Draft Guide to the New IUCN Red List Categories and Criteria [*]

After six years of research and broad consultation, the new IUCN Red List Categories were adopted by the IUCN Council in November of 1994. The new IUCN categories and criteria have been developed to improve the objectivity in assessing the conservation status of species, thus improving consistency between users. The new system has been designed to incorporate all taxa, with the exception of micro organisms, and therefore facilitates comparison across widely different taxonomic groups. The new IUCN categories and criteria are meant to be applied on a global scale to determine the current status of global biodiversity; however, work is currently being done to adapt the new system so that it can be applied at different biogeographic and geopolitical scales.

This document outlines the new categories and criteria and provides examples of how the system should be applied. It is designed to be used as a quick reference guide and to provide a conceptual framework of the new system, and thus should be used in conjunction with the official *IUCN Red List Categories* document.
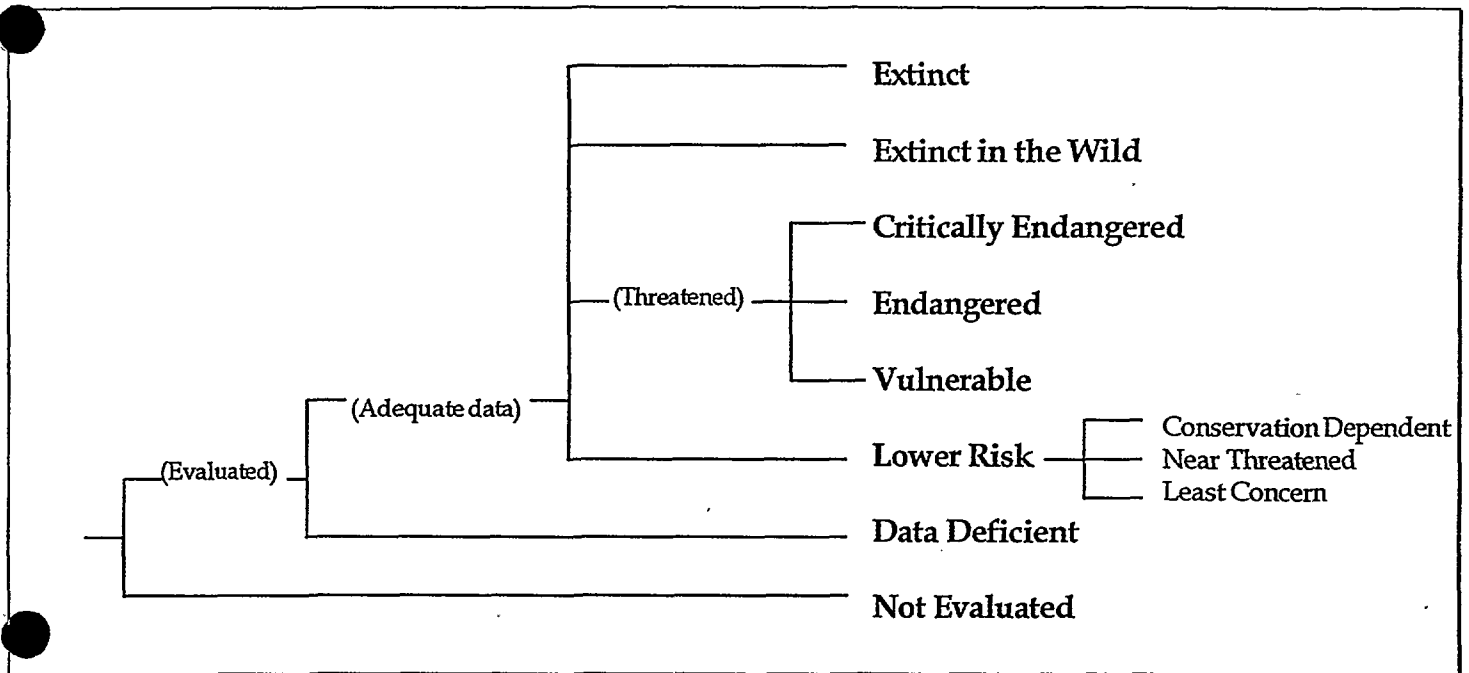

Figure 1. Structure of the Categories illustrates the process that needs to be followed to assess a taxa in one of the 8 IUCN Categories. Of the 8 categories there are three categories of threat, Critically Endangered, Endangered, and Vulnerable. Following the Lower Risk category are the three subcategories for taxa that are not currently threatened.

