source 46 in Appendix A will be helpful.

Recommendations:

- *More work is needed on the whole area of range thresholds and scale problems. We recommend that a workshop involving some clever spatial ecologists as well as conservation biologists would be useful. They could examine alternative solutions such as varying thresholds across taxa and the use of scalars (e.g. dispersal ability)*
- *The preamble to Red List should explain why one system is applicable to all taxa.*

4. Highly skewed metapopulation structure

The current definition of criterion C excludes species where the majority of the mature individuals are found in one population, but some members are found outside the main population (#84). A related problem is that in criterion B, individuals could be unevenly distributed between locations. Species close to the current thresholds do not currently qualify although their status could be as threatened as others which do qualify. Potential solutions to this might be as follows:

Recommendations:

- *The term sub-population could be substituted by 'location' with greater flexibility applied to the latter term (i.e. occurrence of a few individuals do not qualify as 'locations').*
- *criterion C2b could state, "more than or equal to 90% of the mature individuals".*

5. Parity of criteria B and C

David Keith pointed out several ways in which there is a lack of parity between criteria B and C. For example, B may be more exclusive than C, B2 is more flexible and that environmental fluctuations are not included in C. The different number of sub-criteria in B and C is also confusing (#76). There are no quantitative thresholds for fragment size in B1, whereas there are for C2a. There was general discussion of these differences and whether they were necessary given the different biological phenomena being identified by criteria B and C. The issue needs more investigation.

Recommendations:

- *General consideration of the range area criteria as discussed above (see also page 16) at a workshop will help resolve this issue.*
- *Consider adding a sub-criterion C2c encompassing fluctuation. This should be tested as it may be too inclusive.*
- *The inclusion B1 within the basal part of the criteria would help to bring the two into concordance.*
- *This problem may disappear if an explicit and well-described process was followed (see page 16).*

6. Extremely restricted populations

Under the current criteria there is no way of listing very small but stable populations, measured only by range, at above VU, without invoking declines from unpredictable threat processes. Whilst it would be possible to create a D2 equivalent for EN, and maybe even CR, the levels would need to be validated to ensure extinction risks are appropriate. Such a solution must exclude poorly known taxa or regions. This could alternatively be addressed by reworking the definition of B1+2c.

7. Irregular phenomena

The criteria do not provide a mechanism to deal with high impact and irregular episodic threats such as drought or fires (#73-4). Guidelines for complex phenomena would be a welcome addition to the categories booklet.

Recommendations:

- *Inclusion of the term 'episodic reduction' to criteria B2 and/or C2 (and possibly to criterion A also, depending on its final form). This term would require a robust definition.*
- *Guidelines to illustrate how biologically realistic values for the phenomena and their impact could be used in quantitative models under criterion E.*

8. Habitat availability and status

A request was made for additional sub-criteria to reflect characteristics of habitat such as regeneration capacity, habitat availability and protection status, particularly in relation to criteria B and C (#80, 83).

Recommendations:

- *Guidelines should be re-written to invoke continuing decline in habitat or population size etc., which are currently intended to incorporate processes such as these.*
- *Better documentation would enable these to be incorporated into AOO, habitat quality etc. under criteria B and C.*

9. Unusual ranges

All areas in the Red List criteria are in km^2. There have been a number of requests to account for the three-dimensional ranges of marine fishes and birds (#110,121), and for the linear (#122) (or even 3D) ranges of riverine species.

Recommendations:

- *Amendments to the definition of area of occurrence to indicate flexibility (e.g. linear riverine ranges might be interpreted as the square root of AOO)*
- *The problem may be irrelevant, since other criteria may catch the species in question and area may incorporate what is needed by criteria.*

10. Definition of location

A number of requests were made for a clearer definition of the term location (#100-102, 128), see (IUCN 1994), p12, note 11.

Recommendations:

- *Replace 'event' in definition with 'extinction process' or equivalent*
- *Include text distinguishing sub-populations and locations*

11. Other issues not fully dealt with

Definition of population (#104-106, 108)

This simply requires better documentation explaining that the term population is used in a very specific way in the criteria because evaluation may be of whole species, sub-species, races or biological populations.

Projection to whole population on the basis of just a few sites (#118-9)

This is a difficult issue, which can only be addressed by guidelines and examples.

Range size problems (#123-4)

These include spatial variation in range of habitat and population growth. This is a problem in many instances but information will usually not be available to assess the scale of variation.

Severely fragmented (#125)
This shouldn't be a problem if more worked examples are provided in the guidelines.

2.4 General issues and group discussion

1. Purpose of the Red List

General discussion of the purpose of the Red List revealed some areas of confusion. The following points deal with many misdirected criticisms:

- Red Lists are explicitly for global-scale comparisons.
- Some of the criticisms of the criteria come from applications which they were not designed for.
- IUCN is not seeking to be prescriptive about national or regional legislative schedules for conservation priorities.
- Assessors are free to adapt and apply the criteria *for their own purposes* in any way they wish.

