International Union for Conservation of Nature (IUCN)

IUCN Members

80 States

112 Government agencies

>800 NGOs

Commissions
(10,000 scientists & experts)

Commission on Ecosystem Management

IUCN The World Conservation Union CEC Commission on Education and Communication

COMMISSION ON ENVIRONMENTAL LAW

CEESP

WCPA WORLD COMMISSION ON PROTECTED AREAS

SSC Species Survival Commission

IUCN Secretariat

1,100 staff in 62 countries, led by IUCN's Director General

IUCN Red List Unit

- Management of the IUCN Red List (database, web site)
- Assessment review
- Petitions and enquiries

- Training workshops
- Assessment workshops

- Other projects and Red List tools
  - Red List Index
  - Global Species Assessments
  - Regional assessment initiatives
  - Climate change and extinction risk assessment




What are we trying to do?

- Identify and document those species most in need of conservation attention if the global extinction rates are to be reduced.
- Provide a global index to monitor the status of the world's biodiversity.

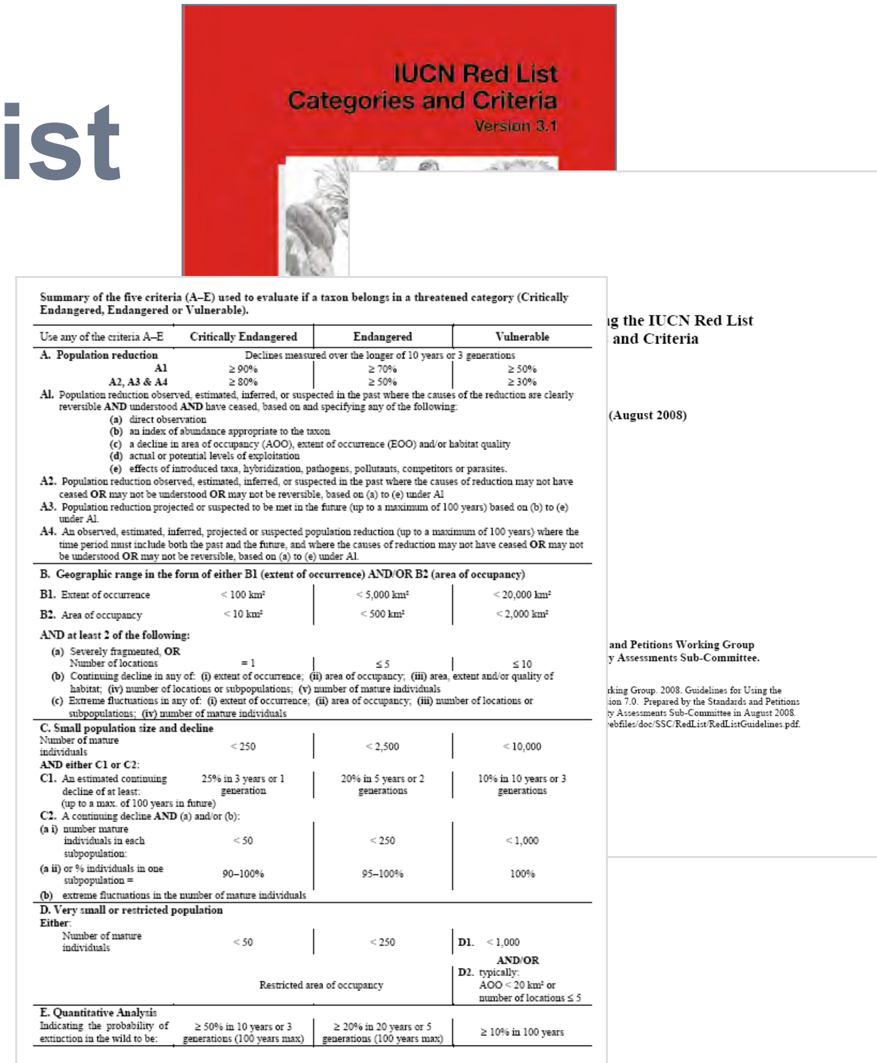
The IUCN Red List Assessment:
An estimate of **extinction risk**

What is the likelihood of a species becoming extinct in the near future, given current knowledge about population trends, range, and recent, current or projected threats?

The IUCN Red List Categories & Criteria

All materials are freely available on IUCN Red List web site:

www.iucnredlist.org



Summary of the five criteria (A–E) used to evaluate if a taxon belongs in a threatened category (Critically Endangered, Endangered or Vulnerable).

Use any of the criteria A–E	Critically Endangered	Endangered	Vulnerable
A. Population reduction	Declines measured over the longer of 10 years or 3 generations		
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible **AND** understood **AND** have ceased, based on and specifying any of the following: **(a)** direct observation **(b)** an index of abundance appropriate to the taxon **(c)** a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality **(d)** actual or potential levels of exploitation **(e)** effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.			
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1			
A3. Population reduction projected or suspected to be met in the future (up to a maximum of 100 years) based on (b) to (e) under A1.			
A4. An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1.			
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following:			
(a) Severely fragmented, **OR** Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
C. Small population size and decline			
Number of mature individuals	< 250	< 2,500	< 10,000
AND either C1 or C2:			
C1. An estimated continuing decline of at least: (up to a max. of 100 years in future)	25% in 3 years or 1 generation	20% in 5 years or 2 generations	10% in 10 years or 3 generations
C2. A continuing decline **AND** (a) and/or (b):			
(a i) number mature individuals in each subpopulation:	< 50	< 250	< 1,000
(a ii) or % individuals in one subpopulation =	90–100%	95–100%	100%
(b) extreme fluctuations in the number of mature individuals			
D. Very small or restricted population			
Either: Number of mature individuals	< 50	< 250	**D1.** < 1,000
			AND/OR
	Restricted area of occupancy		**D2.** typically: AOO < 20 km² or number of locations ≤ 5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations (100 years max)	≥ 20% in 20 years or 5 generations (100 years max)	≥ 10% in 100 years

The Red List assessment process

Assessors

<u>Outside IUCN</u>

- **Regional/national assessments (endemic species)**
- **Other assessors**

<u>Within IUCN</u>

- **Specialist Groups, Red List Authorities**
- **Global Biodiversity Assessment projects**
- **Regional projects**

Unreviewed Assessment

Reviewed Assessment

IUCN Red List Unit

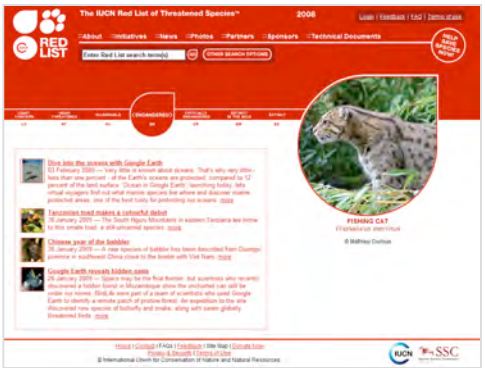
Checked, reviewed assessments

Peer review process

Red List Authorities

Reviewers

At least 2 reviewers for every assessment



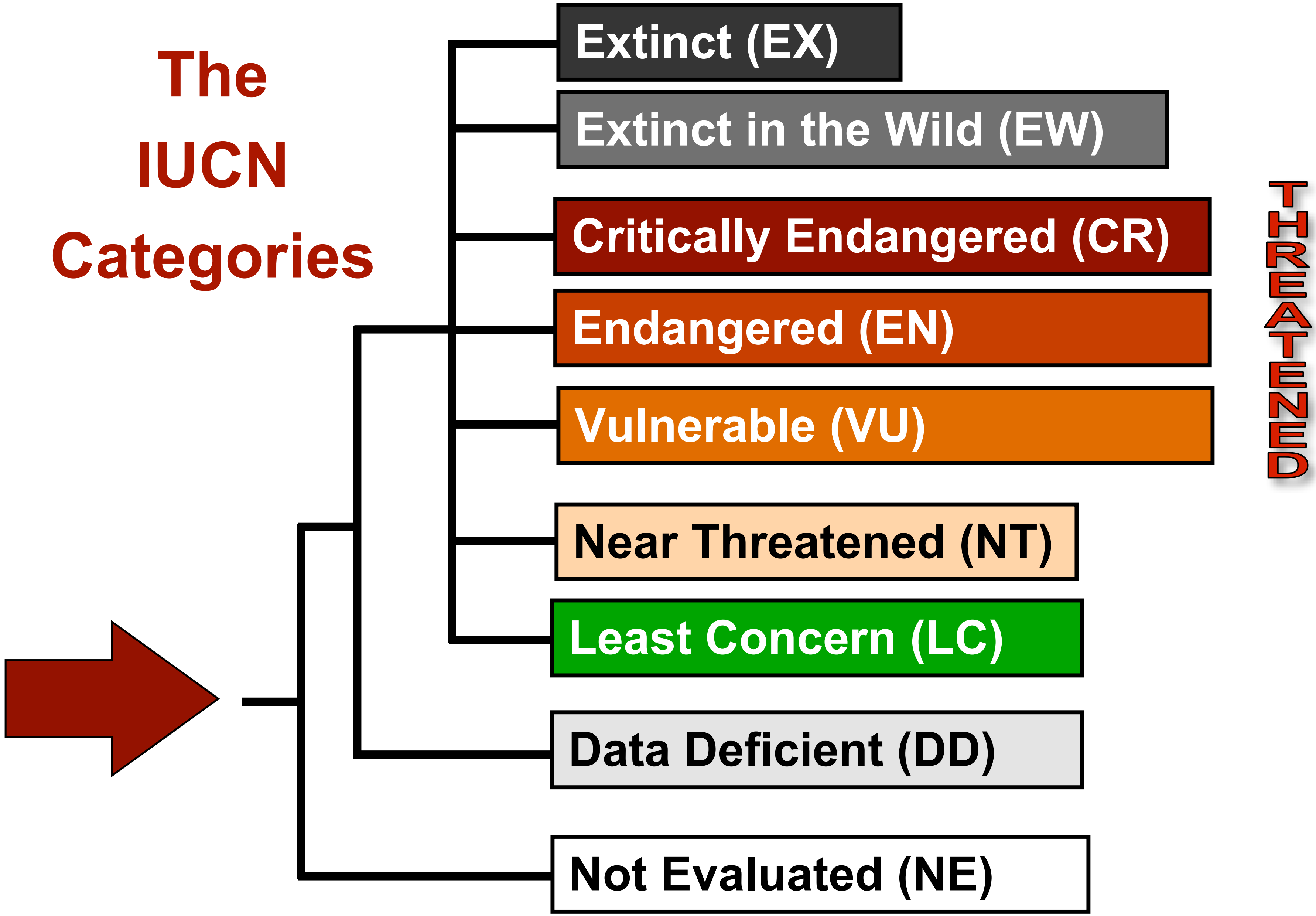
Rabb's Fringe-limbed Treefrog
Ecnomiohyla rabborum

Category: Critically Endangered

CR A2ace;B1ab(iii)

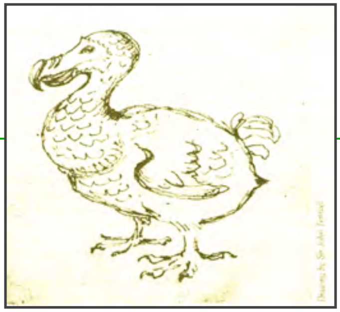
Criteria & subcriteria

The IUCN Categories



Extinct (EX)

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



Dodo, *Raphus cucullatus*

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 naturalized population (or populations) well outside the past range.