The Categories

There are eight well-defined categories that enable the classification of almost every species or subspecies in the world. The eight categories are illustrated in bold in Figure 1. Complete definitions are on page 3, Figure 2. The first two categories in Figure 1 are relatively self explanatory. **Extinct** means that there is no reasonable doubt that the last individual has died. **Extinct in the Wild** means that the species has been extirpated from its natural habitat. The following three categories in the diagram are the categories of threat, each of which have quantitative criteria that are meant to reflect probability of extinction at different levels of endangerment. These criteria will be discussed further in the next section. The **Lower Risk** category has three subcategories:

- *Conservation Dependent*, taxa that do not qualify for the Vulnerable category because of species-specific or habitat-specific conservation efforts

- *Near Threatened* , taxa that are not Conservation Dependent, but almost qualify for one of the Vulnerable criteria

- *Least Concern,* taxa that are not in any immediate danger of extinction.

These subcategories help to monitor species and subspecies and may aid in identifying early trends of endangerment.

The remaining two categories do not reflect the status of taxa. The category **Data Deficient** highlights taxa for which sufficient information is lacking to make a sound status assessment. The category **Not Evaluated** applies to taxa that have not yet been assessed with the new categories.

The IUCN Red List Categories

Figure 2

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E)

ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E)

VULNERABLE (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E)

LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated and does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. **Conservation Dependent (cd).** Taxa which are the focus of a continuing taxon-specific or habitat specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

2. **Near Threatened (nt).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

3. **Least Concern (lc).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

The Criteria and Subcriteria for the Categories of Threat

The three categories of threat, Critically Endangered, Endangered, and Vulnerable, are all determined by quantitative criteria. For each of the categories of threat there are five criteria (A-E), which are based on biological parameters that generally describe a process of extinction. Most of the criteria also have subcriteria that are used to justify the listing of a species under a given category, criteria and subcriteria. Vulnerable: C2a is an example of a category, criteria and subcriteria. Vulnerable is the category, C the criteria and 2a the subcriteria.

The five criteria are:

A.   Declining Population (past or projected)
B.   Small Distribution and Decline or Fluctuation
C.   Small Population Size and Decline
D   Very Small Population or Very Restricted Distribution
E.   Quantitative Analysis (e.g, Population Viability Analysis)

The criteria aid in assigning a broad range of taxa to one of the categories of threat using quantitative thresholds. Because the system was designed to encompass species with very different life histories, not all the criteria will be applicable to every species. For a species to qualify for either Critically Endangered, Endangered, or Vulnerable, it must only meet one of the five criteria (A-E) for a specific category of threat. However, taxa should be listed with only as many criteria as are applicable for the highest (i.e. most severe) category of threat for which it qualifies.

Criteria A-D should be viewed as flags meant to highlight species that are likely to be threatened with extinction. If a species is identified as threatened under one of he A-D Criteria, but is not considered threatened when the appropriate SSC Specialist Group (with peer review) applies Criterion E, (Quantitative Analysis), then Criterion E over rides all other criteria and the species is listed as Lower Risk.

Although the criteria for each of the categories of threat are based on quantitative thresholds, the system must remain relatively flexible to ensure that taxa for which there is very little information can also be assessed within the new framework. This has been done by incorporating inference and projection into the assessment process. Therefore, the person conducting an assessment is expected to use the best available information in combination with inference and projection to test a taxon against the criteria. However, if inference and projection are used, the assumptions made must be documented. If there is any reasonable concern that a species is threatened with extinction, it should qualify for the criteria of one of the categories of threat.

Table 1 Summary of New IUCN Categories and Criteria

Use any of the A-E criteria	Critically Endangered	Endangered	Vulnerable
A. **Declining Population** population decline rate at least using either 1. population reductions observed, estimated, inferred, or suspected in the past or 2. population decline project or suspected in the future based on: a) direct observation b) an index of abundance appropriate for the taxon c) a decline in area of occupancy, extent of occurrence and/or quality of habitat d) actual or potential levels of exploitation e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors, or parasites	80% in 10 years or 3 generations	50% in 10 years or 3 generations	20% in 10 years or 3 generations
B. **Small Distribution and Decline or Fluctuation** Either extent or occurrence or area of occupancy and 2 or the following 3: 1. either severely fragmented: (isolated subpopulations with a reduced probability of recolonization, if one extinct) or known to exist at a number of locations 2. continuing decline in any of the following: a) extent of occurrence b) area of occupancy c) area, extent and/or quality of habitat d) number of locations or subpopulations e) number of mature individuals 3. fluctuating in any of the following: a) extent of occurrence b) area of occupancy c) number of locations or subpopulations d) number of mature individuals	$< 100 \text{ km}^2$ $< 10 \text{ km}^2$ $= 1$ any rate > 1 order/mag.	$< 5,000 \text{ km}^2$ $< 500 \text{ km}^2$ ≤ 5 any rate < 1 order/mag.	$< 20,000 \text{ km}^2$ $< 2,000 \text{ km}^2$ ≤ 10 any rate < 1 order/mag.
C. **Small Population Size and Decline** Number of mature individuals and 1 of the following 2: 1. rapid decline rate 2. continuing decline and either a) fragmented or b) all individuals in a single subpopulation	< 250 25% in 3 years or 1 generation any rate all sub-pops ≤ 50	$< 2,5000$ 20% in 5 years or 2 generations any rate all sub-pops ≤ 250	$< 10,000$ 10% in 10 years or 3 generations any rate all sub-pops $\leq 1,000$
D. **Very Small Restricted** Either 1. number of mature individuals or 2. population is susceptible	< 50 (not applicable)	< 250 (not applicable)	$< 1,000$ area of occupancy $< 100 \text{km}^2$ or number of locations < 5
E. **Quantitative Analysis** Indicating the probability of extinction in the wild to be at least	50% in 10 years or 3 generations	20% in 20 years or 5 generations	10% in 100 years