2. Universality of criteria thresholds

Are all criteria applicable to all species? Howard Powles believes that the threshold values for criteria is a function of biology, and that whilst an 80% decline for some species was an effective indicator for critically endangered, for others 99% was a better figure. William Bond pointed out that this was true for many plant and insect species, particularly in arid zones. Georgina Mace responded that not all criteria are appropriate for assessing all species. She went on to say that the threshold values did represent appropriate measures (of extinction risk) for the kinds of species those criteria were focused upon. Nigel Collar was supportive, saying that the precedent set by allowing exceptions would open the door to any number of permutations which would fundamentally undermine the authority of the judgement. Andre Punt noted that generation length as a scalar introduced a degree of taxon-specificity but that this may be insufficient to account for the high productivity that allows many (fish) species to recover from serious declines.

3. Generation length

Larry Master questioned why IUCN uses generation time in its assessments at all. Georgina Mace responded that it was important from a biological point of view. Since organisms live at different rates, generation length acts as a surrogate for turnover. Thus a long lived species declining at the same rate (measured as percentage change per generation) as a short-lived one will show smaller reductions over time (measured in years). This must be reflected in the assessment. Other methods of incorporating generation length were discussed, but no simple solution was apparent. However it was recognised that a balance needed to be drawn between feasibility and biological realism, and that a cap on maximum generation length was desirable.

4. Marine fishes

Howard Powles raised a general concern about the applicability of the criteria to marine fish species. He noted that criterion E would be the most relevant in these cases, but since data are not available criteria A and B were the only ones likely to be applicable. However, these tended to lead to too many species being included in threatened categories. Georgina Mace replied that species continuing to decline would ultimately go extinct, and that this was the simple basis behind the formulation of criterion A. Andre Punt pointed out that in practice the cause of decline was often not just merely known but also controlled, and that this knowledge should be incorporated into listing decisions. It was agreed that in principle criterion E was a good way of dealing with these species, but there are practical problems with wider usage of E, or with allowing this criterion to over-rule other criteria (see below).

5. Criterion E

There is widespread support in Japan for criterion E, where there is a feeling that the criterion should be more widely used (#87). Much work in that country has used quantitative evaluation of extinction risk (e.g. Yahara *et al*. unpublished). There is a feeling that criterion E is superior to the other categories, and should be allowed to overrule the listings by other categories. Specifically, Matsuda *et al*. (1997) called for a down-listing of the southern bluefin tuna from Critical to Vulnerable.

Leaving aside the specific examples and controversies, there are a number of general points to be made in response to these issues. One is practical; probability of extinction derived from population viability analyses is extremely sensitive to the model parameters and structure. Allowing E to overrule other criteria could lead to the submission of a large number of models, each of which would have to be evaluated on its own merit; such an influx could overload IUCN's already stretched capacity. A minimum requirement of any listing by criterion E, however, would be some kind of documentation of parameters and the kind of models used.

Secondly, this proposal contradicts the role of the criteria as alternative but equally valid methods of identifying taxa which are showing "symptoms of endangerment." This problem could be solved by better explanation of the role of the Red List in the supporting documentation.

A separate point concerning criterion E is that the threshold values vary by category. There are two implications of this. One, raised by Matsuda *et al*. (1997) (#98 in Appendix B) is that species with generation lengths in excess of 20 years are able to qualify for EN but not VU. Similarly, Ulf Gardenfors suggested that the time window specified in the threshold levels were misleading, and that because many species show sigmoid extinction curves it is possible to have, for example, a 10% chance of extinction in 20 years (not meeting EN), but a 90% chance of extinction in 50 years indicating that the risk of extinction is very high, but the E criterion still allows it only to be classified as VU. This may require more attention.

6. Data quality and Deficiency

The category of Data Deficient (DD) was the subject of considerable debate. A number of issues were raised: Andre Punt pointed out the potential funding implications of a DD listing. He noted a distinction between species which are DD and fairly sure of qualification for a higher category of threat, and others which are probably secure. Tetsukazu Yahara suggested that a new category of 'threatened' be used for the former, rather like the old category of 'Indeterminate'. Charlotte Lusty suggested that the latter might best be listed as Not Evaluated. Rather than introduce still further assessment and notation into the system, perhaps it would be better to add a clause into DD which made it easier to classify the second class into least concern.

The degree to which inference was used provoked much debate. Charlotte Lusty felt strongly that DD should be used only as a last resort, but others disagreed. Sanjay Molur requested clearer guidelines on when data of sufficient quality had been obtained in order to make a listing. This is an important point, as a review of the correspondence suggests that whilst the current system is far more robust than the previous one, there remains considerable variation among assessors in the degree to which they will make assumptions about data in order to make a listing. Andre Punt stated that more guidance on the use of precautionary principle was necessary because for most marine species there is high uncertainty and hypotheses can be constructed for almost any species which (although relatively unlikely) would lead to them being listed as threatened. He stated that a particular instance of this was how trend information should be used (best estimate, an upper percentile etc.) and suggested that minimum standards for estimating decline rates (e.g. 5 data points) might be needed. He stated that there should be guidelines for the use of inference in projections and a provision in the listing for categorisation of uncertainty.