Franklinia,
Franklinia alatamaha

A taxon is threatened when the best available evidence indicates that it meets any of the criteria A to E for the thresholds stated in one of the three threatened categories: Critically Endangered, Endangered or Vulnerable.

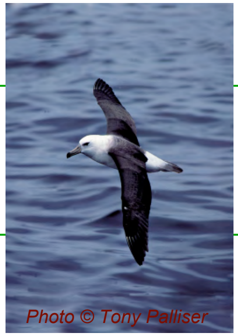
Critically Endangered (CR)

CR taxa are considered to be facing an **extremely high risk of extinction** in the wild

Mandrinette, *Hibiscus fragilis*

Endangered (EN)

EN taxa are considered to be facing a **very high risk of extinction** in the wild



Black-browed Albatross, *Thalassarche melanophrys*

Vulnerable (VU)

VU taxa are considered to be facing a **high risk of extinction** in the wild

Golden Pagoda, *Mimetes chrysanthus*

Near Threatened (NT)

A taxon is Near Threatened when it has been evaluated against the criteria and **does not qualify** for CR, EN or VU now, **but is close to qualifying** for or is **likely to qualify for a threatened category in the near future**.

Macaronesian Laurel, *Laurus azorica*

Least Concern (LC)

A taxon is Least Concern when it has been evaluated against the criteria and **does not qualify** for CR, EN, VU or NT. **Widespread and abundant taxa** are included in this category.

Olive Baboon, *Papio anumbis*

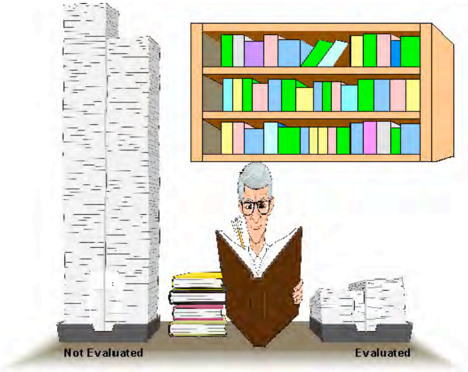
Data Deficient (DD)

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.

Tree Tomato
Solanum [Cyphomandra] betacea

Not Evaluated (NE)

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



Data Deficient (DD)

Not Evaluated (NE)

Although DD and NE are not threatened categories, taxa classed as DD or NE should NOT be treated as not threatened

The IUCN Red List Criteria

CRITERIA

A Population reduction

B Restricted geographic range

C Small population size & decline

D Very small or restricted population

E Quantitative analysis

Quantitative thresholds

THREATENED CATEGORIES

Critically Endangered (CR)

Endangered (EN)

Vulnerable (VU)

Summary of the five criteria (A–E) used to evaluate if a taxon belongs in a threatened category (Critically Endangered, Endangered or Vulnerable).

Use any of the criteria A–E	**Critically Endangered**	**Endangered**	**Vulnerable**
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A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1			
A3. Population reduction projected or suspected to be met in the future (up to a maximum of 100 years) based on (b) to (e) under A1.			
A4. An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased **OR** may not be understood **OR** may not be reversible, based on (a) to (e) under A1.			
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following:			
(a) Severely fragmented, **OR** Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals			
(c) Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals			
C. Small population size and decline			
Number of mature individuals	< 250	< 2,500	< 10,000
AND either C1 or C2:			
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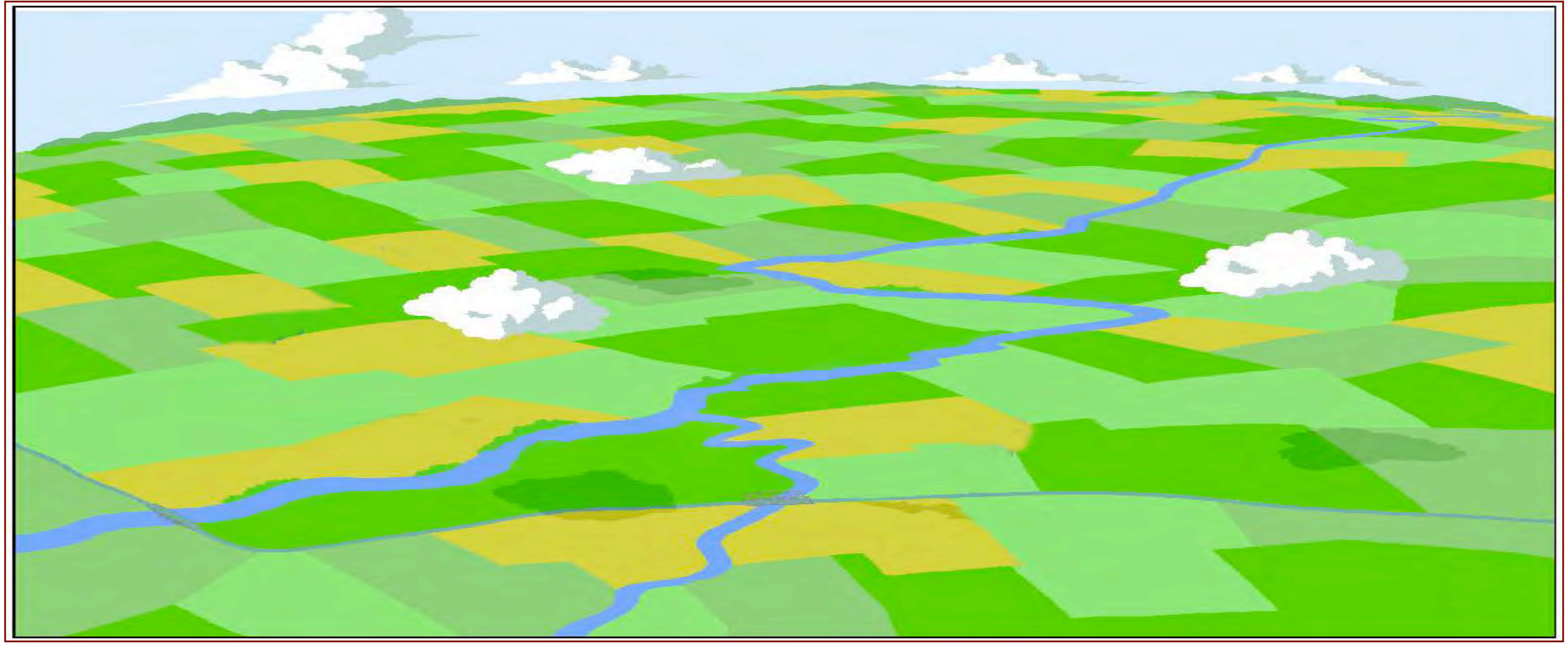
(b) extreme fluctuations in the number of mature individuals			
D. Very small or restricted population			
Either:			
Number of mature individuals	< 50	< 250	**D1.** < 1,000
			AND/OR
	Restricted area of occupancy		**D2.** typically: AOO < 20 km² or number of locations ≤ 5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations (100 years max)	≥ 20% in 20 years or 5 generations (100 years max)	≥ 10% in 100 years

Criterion B

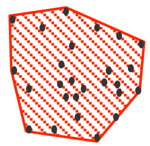
Restricted geographic range and fragmentation, continuing decline or extreme fluctuations



Criterion B

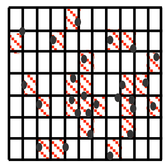
Based on **either** **of two sub-criteria:**

B1: Estimated extent of occurrence



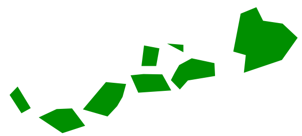
AND / OR

B2: Estimated area of occupancy

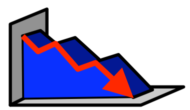


AND at least **TWO** of a-c:

a. Severely fragmented or few locations



b. Continuing decline

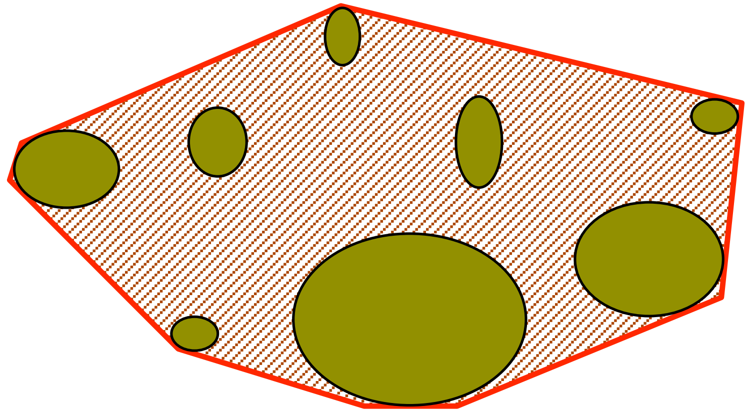


c. Extreme fluctuations

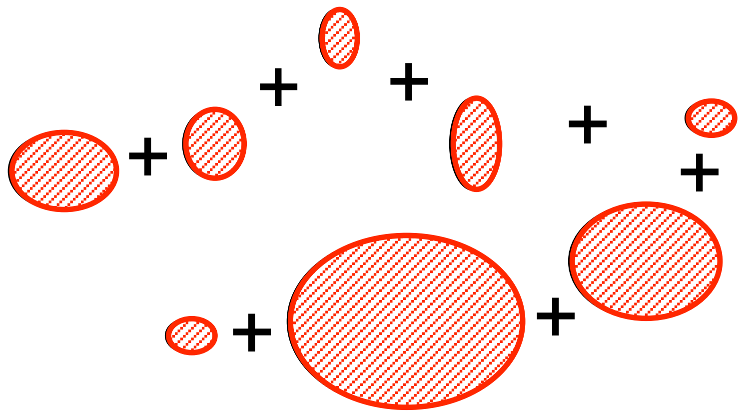
Extent of Occurrence

Area of Occupancy

Extent of Occurrence is the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all known, inferred, or projected sites presently occupied by the taxon.