Guide to the New IUCN Red List Categories and Criteria

Things to remember when using the Criteria

With the exception of Criterion E, subcriterion must always be listed. For example, A1c,d; B1+2c; C1; and D1. Clearly listing the subcriteria provides the reasoning for placing a taxon in a specific category, and if questioned, the reasoning can be reexamined. It also enables people to understand the primary threats facing a taxon and may aid in conservation planning.

It is important to pay particular attention to the **B.** criterion. This is because it is the most commonly misused. To qualify for the **B.** criterion the general distributional requirement must first be met for one of the categories of threat (extent of occurrence or area of occupancy). The taxon must then meet at least two of the three options listed for the B. criterion, and the relevant subcriteria. The options are, (1) severely fragmented or known to exist in no more than x locations, (2) continuing decline, or (3) extreme fluctuation. Therefore, if a taxon met the distributional requirement for the Endangered category and option (3) extreme fluctuation, but none of the other options, it would not be enough to list the taxon as Endangered under the **B.** criterion. To qualify it would also have to meet either the number (1) or (2) options plus subcriteria. An example of the proper use of the **B.** criterion is **Endangered: B1+3d.** This means that the taxon is thought to have an extent of occurrence of less than 5000 km^2 , the population is severely fragmented and there is an extreme fluctuation in the number of mature individuals.

For the **C.** criterion, the general population requirement must be met plus one of the two options. For example, to qualify for Endangered under the **C.** criterion, the general criterion, "population estimated to number less than 2500 mature individuals" needs to be met as well as either of the options and relevant subcriteria (note that the population figure is for mature individuals).
The options are:

1) An estimated continuing decline of at least 20% within 5 years or 2 generation, which ever is longer.
2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
   a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals).
   b) all individuals are in a single population.

Therefore, to list a species as Endangered under the **C.** criterion there are a number of different combinations that may apply. For example, **Endangered:**

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C1 or   **C2a** or   **C1; C2b** etc.

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The **D** criterion under the Vulnerable category provides two options, **D1** and **D2.** A taxon qualifies for the **D1** criterion if the population of mature individuals is smaller than the threshold set for each of the categories of threat. The **D2** option is provided for taxa that are not decreasing, but are characterized by an acute restriction in their area of occupancy or in their number of locations (This was formerly a separate criterion called susceptible, which is no longer distinguished).

The **E.** Criterion is only applicable if a quantitative analysis has been conducted such as a Population Viability Assessment .

Definitions

The IUCN Red List categories and criteria must be clearly understood before the evaluation process is begun.

1. Population
Population is defined as the total number of individuals of the taxon.
For functional reasons, primarily owing to differences between life-forms, population numbers are expressed as **numbers of mature individuals** only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Subpopulations
Subpopulations are defined as **geographically or otherwise distinct groups** in the population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

3. Mature individuals
The number of mature individuals is defined as **the number of individuals known, estimated or inferred to be capable of reproduction**. When estimating this quantity the following points should be borne in mind:

- Where the population is characterised by natural fluctuations the minimum number should be used.

- This measure is intended to count individuals capable of reproduction and should therefore exclude individuals that are environmentally, behaviourally or otherwise reproductively suppressed in the wild.

- In the case of populations with biased adult or breeding sex ratios it is appropriate to use lower estimates for the number of mature individuals which take this into account (e.g. the estimated effective population size).

- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).

- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.

4. Generation
Generation may be measured as the **average age of parents in the population**. This is greater than the age at first breeding, except in taxa where individuals breed only once.

5. Continuing decline
A continuing decline is **a recent, current or projected future decline**
whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but

an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

6. 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**, although the decline need not still be continuing. 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.