There was general agreement amongst the workshop participants that rather than hide such deficiencies beneath further complicating rules, these problems would be best dealt with best in the form of examples in the red booklet (IUCN 1994) to demonstrate the kind of value judgements IUCN would like to see adopted across the board. However, some felt that the sentence in the definition of

DD on page 14 of the booklet (IUCN 1994) about well studied taxa not necessarily having appropriate data for assessment was potentially misleading.

Mary Seddon pointed out that a number of species qualified under B1, but only under one sub-criterion, and that out of necessity these had been listed as DD.

7. Miscellaneous general points

The first few points raised in Appendix A illustrate the need to be clearer about the purposes of the Red List, and to raise the accountability of those who participate in the listing process. Georgina Mace supported this view but pointed out that much of this will be taken account of by the proposed listing authorities. Various other points were raised during the ensuing discussion:

- the problem of how active management could be defined was raised. How effective, for example, was the CITES ban on ivory trade in promoting the recovery of the African elephant population?
- It was suggested that IUCN criteria should also relate to CITES listings. However the Red Listings are intended to inform, whilst the intention of CITES was management in a political context. The Red List should not be used to override local knowledge or dictate management policies.
- there has been considerable variation in application of background data, particularly in relation to the projection of population trends into the future based on, for example, the designation of a plot of land as a logging concession. It was suggested that consistency should be sought among assessors, and the Red List Officer (once appointed) could provide a consistent view on this.
- new categories for secure, stable/increasing were suggested.
- guidelines for assessing species in degraded habitats were requested.
- there is a difficult problem with the listing of species which are declining in some areas and rising in others. It was agreed that this was an important issue, to which there was no simple solution.
- the question of whether the 5 year down-listing rule was desirable was raised, it could cause problems by making the categories too inclusive**.**

3.

Summary and Conclusions

3.1 General Conclusions

1. Re-drafting the Red booklet

The contents of the booklet *IUCN Red List Categories* (IUCN 1994) were noted to be deficient in a number of areas. Following other technical discussions, some extensive work would be needed to ensure this was more complete. The sections dealing with the context and purpose of the IUCN Red List need particular attention.

2. Range area issues

Range areas, scale issues, habitat quality assessment and extrapolating the status of the entire population from information on only a small sample, were all felt to be important issues. In general, these topics need consideration by appropriate experts with a view to providing guidelines for assessors to use, rather than changes the criteria. However, there may be reasons to alter the structure of criterion B. It was recommended that expert advice in these areas be sought, preferably including a technical workshop**.**

3. Marine species

There is a general consensus that marine species are not well served by the current criteria. This relates to both the nature of the criteria and the critical values for key parameters. There are also particular problems related to fisheries species. It was recommended that a workshop on extinction risk assessment of marine organisms be held to review these issues in the broader context of the IUCN criteria (see page 14). It will be helpful to include a few non-marine specialists with wide experience of the criteria among the participants. Howard Powles agreed to take the proposal for this workshop to the Canadian Department of Fisheries and Oceans for their consideration. It was agreed that he would co-ordinate DFO workshop with Ruth Barretto of SSC**.**

4. Criterion A

A number of problems with the criterion A were identified and some suggestions made for its reformulation. However, the implications of these changes for a wide range of species need to be explored. It was agreed that a workshop be held to review possible alterations to criterion A. This should take place after the marine workshop (see 1.2.3. above) and be informed by its output.

5. Regional listing

All are agreed on the importance of adapting the current system in order that it be a useful tool at regional and national levels. Of particular importance will be a system that allows species assessments made at local levels to feed into global assessments. This is currently a separate process in SSC but there is a clear need for continued linkage with the review.

6. Other issues

There are a number of other issues referred to in the workshop outputs (section 3) that require further discussion. These should be considered by all workshop groups, but may have to be finally resolved by small group discussions or e-mail correspondence. Contributions on all of these are welcome**.**

1. *Near threatened categories*

Various alternative amendments to the near-threatened categories were considered, including whether lc, nt and nc should be retained at all or in their current forms (see page 9-10)? Although these were discussed, no consensus emerged.

2. *Certainty and confidence of listings*

Some system is needed to indicate the confidence with which assessments are made and the quality of the data that goes into assessments. Partner organisations such as TNC and BirdLife International are also working in this area, and it was recommended that some common system be developed. A common system would also be useful for the documentation accompanying species listings (see page 10).

3. *Generation length*

Although there was general agreement that generation length was an important component of the criteria, there are problems associated with the definition for some organisms (see page 12,13) and amendments may be necessary.