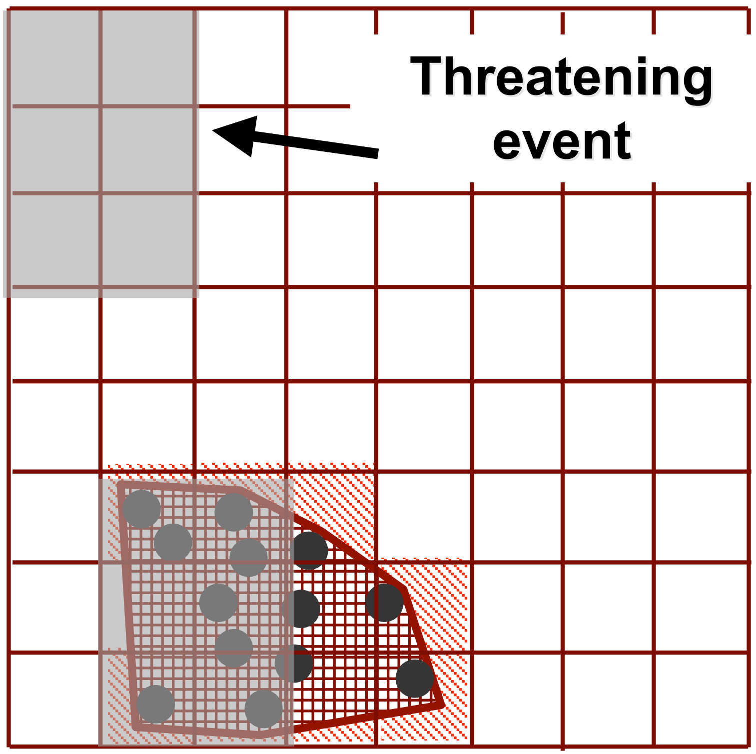


Area of Occupancy is the area within the extent of occurrence which is actually occupied by the taxon (measured by overlaying a grid and counting number of occupied cells).



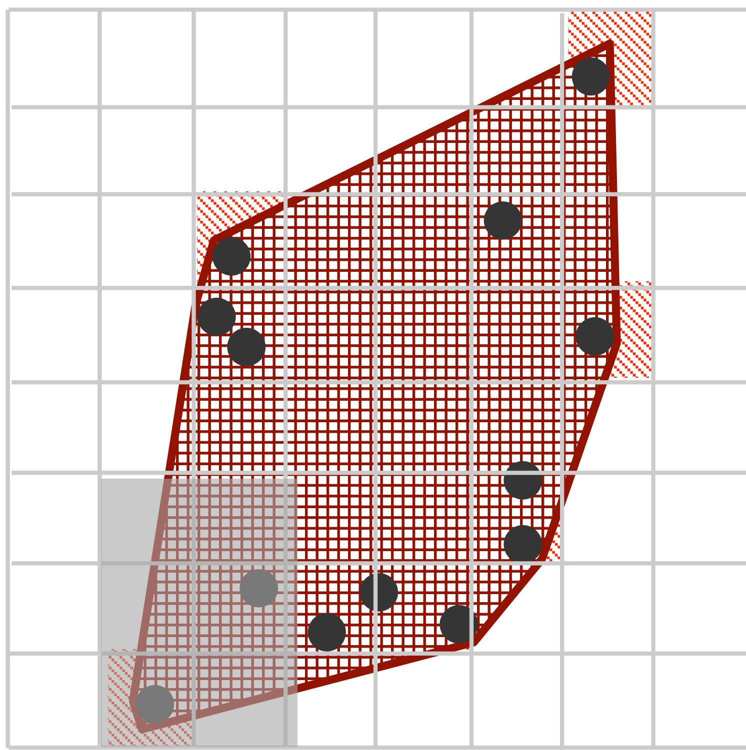
Extent of Occurrence

Comparison of taxa with same AOO but different EOO – a single threatening event is more likely to rapidly have a major impact on the taxon with the smaller EOO than the taxon with the larger EOO:



AOO = 10x4 = 40 km²

EOO = 34 km²



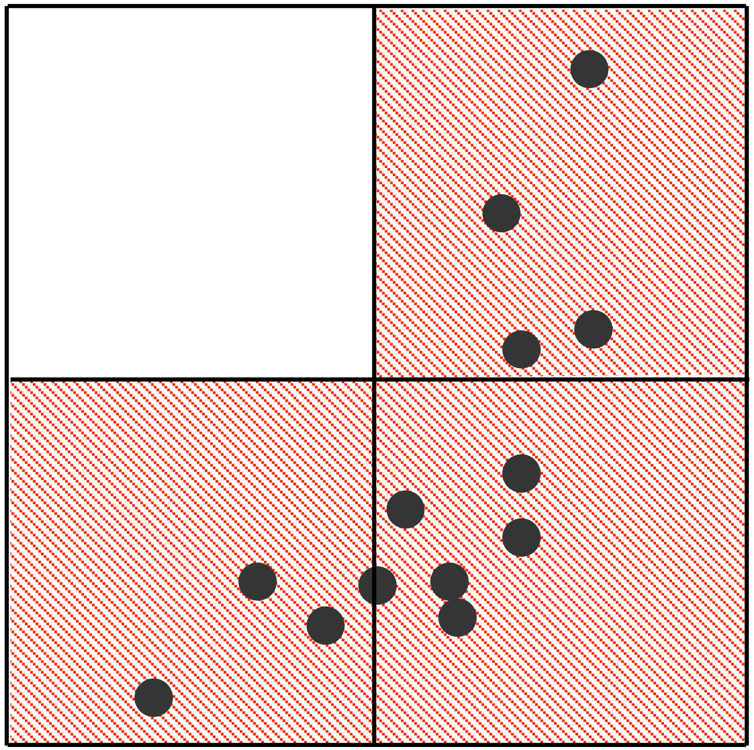
AOO = 10x4 = 40 km²

EOO = 105 km²

Area of Occupancy

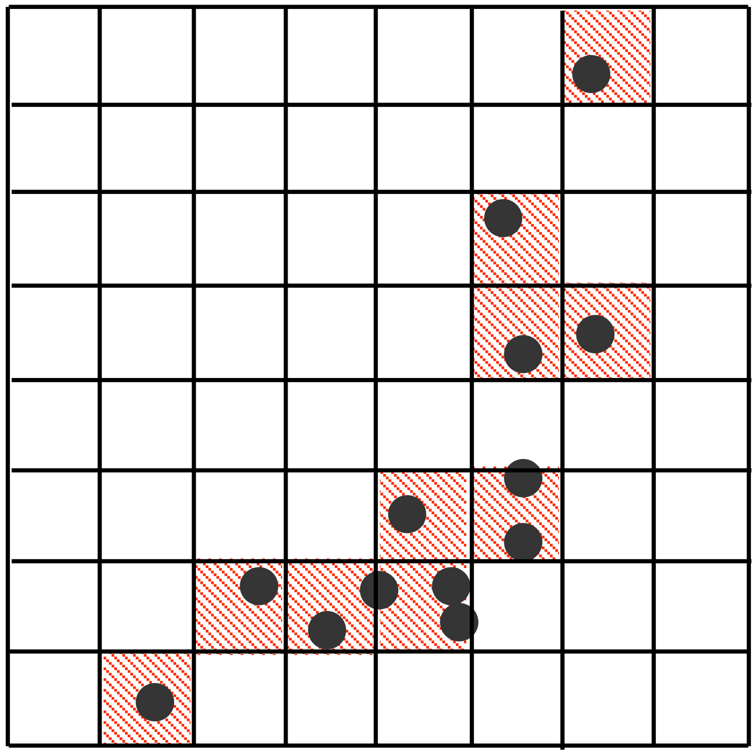
Problems of Scale

Grid Cells 16 units²



AOO = 3 x 16 = 48 units^2

Grid Cell = 1 unit²



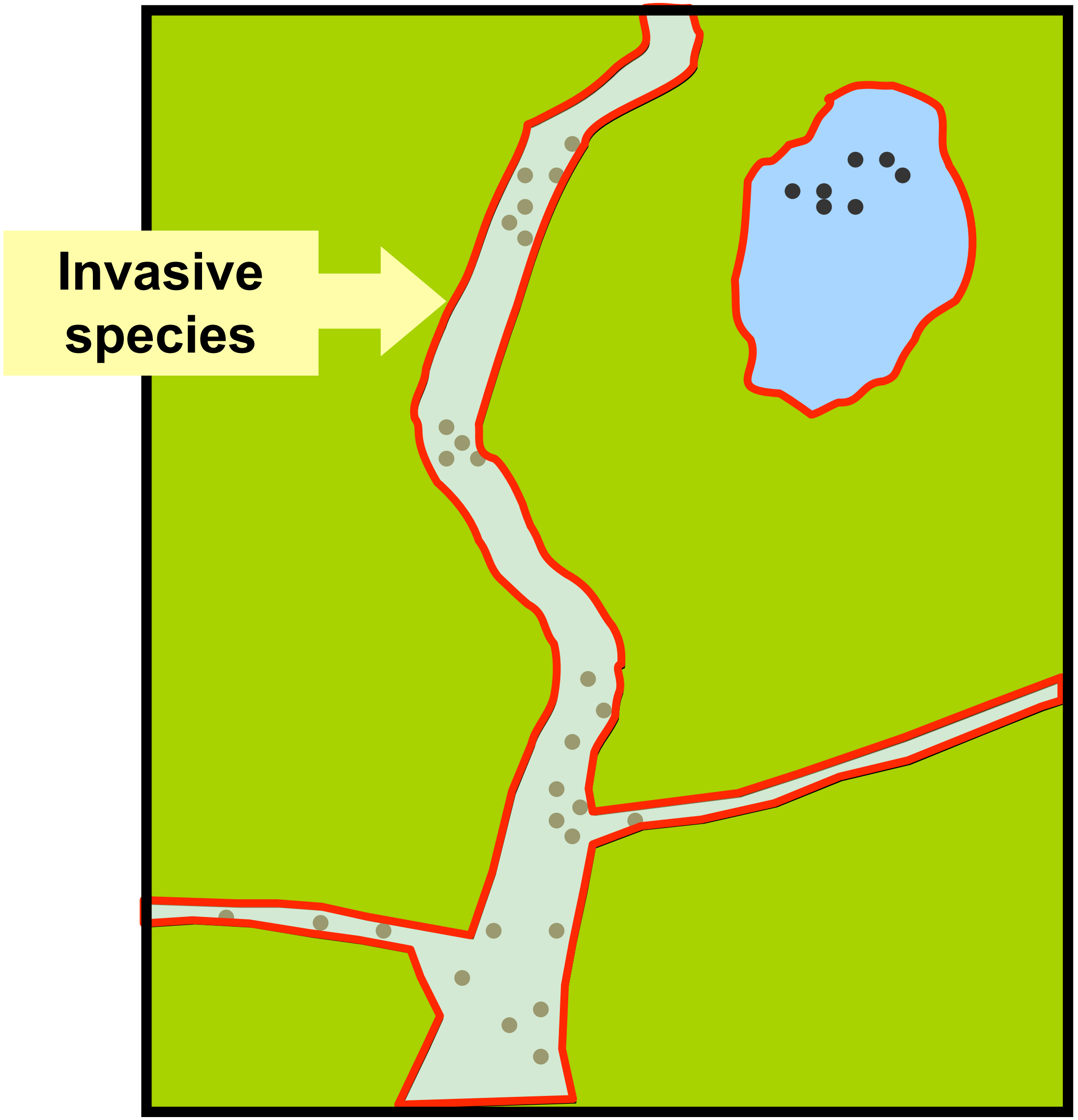
AOO = 10 x 1 = 10 units^2

In many cases, a grid size of 2 km (i.e., cell area 4 km²) is an appropriate scale.

Location

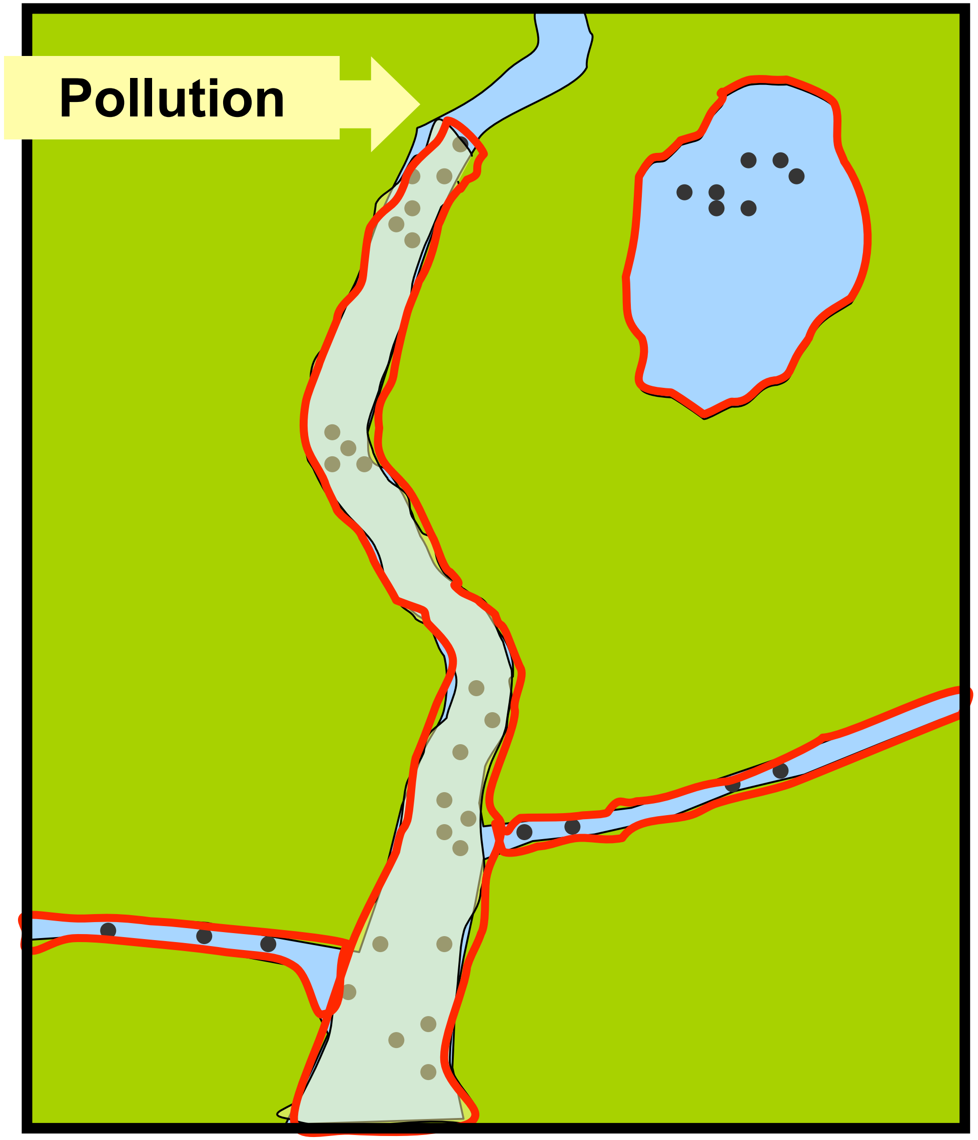
Location is a geographically or ecologically distinct area in which **a single threatening event can rapidly affect all individuals of the taxon.**

Location



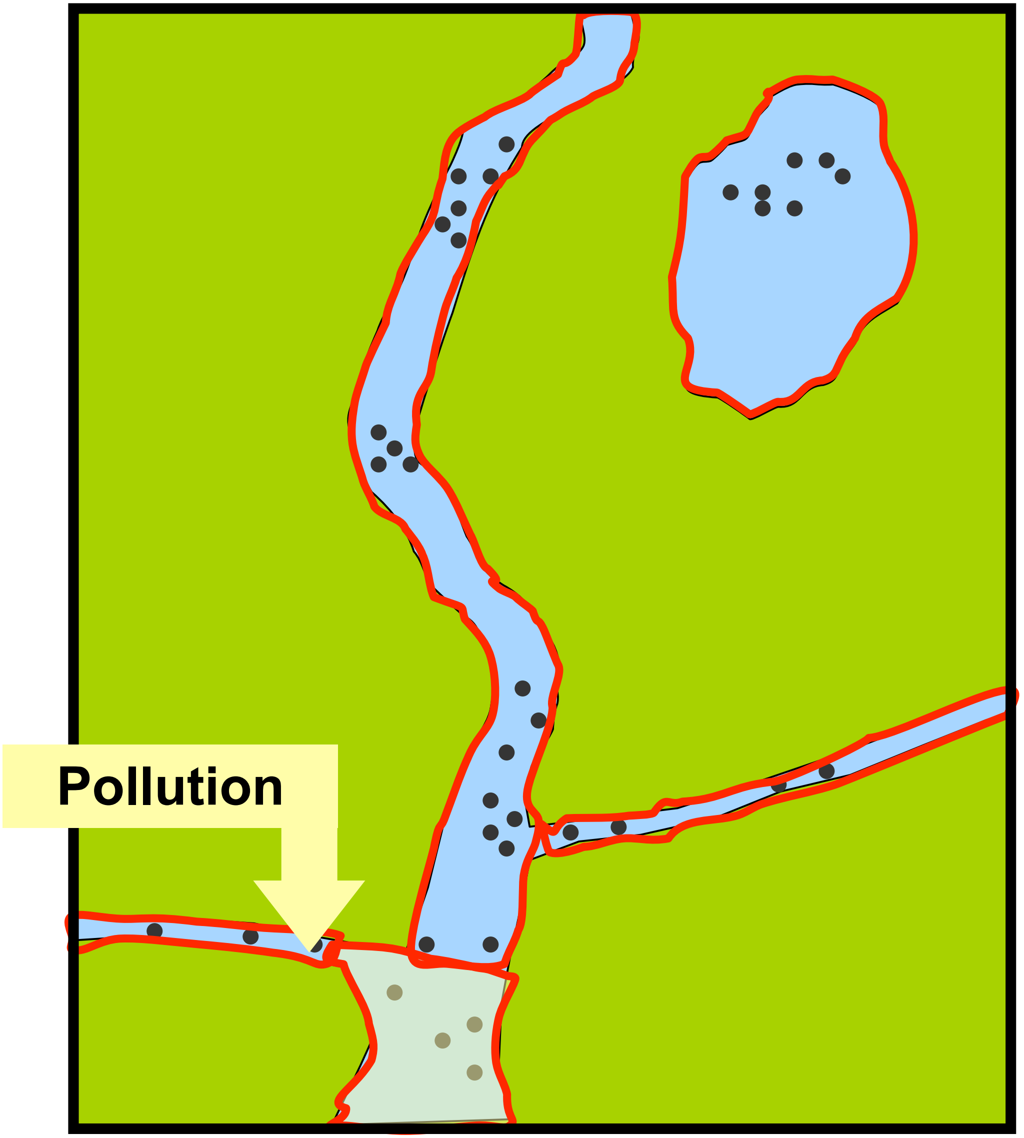
2 locations

Location



4 locations

Location

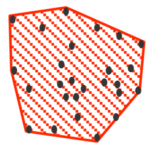


4-5 locations

Criterion B

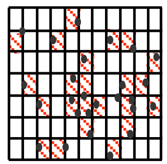
Based on either of two sub-criteria:

B1: Estimated extent of occurrence



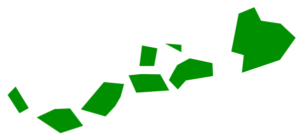
AND / OR

B2: Estimated area of occupancy

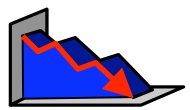


AND at least **TWO** of a-c:

a. Severely fragmented or few locations

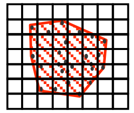
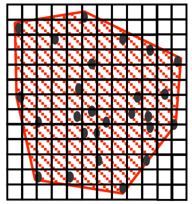
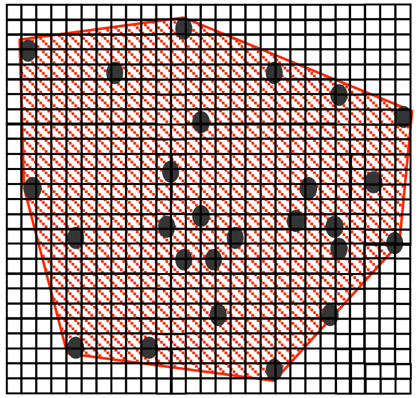


b. Continuing decline



c. Extreme fluctuations

Criterion B

	Subcriterion B1	Subcriterion B2	
	Extent of occurrence estimated to be:	Area of occupancy estimated to be:	
CR	< 100 km²	< 10 km²	
EN	< 5,000 km²	< 500 km²	
VU	< 20,000 km²	< 2,000 km²	

Criterion B

AND at least **TWO** of a, b or c:

	a. Severely fragmented or # locations:	b. Continuing decline in any of the following:	c. Extreme fluctuation in any of the following:
CR	1	(i) EOO	(i) EOO
EN	≤ 5	(ii) AOO	(ii) AOO
		(iii) Area, extent and/or quality of habitat	(iii) # locations or subpopulations
		(iv) # locations or subpopulations	(iv) # mature individuals
VU	≤ 10	(v) # mature individuals	

Use any of the criteria A-E	**Critically Endangered**	**Endangered**	**Vulnerable**
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following			
(a) Severely fragmented, **OR**			
Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals			
(c) Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals			

Case Study

Taylor’s Salamander
Ambystoma taylori

Taylor's Salamander, *Ambystoma taylori*

Taxonomy

Based on both allozymes and mtDNA, this is a very distinctive salamander. The *Ambystoma* salamanders occurring in other natural lakes around Alchichica are not closely related to this species.

Range:

Taylor's salamander is endemic to Lake Alchichica, a saline crater lake located in eastern Puebla, Mexico, at 2,290 m above sea level. The *Ambystoma* salamanders occurring in the other natural lakes around Alchichica are not closely related to this species. The surface area of the lake is 2.3 km².

Taylor’s Salamander, *Ambystoma taylori*

Population

Even at its only known locality this is a rare species, although formerly it was common there. Divers deep in the lake have seen the species recently.

Habitat & Ecology

This salamander usually does not metamorphose, and most individuals live permanently in water. But, occasional individuals have been known to metamorphose. It breeds in the lake, and is usually found in very deep water, often more than 30 m below the surface.

Taylor’s Salamander, *Ambystoma taylori*

Threats

The most serious threat to the species is water extraction and diversion resulting in the lake becoming even more saline. The water level has dropped many meters over the last two decades. Continued transformation and pollution of the lake is likely to result in the disappearance of this species. Attempts to introduce fish in the lake have failed because of its salinity.

Conservation Biology

Taylor’s salamander does not occur in any protected area. Captive breeding may be an essential short-term measure to save this species, if it is not too late. The protection of the Alchichica lake is an urgent priority. This species is protected under the category Pr (Special protection) by the Government of Mexico.

Taylor's Salamander, *Ambystoma taylori*

Is the taxon eligible for Red List assessment?

- Description of the species has been published (Brandon, Maruska & Rumph, 1981).

YES

Taylor’s Salamander, *Ambystoma taylori*

Can criterion A be applied?

(Population reduction at a specific rate over 10 years or 3 generations (whichever is longer) in the past, present, and/or future)

- The species was formerly common and is now rare.
- BUT, no indication of the time period over which a presumed decline has taken place or data to be able to estimate the scale of population decline.

NO

Taylor's Salamander, *Ambystoma taylori*

Can criterion B be applied?

(Restricted geographic range AND severe fragmentation, continuing decline and/or extreme fluctuations)

- The total lake area = 2.3 km² therefore the Critically Endangered thresholds for extent of occurrence (<100 km²) and area of occupancy (<10 km²) are both met (CR B1+2).
- Main threats are water extraction and pollution, which affect the whole lake and the whole population: only one location (CR B1a+2a).
- Habitat quality declining (water extraction causing increased salinity), declining population (now rare, ongoing habitat degradation) (CR B1b(iii,v)+2b(iii,v)).

YES – CR B1ab(iii,v)+2ab(iii,v)

Taylor's Salamander, *Ambystoma taylori*

Can criterion C be applied?

(Small population size and continuing decline)

- Although the population is described as rare, it is difficult to estimate actual numbers of mature individuals from this.

NO

Taylor's Salamander, *Ambystoma taylori*

Can criterion D be applied?

(Very small or restricted population)

- Population size cannot be estimated from the information given.
- Species is restricted to only one, small location (AOO <10 km², 1 location) (VU D2).
- Continued transformation and pollution of the lake is likely to result in the disappearance of this species.

YES - VU D2

Taylor's Salamander, *Ambystoma taylori*

Can criterion E be applied?

(Quantitative analysis estimating probability of extinction in the wild)

- No quantitative analysis has been carried out.

NO

Taylor's Salamander, *Ambystoma taylori*

- Criterion A: NO
- Criterion B: **CR B1ab(iii,v)+2ab(iii,v)**
- Criterion C: NO
- Criterion D: **VU D2**
- Criterion E: NO

Final assessment:

Taylor's Salamander (*Ambystoma taylori*) is
Critically Endangered: CR B1ab(iii,v)+2ab(iii,v)

RED LIST DOCUMENTATION

An example: Tasmanian Devil (*Sarcophilus harrisii*)

The IUCN Red List of Threatened Species™ 2008

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HELP SAVE SPECIES NOW!

Sarcophilus harrisii

NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

Summary | Classification Schemes | Images & External Links | Bibliography | Full Account

Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
ANIMALIA	CHORDATA	MAMMALIA	DASYUROMORPHIA	DASYURIDAE

Scientific Name:	*Sarcophilus harrisii*
Species Authority:	(Boitard, 1841)
Common Name/s: English – Tasmanian Devil French – Diable De Tasmanie	
Taxonomic Notes:	*Sarcophilus laniarius* has also been used recently in light of comparisons between a fossil specimen, *S. laniarius* (named prior to the naming of *S. harrisii*), and the extant species (Werdelin 1987).

Taxonomy
Assessment Information
Geographic Range
Population
Habitat and Ecology
Threats
Conservation Actions

Assessment Information [top]

Red List Category & Criteria:	Endangered A2be+3e ver 3.1
Year Assessed:	2008
Assessor/s	Hawkins, C.E., McCallum, H., Mooney, N., Jones, M. & Holdsworth, M.
Evaluator/s:	Hoffmann, M. & Chanson, J. (Global Mammal Assessment Team)

Justification:
Listed as Endangered as standardized surveys indicate that the global Tasmanian Devil population has declined by more than 60% in the last 10 years (Hawkins *et al*. 2006, McCallum *et al*. 2007). Research indicates that an invariably fatal infectious cancer, Devil Facial Tumour Disease (DFTD), is responsible for the decline. DFTD currently occurs across the majority (estimated 60%) of the geographic range of the devil and continues to spread at variable rates (depending on location) in the range of 7-50 km/y (McCallum *et al*. 2007). Mark-recapture data from the most intensively studied population at Freycinet National Park estimated a decline in total population size of 30% in the first 3 years after disease arrival, with an annual decline in the adult (2+) population of 50% (Lachish *et al*. 2007). Both projections from these observed results and an epidemiological model predict local extinction at this site within 10 years of disease arrival (McCallum *et al*. 2007). At a second site, Mt William, where DFTD signs were first reported 10 years ago, mark-recapture methods estimate a decline of 90% over 10 years. There is no evidence either of a reduction in disease prevalence or of the rate of population decline as devil abundance reduces. On current information, we therefore project at least 90% population decline over the next 10 years across the 60% of the devil's distribution currently occupied by disease, with at least a 100 km extension of the disease distribution. Together, this would amount to a further decline (in excess of the 50% already observed) of at least 70% in the next 10 years, with widespread local extinctions. Whilst the cause of decline (DFTD) is understood, it has not ceased and its effects are not reversible with current knowledge.

History:	1996 – Lower Risk/least concern (Baillie and Groombridge 1996)

Geographic Range [top]

Range Description: The Tasmanian Devil is found throughout mainland Tasmania, Australia, an area of
and 430 +/-160 years
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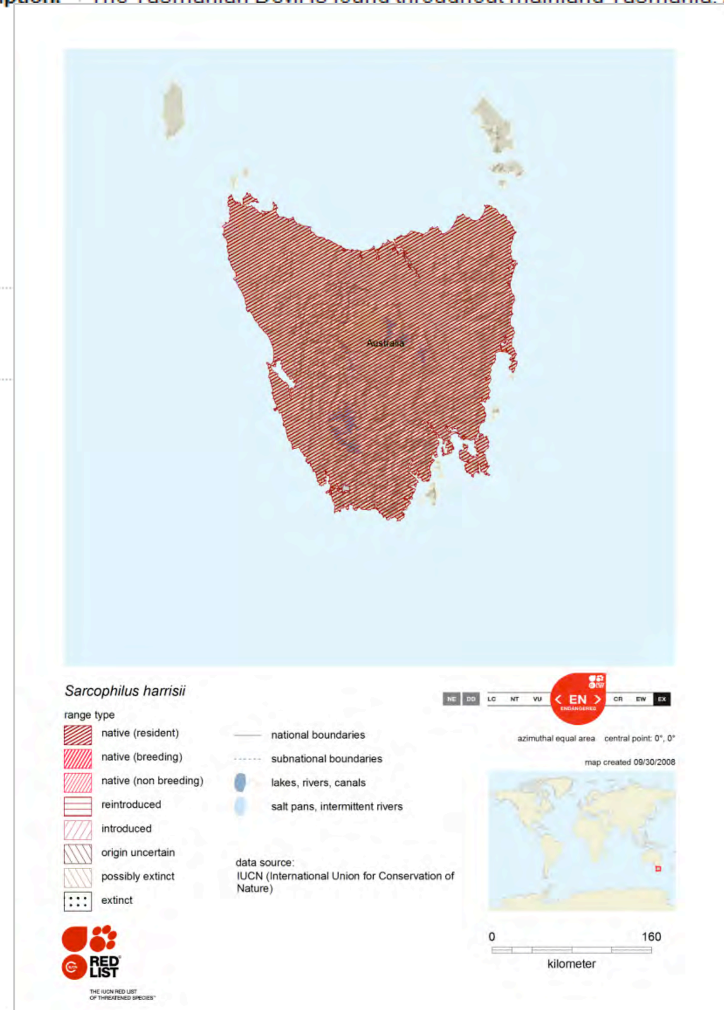
2007 all Tasmanian
ooney unpubl.).