7. Extreme fluctuations
Extreme fluctuations occur in a number of taxa where **population size or distribution area varies widely, rapidly and frequently**, typically with a variation greater than one order of magnitude (i.e., a tenfold increase or decrease).

8. Severely fragmented
Severely fragmented refers to the situation where increased extinction risks to the taxon result from the fact that **most individuals within a taxon are found in small and relatively isolated subpopulations**. These small subpopulations may go extinct, with a reduced probability of recolonisation.

9. Extent of occurrence
Extent of occurrence is defined as **the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon**, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

10. Area of occupancy
Area of occupancy is defined as **the area within its 'extent of occurrence' (see definition) which is occupied by a taxon**, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km^2, and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small (see Figure 2).

11. Location
Location defines a **geographically or ecologically distinct area** in which a single event (e.g. pollution) will soon affect all individuals of the taxon present. A location usually, but not always, contains all or part of a subpopulation of the taxon, and is typically a small proportion of the taxon's total distribution.

12. Quantitative analysis

A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other **quantitative form of analysis, which estimates the extinction probability of a taxon or population** based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

Most Common Questions

(1) If the new categories and criteria have been applied on the subspecies level, can that information be summarized to determine the species level assessment?
No. The new system needs to be applied separately on the species and subspecies level. Although the subspecies assessments should provide a general indication of what the overall species level assessment is likely to be, extrapolating the species level status from the subspecies assessments can often lead to the wrong result. For example, it is possible that three subspecies are Vulnerable under D, but the overall species level assessment is Lower Risk. Conversely, it is possible that one of the subspecies is lower Risk, but that the species level assessment it Critically Endangered under criterion A (Declining Population). Therefore, to ensure clarity and accuracy the new categories and criteria must be applied separately to species and subspecies.

(2) When does a species qualify for Near Threatened?
To qualify for the Lower Risk (Near Threatened) subcategory, the taxon should be very close to qualifying for one of the Vulnerable criteria. For example, to qualify for the Vulnerable D criterion, a taxon must have less than 1000 mature individuals. If a population had 1100 mature individuals it should be listed as Lower Risk (Near Threatened).

(3) How should populations with very restricted ranges, but no immediate threats be listed?
The criterion Vulnerable D2 was designed to highlight the threat faced by populations with acute restrictions in the area of occupancy, or in the number of locations. This criterion is for species for which there is no immediate recognized threat, but one stochastic event could easily shift the entire population into the Critically Endangered or Extinct category.

(4) If a study has only been conducted on a small proportion of a species population, is it acceptable to use extrapolation and apply this information to the overall population?
When assessing the conservation status of species, there is rarely information on the status of a species throughout its entire distribution. Therefore, it is necessary to extrapolate from the known information. However, this extrapolation must be conducted in a responsible manner. If a species has only been studied from a small part of its total distribution, and the available information indicates that the studied population is experiencing a significant decline, these threats must be examined to determine whether they would be applicable to the remaining unstudied proportion of the population. For example, If 10% of the overall population were studies and known to be Vulnerable, due to the effects of industrial pollution (Vulnerable: A1e), but industrial pollution was not viewed as a threat in the unstudied proportion of the population, the species would be listed as Lower Risk (Least

Concern). If industrial pollution was viewed as a potential problem throughout the species distribution, the conservation assessment would be Vulnerable A1e.

(5) If estimates for the current status of a species range over two or more of the categories of threat, which category should be selected?
In situations where a spread of credible estimates qualify a species for two or more categories of threat, the taxa should be listed under the higher category (more threatened).

(6) At what point should a species be classifies as Data Deficient?
If a species is know, but there is no information about its current status or possible threats, than it is DD.

(7) Can this system be used with Limited Information?
When the new categories and criteria were being designed it was recognized that there are rarely detailed hard data on activities that negatively affect a species such as, human exploitation, introduction of exotics, or the implications of habitat loss on population size. This is especially the case for species that are threatened with extinction. Therefore, inference and projection are incorporated into the new system and should be used with the best available information to assess the status of species about which little is known.

Case Studies

The first four case studies demonstrate how the new IUCN categories and criteria should be applied to a number of different taxa. The remaining examples will have to be worked on by your group and the appropriate category and criteria assigned (it may be helpful to refer to the summary on page 5 of this document in addition to using the *IUCN Red List Categories*). The point of this exercise is to learn how to use the system. Thus, to promote consistency within groups, please make conservation assessment based only on the given information. The following examples are based on information from the SSC specialist Groups, The Nature Conservancy, Birdlife International, and the World Conservation Monitoring Center. If your group completes these assessments, please ask for a another sheet of examples, or assess some species that your group is familiar with.