4. *Criterion D2*

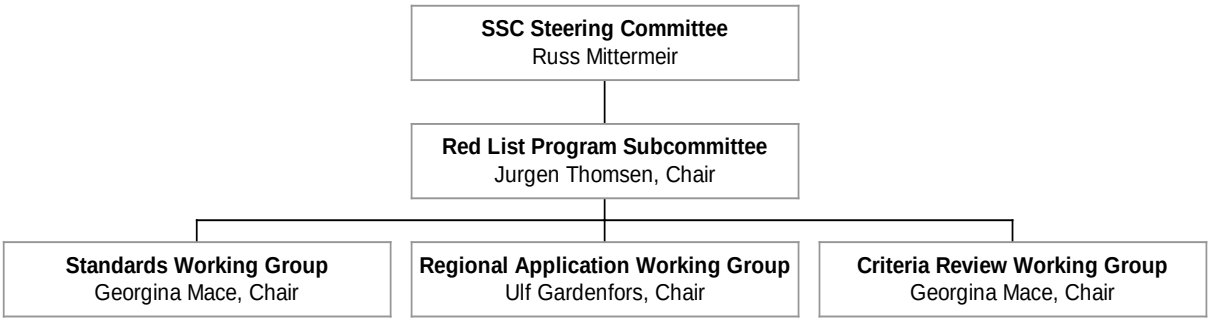
The desirability, consequences and rationale for widening the use of criterion D2 into EN and CR might be considered.

3.2 Dissemination and format of the workshop report

Georgina Mace proposed that the workshop report should consist primarily of the tables of issues and correspondents (Appendices A and B), and the 3 working group reports as presented. Simon Stuart suggested that an e-mail listserver of workshop participants be established for exchange of information and views following the workshop, and that the workshop report (and subsequent developments in the criteria review) be posted on the SSC website (as an alternative to the production of many hard copies). Participants were encouraged to inform any interested parties of the workshop report through e-mail based news groups. Andre Punt emphasised the particular need to inform the fisheries community of the deliberations of the workshop. This was agreed.

The structure of the Red List review procedure agreed upon at the SSC Executive Committee Meeting, 23-4 September 1997, (section 3c), was endorsed. It was agreed that alongside the Regional Assessment Working Group (chair Ulf Gardenfors) and Standards Working Group (chair Georgina Mace), the criteria Review Working Group (chair Georgina Mace) would comprise, initially at least, the participants of this workshop.

Structure of the IUCN/SSC Red List Programme



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References

Caughley, G. (1994) Directions in Conservation Biology. *Journal of Animal Ecology*, **63**, 215-244.

IUCN. (1994) *IUCN Red List Categories*. IUCN, Gland.

IUCN. (1996) *1996 IUCN Red List of Threatened Animals*. IUCN, Gland.

Mace, G. M. & Lande, R. (1991) Assessing extinction threats: toward a reevaluation of IUCN threatened species categories. *Conservation Biology*, **5**, 148-57.

Matsuda, H., Yahara, T. & Uozumi, Y. (1997) Is tuna critically endangered? Extinction risk of a large and overexploited population. *Ecological Research*, **12**, 345-356.

Yahara, T., Kato, T., Inoue, K., Yokota, M., Kadono, Y., Serizawa, S., Takahashi, H., Kawakubo, N., Nagamusu, H., Suzuki, K., Ueda, K. & Kadota, Y. (unpublished) Red List of Japanese Vascular Plants: Summary of methods and results.

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APPENDIX A: Table of Correspondence

Sources for comments on the criteria and Categories.

This list includes all the written comments that have been included in the review so far. There are general comments sent to Simon Stuart (SNS), Jonathan Baillie (JB) and Georgina Mace (GM) during the process of listing. In addition there are responses to David McDowell (DMD), Director General of IUCN and David Brackett (DB), SSC Chair, who wrote to IUCN members and SSC members respectively, requesting views.

No.	Date	Type	Correspondent	Afilliation	Context
1	13.10.95	letter to JB	Scott Miller	Bishop Museum, Hawaii	lepidoptera, bugs Regional Hawaii
2	5.2.96	fax to SSC members	George Rabb	SSC	General and Russian
3	14.9.96	draft manuscript	Matsuda, H., Yahara, T.& Uozumi, Y.	Kyushu University Tokyo University, Japan	Tuna
4	11.10.96	fax to DMD	L.S. Parsons, Assistant Deputy Minister	Dept of Fisheries and Oceans, Canada	Marine Fishes
5	15.10.96	Agenda	Mollusc Specialist Group criteria Meeting	Mollusc SG	General and molluscs
6	15.10.96	Meeting report	Mollusc Specialist Group criteria Meeting	Mollusc SG	General and molluscs
7	16.10.96	email to Randall Reeves	Michael Kingsley	Dept of Fisheries and Oceans, Canada	Fishes
8	20.10.96	to SSC	South American NGO's & Reply from SNS	S America	Regional: South America
9	6.11.96	to SNS	Grahame Webb	Wildlife Management International & Crc SG	Crocodiles
10	13.11.96	to S. Fowler, Shark SG	Hiroshi Hatanaka	Fisheries Agency, Japan	Sharks
11	1.12.96	paper	M.J. Samways	University of Natal & Odonata SG	Odonata, Safrica
12	6.11.96	to SNS	Grahame Webb	Wildlife Management International & Croc SG	Turtle
13	11.3.97	to JB	John Burton		*Mus mayori*
14	4.7.97	to DMD	Justin Gerlach	Nature Protection Trust of Seychelles	Regional: Seychelles
15	11.7.97	to DMD,	R.W. Dwyer, Executive Officer	Chobe Wildlife Trust	General