e island off south-
d records from after
nshore island to the

Countries:

Range Map:



Population [top]

Population:

In the early to mid-1990s, the total population estimate was 130,000 – 150,000 individuals (M. Jones pers. comm.; N. Mooney pers. comm.; DPIW unpubl.), based on extrapolations of population density estimates according to habitat. Systematic statewide spotlighting surveys have been carried out since 1985. Spotlighting sightings of Tasmanian Devils across the state have declined significantly since emergence of Devil Facial Tumour Disease (DFTD) in the mid-1990s: by 27% by early 2004, by 41% by early 2006, by 53% by early 2007 (Hawkins *et al.* 2006; McCallum *et al.* 2007), and by 64% by early 2008 (C. Hawkins *et al.* unpubl.). The decline was significantly sharper in regions where DFTD had been reported earliest, such that in north-east Tasmania, mean sightings have declined by 95% from 1992-1995 to 2005-2007, with no indication of recovery or plateau in decline. Comparison of mark-recapture results in the same area from the mid-1980s and 2007 supports this finding (McCallum *et al.* 2007). At the Freycinet peninsula, on the east coast of Tasmania, where the population has been monitored through trapping from 1999 to the present, the population has declined by at least 60% since the disease was first detected in 2001 and the adult population still appears to be halving annually (Lachish *et al.* 2007). Other indicators of devil abundance, such as roadkills, predation on stock, and carrion removal, also support this conclusion of a substantial decline.

If a 64% decline based on spotlighting surveys is applied to the population estimates from the mid-1990s, the 2007 population size would have been an estimated 25,000 mature individuals (50,000 individuals total). Another method generated an estimated total population size in 2004 of approximately 21,000 mature individuals (C. Hawkins, unpubl.). This estimate was derived from mark-recapture density estimates from ten sites (four disease-free sites, six diseased sites) in the highest density areas (north-east and south-east Tasmania) and from one disease free site outside the high density area. The population estimate at each trapping site incorporated 95% confidence intervals of +/-c. 25%. A standard buffer was placed around each trap site to calculate the area from which Tasmanian Devils are trapped during a survey, and this area varies between sites, affecting density calculations. If this estimate is of a population that had declined by 27% of the pre-disease population size, then the 2007 population (estimated to have declined by 64%) would be 10,000 mature individuals.

For both estimates, the potential error is high and still under discussion. The estimation of mature individuals is particularly subject to error since the disease has so reduced the proportion of older individuals: in disease-free sites, half of all individuals trapped are typically mature, but this proportion is much less in diseased sites (varying locally according to time since disease emergence). Acknowledging these provisos, the best estimate of total population size based on current evidence thus lies within the range of 10,000-25,000 mature individuals.

While Tasmanian Devil distribution across the state appears to be continuous, two management units have been identified, with devils in north-western Tasmania being genetically distinct from those found across the rest of the State (Jones *et al.* 2004; Farmer 2006).

Habitat and Ecology [top]

Habitat and Ecology:

Tasmanian Devils are found throughout Tasmania, in all native terrestrial habitats, as well as in forestry plantations and pasture, from sea level to all but the highest peaks of Tasmania (Jones and Rose 1996, Jones and Barmuta 2000). Densities are lowest in the buttongrass plains of the south-west and, prior to Devil Facial Tumour Disease (DFTD) emergence, highest in the dry and mixed sclerophyll forests and coastal heath of Tasmania's eastern half and north-west coast (Jones and Rose 1996). Open forests and woodlands are preferred, while tall or dense wet forests are avoided (Jones and Rose 1996; Jones and Barmuta 2000). The highest population densities are found in mixed patches of grazing land and forest or woodland. Relative trapping success and spool-and-line tracking indicate that Tasmanian Devils travel through lowlands, saddles and along creeks, avoiding steep slopes and rocky areas, and favouring predictably rich sources of food such as bush/pasture mosaics on farms, carcass and rubbish dumps, and roads (Jones and Barmuta 2000, Pukk 2005; N. Mooney and D. Pemberton pers. comm.). Tasmanian Devils are able to reach very high densities, even in suboptimal habitat, if sufficient food and den sites are available. The 14 km² Badger Island at one time supported 120 Tasmanian Devils.

Seabird colonies, such as Short-tailed Shearwaters (or muttonbirds, *Puffinus tenuirostris*), are thought to have traditionally been a preferred habitat for Tasmanian Devils, providing an important food source. These are now much reduced along the east coast, but some sites remain along the west coast (D. Pemberton pers. comm.).

Dens are typically underground burrows (such as old wombat burrows), dense riparian vegetation, thick grass tussocks and caves. Adults are thought to remain faithful to their dens for life so den disturbance is destabilizing to populations (Owen and Pemberton 2005). In settled areas, dens are often under buildings which may be occupied by people.

Tasmanian Devils are the sole host to the only threatened invertebrate parasite, a tapeworm, *Dasyurotaenia robusta*, which is currently listed as Rare under the Tasmanian Threatened Species Protection Act 1995.

Feeding

Tasmanian Devils are considered to be generalist predators and specialized scavengers; prey comprise primarily medium- to large-sized mammals, although they will eat large invertebrates such as bogong moths (*Agrotis infusa*) and the carcasses of any dead vertebrates, leading them to focus on areas where lambing, calving or wallaby shooting are in progress (Guiler 1970a, Jones and Barmuta 2000, Jones 2003, Owen and Pemberton 2005). Tasmanian Devils solitarily and actively hunt prey up to about 20 kg in size (including Bennett's Wallabies, *Macropus rufogriseus rufogriseus*, and Common Wombats, *Vombattus ursinus*) using a combination of ambush and short, moderate-speed pursuits (Jones 1998, 2003; Owen and Pemberton 2005).

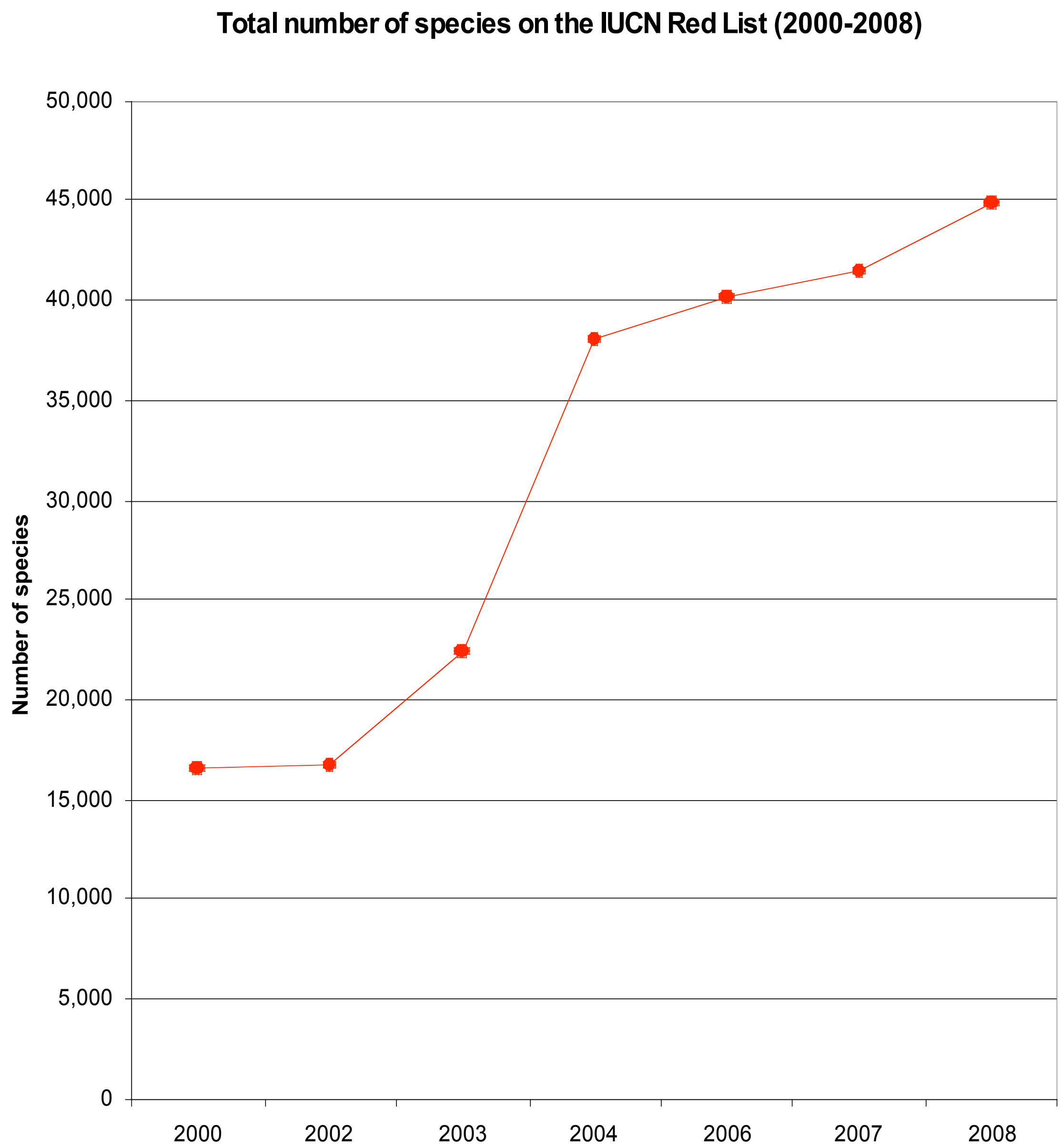
Threats [top]