Species
Ursus maritimus
(Polar Bear)

Distribution
• Circumpolar distribution.
Species information
• The Minimum population is 21,500.
• An estimate of the number of mature individuals is 10,000.
• Some populations have been over-harvested. However, the overall number of polar bears is thought to be stable or increasing.
• In 1973, the International Agreement on the Conservation of Polar Bears and their habitat was signed by Denmark, Canada, Norway, the Soviet Union, and the United States.

Is there enough information to assess the species? yes.
Is it extinct or extinct in the wild? no.
Does the Polar bear qualify for any of the categories of threat?

A. Declining population, this does not apply on a global scale because the overall population is stable or increasing and there is no reason to expect a future decline.

B. Small distribution, the polar bear has a circumpolar distribution and therefore exceeds the distributional requirements.

C. Small population size and declining, the polar bear qualifies for the small population criterion under the Vulnerable category, but the population is not declining. Therefore criterion C. does not apply.

D. Very small population, there are obviously too many mature individuals to qualify for this criterion.

E. Quantitative analysis, this has not been conducted and is thus not applicable.

Therefore the Polar bear does not qualify for any of the categories of threat. This means that the polar bear is classified in one of the subcategories of Lower Risk. The Lower Risk subcategories are:
Conservation Dependent, Near Threatened, Least Concern.

Lower Risk (Conservation Dependent), would the polar bear qualify for Vulnerable if it were not for species specific conservation measures? yes.

Conclusion: The Polar bear is therefore classified as Lower Risk (Conservation Dependent).

Species
Branchinecta belki
(a brine shrimp)

Distribution
- A small range endemic from northern Mexico.

Species information
- Known to occur in four small ponds in an area of less than 100 km^2.
- At present the populations are relatively stable, but they tend to undergo extreme fluctuations, partly as a result of the seasonally astatic habitat.
- All four of the ponds are threatened by agricultural development, extensive cattle gazing, and a federal highway that will be built within close proximity of the ponds.

As we become more familiar with the categories and criteria it is not necessary to continue asking every question in the same order as used for the polar bear case study. It is often useful to use the vulnerable criteria as a starting point and begin asking the questions in either direction from there. In this case we can see that adequate information exists to assess the species and can begin by examining which categories of threat apply.

A. Declining population in the past or future? Yes.
The population is not currently experiencing a significant decline. However, the population has a very limited range and threats such as the construction of a highway indicate that the species many experience a rapid decline in the next 10 years. It can be conservatively estimated that the population will experience a 50% decline over the next 10 years if the threats to the species continue. Therefore, *Branchinecta belki* qualifies for **Endangered: A2c.** Although one of the criterion has now been met, the species must still be evaluated against the rest of the criteria, B-E.

B. Small distribution? Yes.
The species must meet the distributional requirement plus at least two of the other options. This species has an extent of occurrence less than **100 Km^2.** The distributional criteria for Critically Endangered is therefore met. This crustacean is only known to exist at four ponds in a close proximity (one location) and thus qualifies for B1 under Critically Endangered . It meets the B2 criteria, a projected continuing decline, because of the threats discussed above. Finally, it qualifies for the B3 criteria of extreme fluctuations in the number of mature individuals. This fluctuation is caused by the seasonally astatic habitat. Therefore, it qualifies for **Critically Endangered: B1+2a,b,c,d,e+3d.**

C. Small population size and declining. Little information exists to support a reliable estimate of population size.

D. Very small population. Again the population is not well known.

E. Quantitative analysis. This has not been done.

Conclusion: Therefore, Branchinecta belki is classified as **Critically Endangered: B1+2a,b,c,d,e+3d.** It did qualify for the Endangered: A2c, but only the highest category of threat is recorded. Therefore, anything below Critically Endangered would not be considered.

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Species
Canis lupus
(gray wolf)

Distribution
•   Found in all habitats in the Northern Hemisphere with the exception of tropical forest and arid desert.
Species information
•   Populations in Canada and Alaska are estimated to be 34,000 to 35,000 individuals.
•   Some populations have become extinct or have experienced substantial reductions.
•   The overall population has remained stable or increased over the past 45 years.
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As a species the gray wolf does not qualify for any of the categories of threat. Assuming a five year generation time, you would project into the future and past for 15 years. During this window of time the wolf has not, and probably will not, experienced an overall decrease. The distribution is large and so is the population.

The species thus qualifies for one of the subcategories of Lower Risk. The species is not conservation dependent and is currently far from any of the quantitative criteria for the categories of threat.