No.	Date	Type	Correspondent	Afilliation	Context
16	11.7.97	to DMD	Gunter Semantek	Berlin	Quagga
17	19.8.97		Martin Schittler	German Federal Agency for Nature Conservation	German national lists
18	20.8.97	to DMD	Syd Shea	Dept of Conservation & Land Management, W. Australia	Regional
19	23.8.97	to DMD	Berit Lein Head of Department	Directorate for Nature Mangement, Norway	Marine fish National Lists
20	28.8.97	to DB	Aljos Farjon	RBG Kew & Chair, Conifer SG	Conifers
21	5.9.97	to DB	Sally Walker,	CBSG India, ZOO	Regional: India
22	15.9.97	to DB	Tetsukazu Yahara	University of Kyushu, Japan & Japanese Plant SG	Japanese plants
23	17.9.97	to CBSG India	Harry Andrews	Madras Crocodile Bank Trust	Crocodiles
24	26.9.97	to DB	Stefan Pihl	Seaduck SG	seabirds, hypothetical
25	30.9.97	to DMD	Mark Avery, Head of Conservation Science	RSPB, UK	All taxa
26	1.10.97	to IUCN	Sigurdur Thrainsson	Icelandic Government	marine fishes& ecosystems Regional: N Atlantic
27	2.10.97	to DMD	Abdelghani Belouad	National Agency for Nature Conservation, Algeria	National: Algeria
28	3.10.97	to DB	Rod East	Antelope SG	Antelopes
29	6.10.97	to DB	Andrew Smith	Lagomporph SG & Arizona State University	Lagomorphs
30	7.10.97	to DB	Denton Belk, & “Jan”		Copepods
31	9.10.97	to DMD	Hikari Kobayasi	Environment Agency of Japan	Japanese Macaque
32	6.11.96	to DB	Dave Rentz	Orthoptera SG	Orthoptera
33	21.10.97	to DMD	L.S. Parsons, Assistant Deputy Minister	Department of Fisheries & Oceans, Canada	Marine fish
34	21.10.97	to SNS & DB	Jon Hutton & Reply from SNS	Africa Resources Trust	African Elephant
35	22.10.97	to DB	N. Mrosovsky	Univ. Toronto & Marine Turtle SG	Turtles
36	22.10.97	to DB	Craig Hilton-Taylor	South African Plants SG	South African plants
37	27.10.97	to DB	Peter Jackson Urs Breitenmoster	Cat SG	Cats, *Lynx lynx* small cats

No.	Date	Type	Correspondent	Afilliation	Context
			Alan Shoemaker		giraffe, inverts
38	28.10.97	to DB	Perran Ross	Crocodile SG	Crocs, Nile croc, Black caiman
39	28.10.97	to DB	Martin Brooks	African Rhino SG	African Rhinos
40	28.10.97	to IUCN	Keiichi Kawase	Japanese Mission, Geneva	Japan
41	31.10.97	to SNS, GM	Hans de Iongh	IUCN-NC	Workshop, March 98
42	10.1.98	to DB	Aljos Farjon	Conifer SG	Conifers
43	4.2.98	to GM	Charlotte Lusty	WCMC, Tree project	Trees
44	5.2.98	manuscript	Colvan, M., Burgman, M. & Beok, C.	University Melbourne	Anomaly in criteria and categories
45	22.9.97	to GM	Perran Ross	Crocodile SG	Crocodiles
46	4.10.97	manuscript	David Keith & Mark Burgman	NSW National parks & Wildlife Service	Vascular Plants
47	5.2.98	to GM	Chris Thouless	African Elephant SG	Elephant
48	23.2.98	to GM	Jack Musick	Co-chair, Shark SG	Sharks
49	24.2.98	to GM	Colin Bibby	BirdLife International	General
50	1.11.97	manuscript	Mark Burgman	University of Melbourne	Uncertainty
51		IUCN Animals Red List 1996	Jonathan Baillie & Brian Groombridge	IUCN & WCMC	General

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6. APPENDIX B: Table of Issues

This table summarises the comments made in 51 set of comments sent to IUCN concerning the IUCN (1994) categories and criteria, and is intended to form a working document for the scoping meeting. The full set of documentation will be available at the meeting and can be identified by the reference numbers in the right hand column.

Issues are organized broadly into the following categories:

Numbers	
1-25	General issues
26-29	Regional issues
	The categories
30-33	conservation dependent
34-35	least concern
36-40	near threatened
	The criteria
41-74	A
75-81	B
82-85	C
86	D
87	E
	The definitions
88-99	generation length
100-102	location
103-108	population
109-124	range size (EOO and AOO)
125	fragmentation
126-131	Documentation of categories and criteria
132-141	Documentation of species llistings using the categories and criteria