Major Threat(s):	The major threat to this species at present is Devil Facial Tumour Disease (DFTD), compounded by roadkills, dog kills and persecution. **Devil Facial Tumour Disease (DFTD)** Current evidence suggests that DFTD is an infectious, widespread disease (McCallum *et al*. 2007), so that any attempt to delineate boundaries between affected and unaffected locations is likely to be outdated swiftly. DFTD has been associated with local population declines of up to 89% since first reported (Hawkins *et al*. 2006, McCallum *et al*. 2007), indicated by long-term spotlighting data, widespread trapping and laboratory results. The declines, and the prevalence of the disease, have not eased off in any monitoring sites, and DFTD is present even in very low density areas. It is estimated that the adult population is approximately halving annually on the Freycinet peninsula (Lachish *et al*. 2007) with extinction predicted at this site 10-15 years after disease arrival (McCallum *et al*. 2007). Declines were most marked in areas where the disease had been reported earliest, in north-eastern and central eastern Tasmania. Mean spotlighting sightings of Tasmanian Devils per 10 km route, obtained from across the core Tasmanian Devil range (eastern and north-western Tasmania), have declined by 53% since the first report of DFTD-like symptoms in 1996 (McCallum *et al*. 2007). The most immediately threatened location is thought to be the region where DFTD was reported prior to 2003: across 15,000 km² of eastern Tasmania. By 2005, the Devil Disease Project Team had confirmed DFTD in individuals found across 36,000 km² of eastern and central Tasmania (Hawkins *et al*. 2006). DFTD is now confirmed across more than 60% of the devil's overall distribution (C. Hawkins unpubl.), and there is evidence for continued geographical spread of the disease (Hawkins *et al*. 2006), so that Tasmanian Devils across between 51% and 100% of Tasmania may be, or have already been, subject to >90% declines in a ten-year period. The currently affected region covers the majority of the formerly high-density eastern management unit, involving what was perhaps around 80% of the total population. DTFD has resulted in the progressive loss of first the older adults from the population and then the younger adults (Lachish *et al*. 2007) so that populations are comprised of one and two year olds (Jones *et al*. in press, Lachish *et al*. submitted). As female devils usually breed for the first time at age two, they may not successfully raise a litter before they die of DFTD (Lachish *et al*. submitted). An increase in precocial breeding indicates some compensatory response, but as yet this appears to have been insufficient to counter mortality (Jones *et al*. in press, Lachish *et al*. submitted). DFTD behaves like a frequency-dependent disease, probably because the majority of the injurious biting, which is the type of contact most likely to lead to disease transmission, occurs between adults during the mating season (Hamede *et al*. in press). Frequency-dependent diseases, which are typically sexually transmitted, can lead to extinction (McCallum and Jones 2006). Because transmission occurs between the sexes at mating irrespective of population density, these types of diseases lack a threshold density below which they become extinct. Cannibalism is considered fairly common in Tasmanian Devils and renders the species particularly vulnerable to disease transmission (Pfennig *et al*. 1998; Jones *et al*. 2007). However, modes of transmission of DFTD are not as yet known.

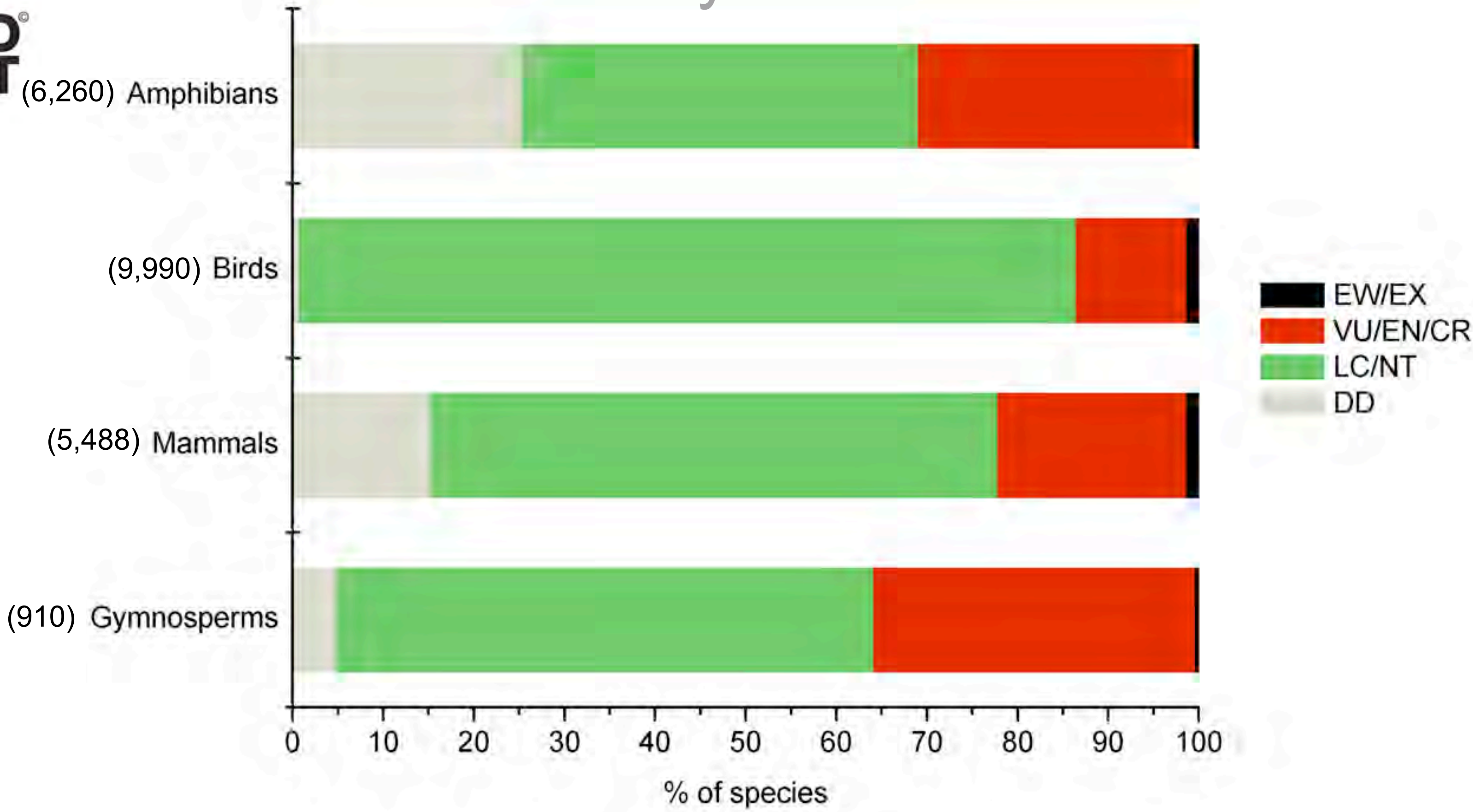
Conservation Actions [top]

Conservation Actions:	As of May 2008, the Tasmanian Devil is listed as Endangered under the Tasmanian Government's *Threatened Species Protection Act 1995*. It is also listed as Vulnerable under the Australian Government *Environment Protection and Biodiversity Conservation Act 1999*. At the end of 2003, the Tasmanian State Government's Department of Primary Industries, Water and Environment (now Department of Primary Industries and Water) launched the Tasmanian Devil Disease Program to investigate and respond to the threat of Devil Facial Tumour Disease. This program, now called the *Save the Tasmanian Devil Program*, has attracted many collaborative researchers. A forum exclusive to those directly involved in DFTD research in February 2007 was attended by approximately 80 people. The mission of the Save the Tasmanian Devil Program is "to maintain the Tasmanian Devil as an ecologically functional species in the wild" (AUSVET 2005). Conservation actions, including research directed towards improving conservation management, are driven by three future scenarios that have the potential to turn the epidemic around and bring devils back into the landscape as an ecologically functional species (Jones *et al.* 2007). These are extinction in the wild and reintroduction, the evolution of resistance, and the broad-scale application of a vaccine. Four management actions can therefore potentially be employed: establishing insurance populations; disease suppression in wild populations; selection for disease resistance; and development of a vaccine (McCallum and Jones 2006). Each of these is included in the current Strategic Plan of the Save the Tasmanian Devil Program. **Insurance strategy** The highest priority is to establish insurance populations of healthy devils in places isolated from the disease, firstly to avoid total extinction and, secondly, as a source for reintroduction to the wild if devils, and therefore also the disease, become extinct. Because these populations will possibly carry the species for 25-50 years and because devils already have low genetic diversity, a conservative retention of genetic diversity of 95% is recommended (Jones et al. 2007; Save the Tasmanian Devil Program Insurance Population Strategy 2007). A large founder base of 150 individuals is recommended, to be built up to an effective population size of 500 individuals. This would mean maintaining an actual population size of about 1700 individuals, if they were all maintained in captivity where breeding is closely managed, or 5,000 individuals if they were all wild-living (Jones et al. 2007; Save the Tasmanian Devil Program Insurance Population Strategy 2007).