Conclusion: Therefore, the gray wolf is **Lower Risk (least concern).**

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Species
Epinephelus indistinctus
(Somali grouper)

Distribution
•   Only known from the Indian Ocean off Somalia.
Species information
•   The holotype was collected in a trawl more than a decade ago
    at a depth of 70 to 80 m.
•   The species has not been searched for since.
•   No recognizable threats.
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Conclusion: With no information on status or threat the Somali grouper is **Data Deficient**

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Species
Corypha talieri
(a talipot palm)

Distribution
•   The last wild tree was felled in northeast India.
Species information
•   The palm still exists in cultivation.
•   The tree has done well in cultivation and a reintroduction into its native habitat has been considered.
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Conclusion: As the palm does not currently live in its native habitat it is classified as **Extinct in the Wild.**

Species
Metatrichoniscoides celticus
(Isopoda)

Distribution
• Wales, England (endemic to mainland Britain)

Species information
• Known from five sites along a roughly 20 kilometer strip of coastline in Glanorgan (South Whales), and from a single coastal site in Cumbria (northern England).
• It is possible that more sites exist, but studies to date have yielded no such findings.
• There are no major recognizable threats.

VU:D2

Species
Deltistes luxatus
(a sucker fish)

Distribution
• Oregon and California.

Species information
• Restricted to southern Oregon and northern California.
• There are seven recorded populations, six in Oregon and one spawning population in California. Less then 38 km^2 of area of occupancy.
• Formerly, the species was widespread and abundant enough to support a commercial harvest and cannery.
• Little successful recruitment has been observed in the past 15 years.
• In the area of its habitat where angler catch has been recorded (Willianson and Sprague rivers), the numbers of fish caught has fallen from 10,000 in 1968 to 630 in 1985.
• The USFWS (1990) has categorized the status of the fish as "declining."
• A dam built in 1928 restricted access form the majority of the species spawning grounds.
• The seven populations are threatened by irrigation and grazing techniques which have resulted in reduced water flow and quality.
• Hybridization is occurring with *Chasmistes brevirostris* and *C. snyderi.*
• non-native species such as yellow perch and flat headed minnows have been introduced.

CR: B1+2c,d; A1c,d,e and A2c,d,e would also be options

Species
Plethododon shenandoah
(lungless salamander)

Distribution
- Page and Madison counties in Virginia.

Species information
- Found in three small isolated mountain populations, generally above 800 m.
- Populations are currently stable and all sites are in National Park holdings.
- Range may be restricted by competition with *P. cinereus*.
- *P. shenandoah* may be threatened by an accumulation of organic matter, allowing *p. cinerus* to invade its habitat. Organic matter may be accumulating due to increased defoliation, brought on by the introduction of non-native insects such as the gypsy moth and the woolly adelgids.

VU:D2; (CR:B1+2c would be an option, but there is little certainty that the population is actually threatened).

Species
Hypochrysops piceatus
(butterfly)

Distribution
- Australia

Species information
- The only known population exists in an area of less than 10 km^2 on the side of a road.
- It is estimated that there are less than 250 mature individuals each year.
- It is likely that the population has decreased by 50% over the past 10 years, but recent observations indicate that the population is relatively stable.
- This lyceanidae is currently threatened by agricultural clearing and road modification.

CR: B1+2c

Species
Nardia huerlimanni
(a liverwort)

Distribution
- The mountain forests of southern New Caledonia.

Species information
- Known only from three small mountain locations where specimens were first collected in the early 1950's.
- Neither sexual nor asexual reproduction has been observed in any of the three populations.
- One of the sites is threatened by logging activities, as an access road has recently been built nearby.

CR: B1+2c; CR A2a is also an option. If it could be proven that the plants are not capable of reproduction then the species would be Extinct in the Wild.

Species
Charmosyna diadema
(New Caledonia Lorikeet)

Distribution
• New Caledonia
Species information
• Cloud forest of New Caledonia.
• The species was described from two female specimens collected in 1859.
• The species was again observed in 1913.
• In 1978 they were thought to be extinct; however, islanders claimed that it still may existed and in 1980 an experienced bushman reported two sightings.
• They may still survive in the cloud-forest of Mount Panie, Mount Humbolt, and the Massif of Kouakoue.

CR: B1+2c, C2a, D1.

Species
Heritiera longipetiolata
(Tree)
Distribution
• Guam, Tinian, and Saipan.
Species information
• Consists of about 1,000 trees on Guam, no more than 1,000 on Tinian and less than 100 on Saipan.
• Little regeneration has been observed by the species found on Guam. This may be caused by seed or seedling predation by ungulates or crabs.
• Habitat loss is not a major problem.