Name	Topic	Context	No.	Comment
General issues				
Keiichi Kawase	General	Marine fishes	1	Expert groups and management agencies must be involved in listing decisions
L.S. Parsons	General	Marine species	2	Listing causes problems for management agency if species are believed at risk of extinction
CBSG India	General	India	3	Listing may affect status on local legislation or have impact on use of flagship species
Jack Musick	General	Sharks	4	Specialist groups should be able to supersede general criteria to provide defensible assessments
Keiichi Kawase	General	Marine fishes	5	Need new system for listing species under management
L.S. Parsons	General	Marine fishes	6	Need a separate process for assessing risk of extinction of exploited marine species
Sigurdur Thrainsson	General	Marine fishes	7	criteria should not be used for species managed as geographical populations or stocks
Sigurdur Thrainsson	General	Marine fishes	8	Need specific criteria for actively managed stocks, listing should be done with management authorities
Colin Bibby	General	Birds	9	Risk of altering system so that its impact and usefulness is reduced. Make changes small
Mark Avery	General	Birds	10	Explaining the criteria properly will be more useful than changing them
Mark Colyvan et al	General	General	11	Figure showing categories should be revised to show nested nature of CR, EN and VU
Mark Avery	General	Birds	12	Quantitative criteria are important - should encourage more data collection
Perran Ross	General	Crocodilians	13	Process of justifying classifications has been helpful for data collection and agreement in the SG
Matsuda et al.	General	General	14	Demonstrable inconsistency between criterion A and criterion E
Michael Samways	General	Odonata	15	Colonising ability should be considered in threat assessments
CBSG India	General	India	16	criteria should be taxon specific; no basis for universal threshold values
CBSG India	General	India	17	criteria not appropriate for tropical species
CBSG India	General	India	18	criteria seem to give wrong answers; what if they are wrong?
Perran Ross	General	Black caiman	19	Species shows massive decline from historical levels, will never recover, but is still LR
CBSG India	General	India	20	Want to assess species at the generic level, or ecosystem level (e.g. mangroves)
CBSG India	General	Indian mammals	21	Inadequate data exists to measure decline rates, population, EOO, AOO
Andrew Smith	General	Lagomorpha	22	criteria worked well
Colin Bibby	General	Birds	23	criteria have worked well
Denton Belk	General	Copepods	24	criteria worked well
Colin Bibby	General	Birds	25	Need congruent criteria, especially between IUCN and TNC
Regional				
Berit Lein	Regional	Norway	26	Minimum timescale should be longer for national than international assessments
CBSG India	Regional	India	27	Strong need for sub-global assessments; difficulty assessing status outside own area
F. Rojas-Suarez et al	Regional	General	28	No apparent reference to national or regional Red Lists, even when species are country endemics
Martin Schnittler	Regional	Germany	29	Need different criteria for national listing and different species

Name	Topic	Context	No.	Comment
The categories				
Baillie & Groombridge	Cons. dependent	General	30	Each threat category could have its own cd category
Charlotte Lusty	Cons. dependent	Trees	31	Relationship of cd to other categories unclear (esp. nt). Also guidance on use of cd in reserves
Craig Hilton-Taylor	Cons. dependent	South African plants	32	Difficulty over boundary areas for VU and especially VU (D2) versus LR cd
Rod East	Cons. dependent	Antelopes	33	Unclear when species dependent on networks of protected areas are cd
Charlotte Lusty	Least concern	Trees	34	Needs to be clearly distinguished from nt and cd
Scott Miller	Least concern	General	35	Need explanation of Least Concern
Craig Hilton-Taylor	Near threatened	South African plants	36	More guidance needed on the use of Near threatened
Rod East	Near threatened	Antelopes	37	Difficulty over boundary areas VU-nt and VU-LR
Scott Miller	Near threatened	General	38	Need criteria for Near Threatened category
Syd Shea	Near threatened	Western Australia	39	Need criteria for Near Threatened category
Tesukazu Yahara	Near threatened	Japanese plants	40	Suggests criterion is 0.1% extinction risk in 100 years
The criteria				
Baillie & Groombridge	criterion A	General	41	Lack of precision over estimation of extinction risk from the A criterion
Keiichi Kawase	criterion A	Tuna	42	Decline is not consistent with extinction risk
L.S. Parsons	criterion A	Marine fishes	43	Decline rates specified in the criteria do not indicate extinction risk
Mark Avery	criterion A	Birds	44	Ned more emphasis on population or range declines - should encourage better monitoring
L.S. Parsons	criterion A	Marine fishes	45	Many species have high productivity and colonising ability, so extinction risk over-estimated
Baillie & Groombridge	criterion A	General	46	Does not identify depleted taxa
CBSG India	criterion A	India	47	3 generations may be 150 years, many species show decline. Is there a maximum time to use?
Charlotte Lusty	criterion A	Trees	48	Long generation times lead to unacceptable listings. Need to include more than just rate of decline
Grahame Webb	criterion A	Crocodilians	49	3 generation lengths is a long time - can represent a relatively small reduction
Grahame Webb	criterion A	Crocodilians	50	Recent trend matters more than total decline over 3 generations - need to consider recovery
Martin Brooks	criterion A	Rhinos	51	Listing of species that show long term decline and recovery may need to reflect current trends more
Nick Mrosovsky	criterion A	Turtles	52	Should weight decline assessment by current situation and recent trends, not ancient declines
Grahame Webb	criterion A	Crocodilians	53	Should consider cause of decline and whether it will continue
Jon Hutton	criterion A	African elephant	54	Guidance needed on when and how to project from past to future - validity of moving window
Chris Thouless	criterion A	Elephants	55	Guidelines needed for when, and over what time period, extrapolation and projection can be used
Baillie & Groombridge	criterion A	General	56	Should there be a shifting time window?
L.S. Parsons	criterion A	Marine species	57	Abundant species are not at risk of extinction even if they show declines
L.S. Parsons	criterion A	Marine fishes	58	Abundance is hard to measure, therefore inaccurate assessment of declines