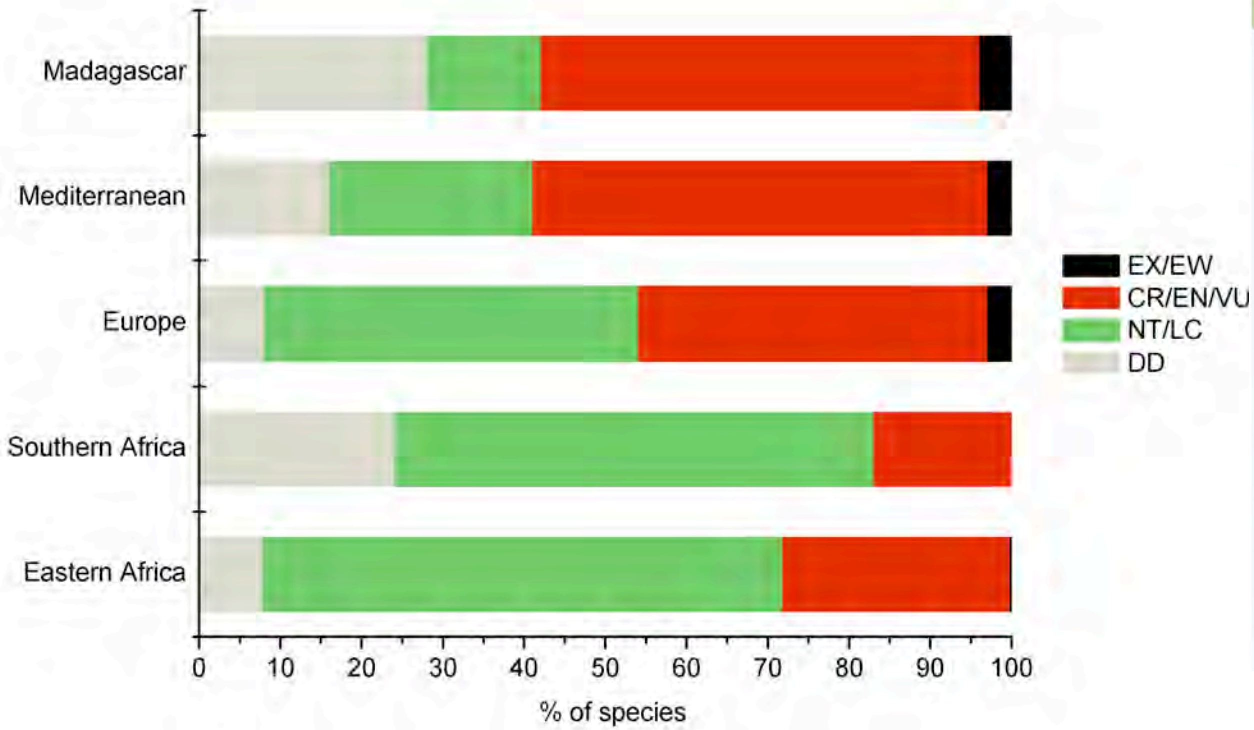
- Number of species on the Red List is increasing
- NOT all are threatened
- Increasing taxonomic coverage
- Many are reassessments
- In 2008, 23,000 processed, of which almost 4,000 were new species to the Red List
- Not just a list
- Compendium of rich information including maps to inform conservation work

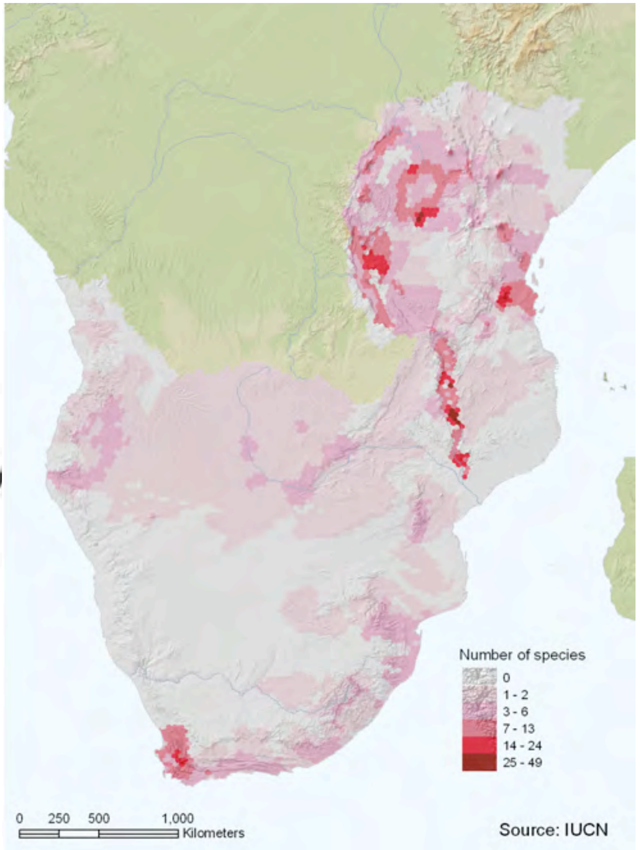


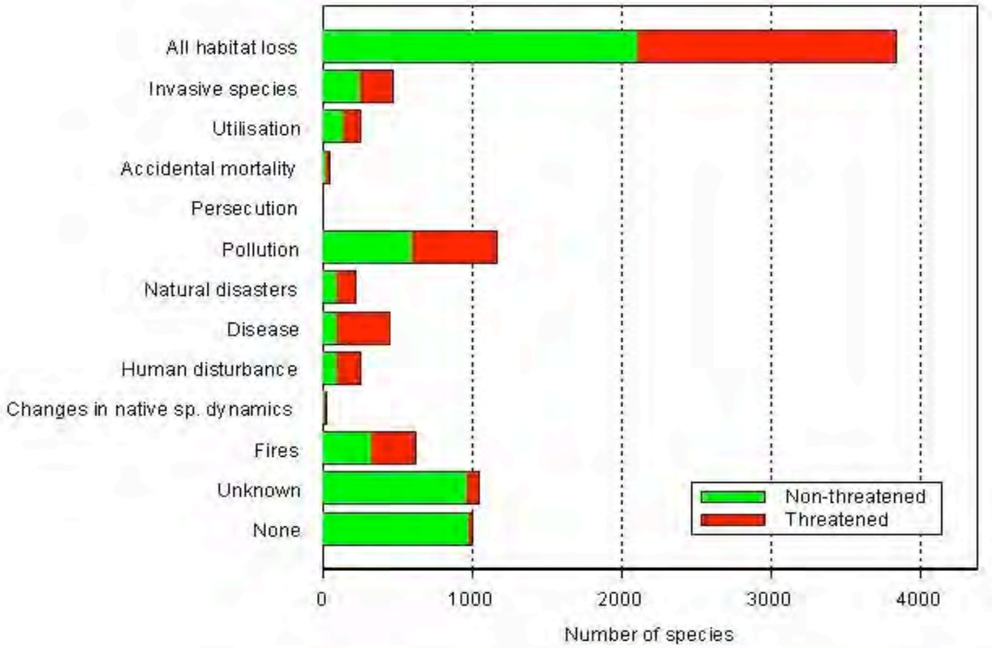
Terrestrial biodiversity

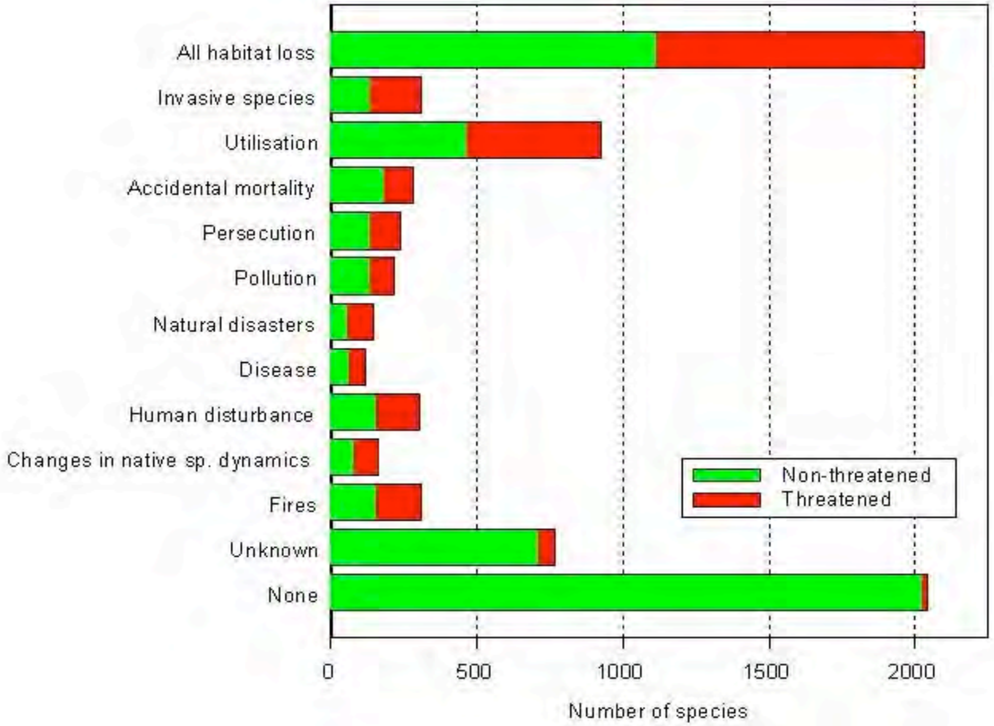


Freshwater biodiversity






All habitat loss
Invasive species
Utilisation
Accidental mortality
Persecution
Pollution
Natural disasters
Disease
Human disturbance
Changes in native sp. dynamics
Fires
Unknown
None
Non-threatened
Threatened
0
1000
2000
3000
4000
Number of species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0
500
1000
1500
2000
Number of species

Red List Web Site

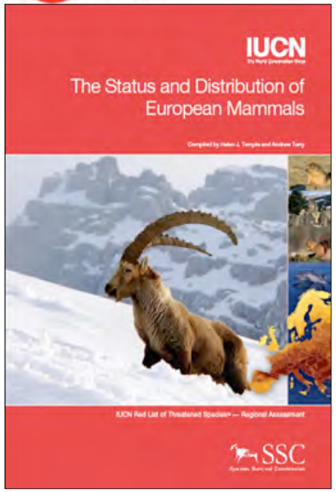
download on the internet - www.iucnredlist.org

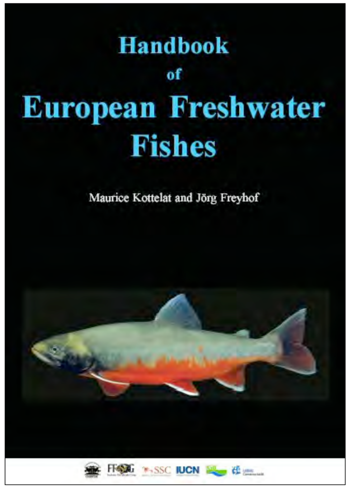
RED LIST

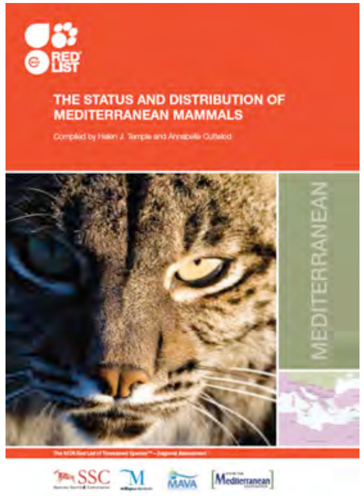
European Commission

Centro de Cooperación del Mediterráneo

MAVA Fondation pour la Nature







2000 **2009**