EN: C2a

Species
Notropis mekistocholas
(a Two-inch fish)

Distribution
• Central Northern Carolina.
Species information
• Restricted to about 6 populations, all occurring within a 11 km^2 area along the Cape Fear River and its tributaries near the Fall line.
• Some of the current habitat has been lost due to inundation from dam construction.
• Potential threats include proposed dams, coal mining, road construction, channel modification and wastewater discharge.

CR: B1+2c

Species
Araucaria schmidii
(Tree)

Distribution
* New Caledonia.

Species information
* known from one location on escarpments near the summit of Mt. Panie in New Caledonia.
* It is possible that individuals could be found on neighboring mountains but this is a remote area and botanically less well known.
* There are currently no major threats.

VU:D2

Species
Cupressus guadalupensis
(tree)

Distribution
* Guadeloupe.

Species information
* Occurs solely on Guadeloupe.
* There are approximately 200 individuals in one or two stands.
* The number of mature individuals is not presently known.
* Little regeneration of any vegetation is evident because of the abundance of goats.

CR: B1+2c,e; C2b

Species
Xantusia riversiana
(lizard)

Distribution
* San Nicolas Island, Santa Barbara (including a small islet off its shore), and San Clemente Island, California.

Species information
* This lizard is a narrow range endemic found only on three islands.
* The introduction of exotic species such as feral cats, goats, pigs, and rabbits are cited as a major threat. However, recent surveys indicate that substantial populations exist at all three of the islands.

VU:D2

Species
Xyrauchen texanus
(a sucker fish)

Distribution
- Restricted to the Colorado River basin.

Species information
- Forty years ago, it was found throughout the Colorado River basin, from Wyoming and Colorado to Sonora and Baja California. Now it only occurs in significant numbers in Lake Mohave, Arizona and Nevada (and these populations are almost exclusively comprised of mature individuals).
- Recruitment has been low or absent despite spawning and hatched larvae.
- Recent dam construction has largely caused reduced high Spring flows, altered river temperatures, and reduced flooding, all of which are important for this species' survival.
- The species is known to have hybridized with *Catostomus latipinnis, C. indsignis, and C. ardens.*
- Non-natives fish have been introduced to the Colorado River basin.

EN:A1c,e; A2c,e

Species
Ciconia stormi
(Storm's Stork)

Distribution
- Kalimantan and Sumatra (including the Mentawai Islands), Indonesia, both peninsular and East Malaysia, Brunei and peninsular Thailand.

Species information
- Recorded from lowland forests, including peat-swamp forest. Found along rivers, streams, ponds, or freshwater swamps.
- Its optimal habitat is extremely lowland river flood plains.
- The species is found widely throughout the Indonesian part of its range, but only at very small densities. Estimates are less than 300 individuals in this country.
- In peninsular Malaysia, the last remaining population is being extirpated by the clearing of riverine forest patches along the lower Perak.
- The only record in Thailand was of a nesting pair in 1986 in an area that is now flooded.
- The species is threatened by lowland deforestation in Kalimantan. Hunting and trade may also be a threat in this region. Swamp forest habitat is being degraded in Indonesia due to logging activities.
- The species resilience to habitat degradation is unknown.

EN:C1; C2a

Species
Cicindela Puritana
(Tiger beetle)

Distribution
- Along the shore of Chesapeake Bay in Calvert Co., Maryland; and along two short stretches of the Connecticut River, in both Massachusetts and in Connecticut.

Species information
- Less than 20 small populations exist, only five of which appear to be relatively stable.
- An estimated 5,000 individuals are present in an area of occupancy of 20 square kilometers. Historically, the distribution was much more widespread.
- High natural larval mortality leads to considerable variation in population size and local extinctions occur.
- The existing populations are threatened by vegetative encroachment, resulting from human activities, disturbance, and collecting.

EN: B1+2c,d+3c.

Species
Pogonichthys macrolepidotus
(Sacramento splittail)

Distribution
- Endemic to California.

Species information
- Formerly distributed in lakes and rivers of the central valley, California, and also in southern San Francisco Bay and at the mouth of Coyote Creek. Now largely confined to the delta (most abundant in the north and western parts).
- The species range declined 62% from 1984 to 1994.
- The rapid decline has been a result of dams; diversions; and agricultural development, including pollution from agricultural runoff.
- Non-native species have been introduced.
- These threats have been exacerbated by drought.
- Proposed increases in the diversion of water from the Delta could cause a rapid decline by eliminating habitat and changing the water conditions that are suitable for spawning.

EN: A1c,e; A2c,e

Species

Polytelis swainsonii

Superb Parrot

Distribution

New South Wales and northern Victoria, Australia.