Name	Topic	Context	No.	Comment
Matsuda et al.	criterion A	General	59	Should link decline rates to population sizes where they are known
Tesukazu Yahara	criterion A	Japanese plants	60	Need to link decline rate to population size to give criterion consistent with E at each threat level
Tesukazu Yahara	criterion A	Japanese plants	61	criterion gives listing of species that are still abundant
Aljos Farjon	criterion A	Conifers	62	Long generation times mean species continue to be listed even though decline has long ceased
CBSG India	criterion A	Indian mammals	63	Need to explicitly allow use of trade data
L.S. Parsons	criterion A	Marine species	64	Declines may be due to natural fluctuations
L.S. Parsons	criterion A	Atlantic cod	65	Fluctuations in abundance may be due to long term environmental fluctuations
Jack Musick	criterion A	Sharks	66	Need to link decline rates to population size
Jack Musick	criterion A	Sharks	67	Cannot apply same decline rate to all species; need to consider life history and density dependence
L.S. Parsons	criterion A	Marine fishes	68	Declines from unexploited levels may be due to sustainable fisheries management
L.S. Parsons	criterion A	Marine fishes	69	Need new mechanism for dealing with declines in managed populations (see details)
Perran Ross	criterion A	Crocodilians	70	Pleased that all species currently in use and in trade were classified as LR
Perran Ross	criterion A	Crocodilians	71	Species will qualify as threatened while in early stages of harvesting programme
Sarah Fowler	criterion A	Marine species	72	For harvested species, stocks may be reduce by up to 50% to increase yield
David Keith	criterion A	Vascular plants	73	New criterion proposed to reflect high risk to localised species facing severe threats
Stefan Pihl	criterion A	Seabirds	74	How to assess the status of a stable population facing multiple potentially severe threats, all unlikely
CBSG India	criterion B	India	75	No data to assess fluctuations (B3)
Charlotte Lusty	criterion B	Trees	76	Many people used only 1 subcriterion under B
Charlotte Lusty	criterion B	Trees	77	Extreme fluctuation is not relevant for trees
Charlotte Lusty	criterion B	Trees	78	20,000 sq km not appropriate for trees
David Keith	criterion B	Vascular plants	79	AOO and EOO threshold values too high
David Keith	criterion B	Vascular plants	80	Needs additional sub-criteria to reflect regeneration capacity, habitat availability and protection status
Syd Shea	criterion B	Western Australia	81	Extreme fluctuation (B2) are common in relation to rainfall in W. Australia
Charlotte Lusty	criterion C	Trees	82	10,000 individuals not appropriate for trees
David Keith	criterion C	Vascular plants	83	Needs additional sub-criteria to reflect regeneration capacity, habitat availability and protection status
David Keith	criterion C	Vascular plants	84	Additional sub-criterion suggested for C2Bwhere >90% individuals are in one subpop
Tesukazu Yahara	criterion C	Japanese plants	85	Inconsistency between criterion C and criterion E
Mollusc SG	criterion D2	Molluscs	86	Area specified may be sufficient to include many individuals (>10,000); very small ranges excluded.
Keiichi Kawase	criterion E	General	87	Should be used more widely and should over-rule assessments from other criteria
The definitions				
Aljos Farjon	Generation length	Conifers	88	Generation length may be >1000 years, so decline is always a reasonable projection

Name	Topic	Context	No.	Comment
Aljos Farjon	Generation length	Conifers	89	Long generation length means that most species in Australia & NZ qualify at least for VU
Baillie & Groombridge	Generation length	General	90	Suggest a maximum generation time of 25 years (max of 75 years for assessment)
Nick Mrosovsky	Generation length	Turtles	91	Three generation lengths is too long for long-lived species - can reflect very ancient declines
Perran Ross	Generation length	Crocodilians	92	Do not have information to assess status of long-lived species 3 generations ago
Mollusc SG	Generation length	General	93	Extrapolation and projection over 3 g.l. can be very unreliable, worse for future than past?
Baillie & Groombridge	Generation length	General	94	Generation time declines under heavy harvesting, and so should be measured pre-exploitation
M. Kingsley	Generation length	General	95	g.l. should be mean age of parent whose young survive to reproduce. Young parents less successful
M. Kingsley	Generation length	General	96	g.l. varies with time and place, sex and whether or not the population is growing
Matsuda et al.	Generation length	Fish	97	Varies with environment, maturation is a feature of body weight not age
Matsuda et al.	Generation length	General	98	Species with g.l.>20 years can meet decline rate criteria under EN and not VU
Tesukazu Yahara	Generation length	Japanese plants	99	Uncertain for most taxa; may lead to very long time periods for assessment
CBSG India	Location	India	100	Definition not appropriate for plants
Mollusc SG	Location	General	101	Inadequately defined
Syd Shea	Location	Western Australia	102	How to decide on locations on islands
Baillie & Groombridge	Population	General	103	Definition of mature individuals should only include those producing young that will survive
Perran Ross	Population	Nile Crocodile	104	Species is LR, but this hides the variation in status across the range which needs attention
Peter Jackson	Population	Felids	105	Cannot assess population sizes accurately enough
Yuri Dgebuadze et al	Population	General	106	Non-standard definition of population
Yuri Dgebuadze etc.	Population	General	107	How to count individuals in clonal organisms, e.g. corals, lichens etc.
Urs Breitnemoser	Population	Felids	108	Assessment of isolated populations needs more consideration than of whole species
CBSG India	Range sizes	India	109	EOO should not be used; AOO only is appropriate
CBSG India	Range sizes	India	110	Need to calculate volume rather than area for aquatic organisms
CBSG India	Range sizes	Indian mammals	111	For criterion B, threshold values should vary with taxa; should estimate by cross species analyses
Charlotte Lusty	Range sizes	Trees	112	AOO and EOO need more guidelines. EOO of 20,000 includes all Jamaican endemics
David Keith	Range sizes	Vascular plants	113	AOOs were often less that 10 km2, even for apparently secure species, when AOO estimated at fine scale
Grahame Webb	Range sizes	Crocodilians	114	Some very restricted species are apparently secure - criterion B
Justin Gerlach	Range sizes	Seychelles endemics	115	All species qualify for VU in the Seychelles
L.S. Parsons	Range sizes	Marine fishes	116	AOO could be useful, but threshold levels need validating
Michael Samways	Range sizes	Odonata	117	Problem with grid cell size(e.g.1/4°) and estimation of AOO. Many sp have very tiny actual ranges
Mollusc SG	Range sizes	General	118	Projection to whole population on the basis of information from just a few sites
Mollusc SG	Range sizes	General	119	Projection to whole population on the basis of information from just a few sites
Mollusc SG	Range sizes	General	120	Need guidance on how to equate loss of range with loss of population
Mollusc SG	Range sizes	General	121	Need guidance on how to measure 3-D ranges (water and air)
Mollusc SG	Range sizes	Freshwater species	122	How to estimate range sizes in linear habitats such as rivers

Name	Topic	Context	No.	Comment
Scott Miller	Range sizes	Invertebrates	123	Only use range sizes; need guidelines on how to evaluate ranges and past or potential reductions
Sigurdur Thrainsson	Range sizes	Marine fishes	124	criteria should consider the centre of distribution and not the entire range of a species
CBSG India	Severely fragmented	India	125	Problem over definition; cannot assess and should just reflect non-contiguous distribution
Documentation if categories and criteria				
Berit Lein	Documentation	Norway	126	Need better explanation of how to use categories and criteria, especially at national level
Charlotte Lusty	Documentation	Trees	127	Red booklet not well read nor understood
Charlotte Lusty	Documentation	Trees	128	Definitions of location, population, fluctuation, declines, fragmentation all inadequate
Craig Hilton-Taylor	Documentation	South African plants	129	Many people misunderstand rules for criterion B and only use 1 sub-criterion
L.S. Parsons	Documentation	Marine fishes	130	Confusion about whether all criteria apply to all species
Perran Ross	Documentation	Crocodilians	131	criteria are difficult and there is a learning process that needs support
Documentation of species listings using the categories and criteria				
Andrew Smith	Documentation	Lagomorpha	132	Need assessment of certainty (accuracy) to accompany listing (e.g. guess to good data)
Mark Burgman	Documentation	General	133	Need a method for assessing certainty in evaluations
F. Rojas-Suarez et al	Documentation	General	134	Need better authority citations in the Red List - names only are inadequate
Jon Hutton	Documentation	African elephant	135	Must provide timely justification and documentation on listings
Keiichi Kawase	Documentation	Marine fishes	136	Caveat in Red List not given sufficient prominence; data and information must be publicly available
L.S. Parsons	Documentation	Marine fishes	137	Basis for listings must be made available for review
Mark Avery	Documentation	Birds	138	Evidence for listing must be clearly presented alongside categories and criteria
Nick Mrosovsky	Documentation	General	139	Data and justification must be publicly available for listing to be valid
Scott Miller	Documentation	Invertebrates	140	Must include references to taxonomic nomenclature used for poorly known taxa
Michael Samways	Documentation	Odonata	141	Morphs should also be considered for inclusion. Taxonomy needs to be checked

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7. APPENDIX C: List of participants

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8. APPENDIX D: Agenda for the IUCN criteria scoping workshop

	MONDAY 2 March 1998	TUESDAY 3 March 1998
9.30	Introduction: Simon Stuart. Participants' introduction, background and specialist interests. Agreement on agenda.	Working groups
11.00	Coffee	Coffee
11.20	Overview of issues	Working groups
1.00	Lunch	Lunch
2.00	Group discussion of the issues Working group formation	Presentations of the working groups
3.30	Tea	Tea
3.50	Working groups	Conclusions
	Finish at 6.00	Finish at 4.30