Species information

- This parrot occurs in loose colonies in riparian woodland.
- Its breeding population is believed to be restricted to the southern part of its range.
- There are an estimated 5,000 breeding pairs.
- Threats include a lack of suitable nesting sites (hollows in the largest available trees), degradation or clearance of foraging sites, and obstruction of flight paths to traditional feeding sites. Trapping may also be a significant threat.

VU:C2b

Species

Catostomus microps

(a sucker)

Distribution

- Upper Pit River drainage system, Modoc and Lassen counties, northeastern California.

Species information

- found at six sites , well within 150 km^2.
- in the 1970^s there were less than 2,000 individuals. In 1985 it was estimated that there was about 1,300 individuals.
- The USFWS (1990) categorized the status of the species as "declining."
- Threats include the introduction of brown trout and other non-native predators, water diversion, riparian destruction, and hybridization with *C. occidentalis*.
- These threats have been exacerbated by drought.

EN: A2c,e; B1+2c,e; C2b

Species
Hyla andersonii
(tree frog)

Distribution
- Three widely disjunct areas: New Jersey, the Carolinas, and Florida-Alabama.

Species information
- Many small populations of this species are found throughout its specialized habitat (pine barrens).
- Many of the areas of occupancy are currently in protected areas.
- The overall population is believed to be stable throughout the species extent of occurrence.
- Development within pine barrens is threatening some of the populations located outside protected areas.
- If the habitat is not properly managed, (i.e. fires are suppressed), then plant succession may pose serious threats.

LR(cd)

Species
Amazona guildingii
(St Vincent Amazon)

Distribution
The upper west and east ridges of St Vincent.

Species information
- Endemic to moist forests (125-1,000 m), this species prefers the lower part of its range where there are still trees large enough to nest in.
- This species was declining in numbers due to habitat loss, hunting, hurricanes, and trade, but due to the conservation actions of NGO's and governmental organizations, the population stabilized in the early 1990s, at about 440-500 individuals.
- A recent survey has indicated that the numbers have increased to 800 birds.

VU:D1; D2.

Species
Oncorhynchus apache
Apache trout

Distribution
- The upper Salt River division of the Gila River basin in Arizona.

Species information
- This species recently suffered a 95% reduction in range due to hybridization with rainbow trout and competition with brook and brown trout.
- The Apache trout is more Vulnerable to angling than brown trout when the two are found in the same stream.
- Restoration efforts are currently underway.

CR:A1c,d,e

Species
Bufo Houstonensis
(toad)

Distribution
- Texas.

Species information
- Populations have been documented in the Central coastal region of Texas: Austin, Bastrop, Burleson, Colorado, Forty Bend, Harris and Liberty counties.
- Populations are extremely small and species distribution has been greatly reduced.
- Total population estimated at 1,500 individuals.
- This toad is threatened throughout its range due to development: lumbering, road building and urbanization.
- This disturbance has forced many of the populations to breed in permanent ponds rather than in temporary pools, resulting in hybridization with *Bufo valliceps*.

EN: C2a; (EN:A2c,e is also reasonable)

Species
Coregonus nigripinnis
(Salmonidae)
Distribution
Historically found in the deep waters of Lake Michigan and Lake Heron.
Species information
• During the 1920's it was one of the two most commercially valuable species in the Great Lakes.
• This species was overfished, and perdation by sea lampreys prevented their recovery.
• The last known specimens were taken from Lake Huron in 1923, and from Lake Michigan in 1969.

EX

Species
Lycaena hermes
(butterfly)
Distribution
• Limited to San Diego, California.
Species information
• This species is restricted to a 20 to 38 km radius.
• The butterfly's limited habitat is threatened by suburban land development.

CR: B1+2c

Information Needed For The IUCN Red Lists

Please provide information in the following format:

(1) Scientific and common name.
(2) Countries of occurrence.
(3) Status of the Taxa (i.e. the appropriate Red List category). If inference and projection are used, please clearly state your rational.
(4) References to any papers, studies or projects that support your assessment.
(5) Taxonomy used.
(6) All participants involved in the evaluation process.
(7) If all species in a group have not been assessed, please provide the overall number of species and clarify which ones have been addressed (e.g. possibly threatened species only).

Example:

NAME	DISTRIBUTION	STATUS	RATIONAL
Scientific name (i.e. Genus, species) Common name if applicable	Current country of occurrence. Please note if a population is naturalized	Conservation status of the species	References and Justification for listing.
Acerodon jubatus Golden-capped fruit bat	Philippines	EN: A1c,d.	Old World Fruit Bats: an Action Plan for their Conservation, 1992 IUCN. (96% decline in 60 years)

Participants: Anthony Michael, Paul Racy, and Stephen Herrero.
Taxonomy follows Wilison and Reeder (1993).