



Key terms and concepts in the IUCN Red List Criteria

[illegible]



An amphibian species

Critically Endangered A2ace;B1ab(iii)

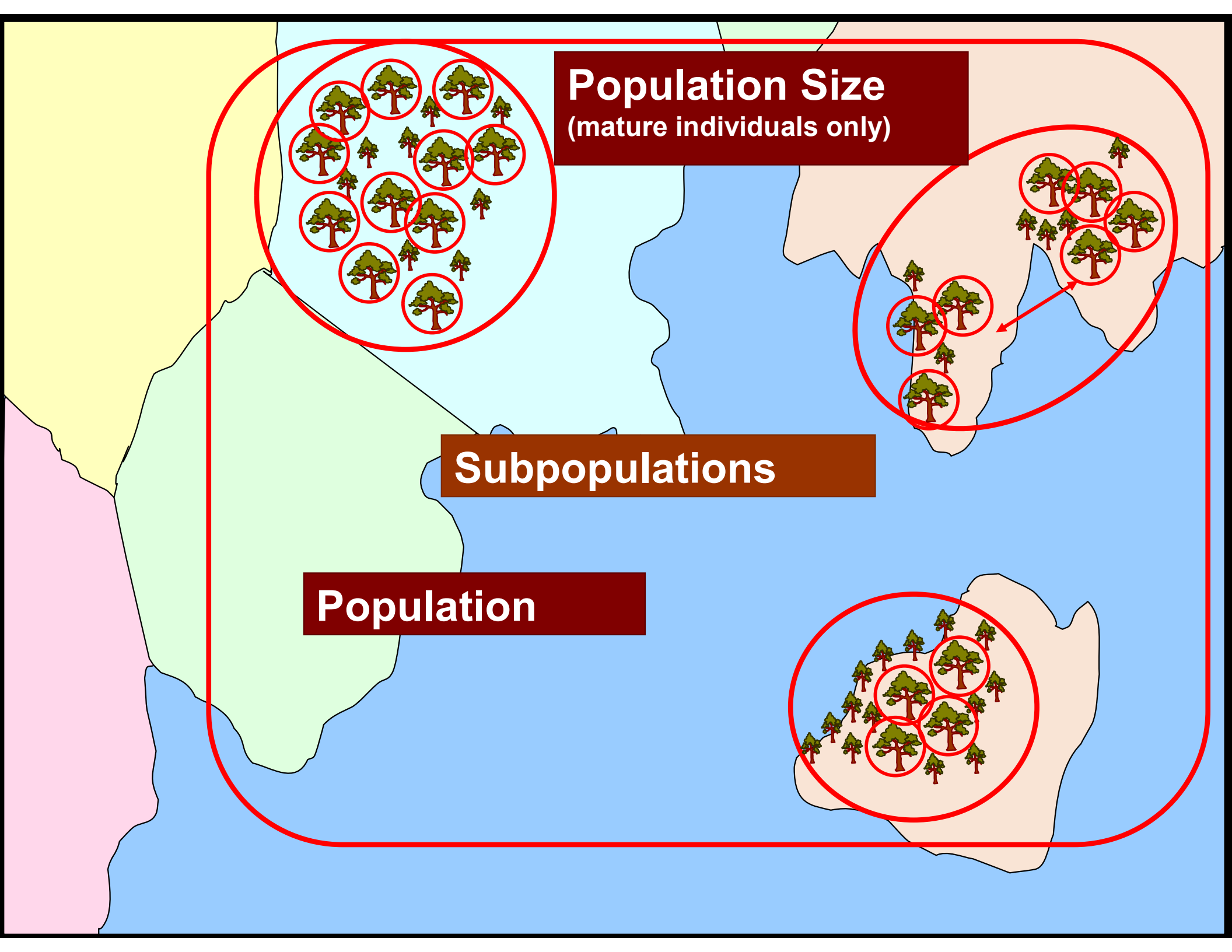
- At least 80% **reduction** in **population size** over the past 10 years or three **generations**.
- Restricted **extent of occurrence**.
- The population is either **severely fragmented** or occurs in just one **location**.
- **Continuing decline** in extent and/or quality of habitat.

1 Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categories and Criteria*. Please refer to both documents for explanations of terms and concepts used here.

Population Size
(mature individuals only)

Subpopulations

Population



Mature Individuals

Number of individuals known, estimated or inferred to be capable of reproduction.

When estimating this, consider the species' biology, behaviour, population densities and fluctuations, etc. The number of mature individuals may not be total number of ALL adults. For example:

Social Bees & Ants

- Large colonies, but only 1 or a few reproducing females (“queens”) at any time.
- New queens can be promoted.
- Mature individuals might be counted as:
Number of active queens x 10 (an expression for the number of potential queens that can realistically be produced) x 2 (the male counterpart)



Photo: Rich Hatfield, Xerces Society

Generation Length

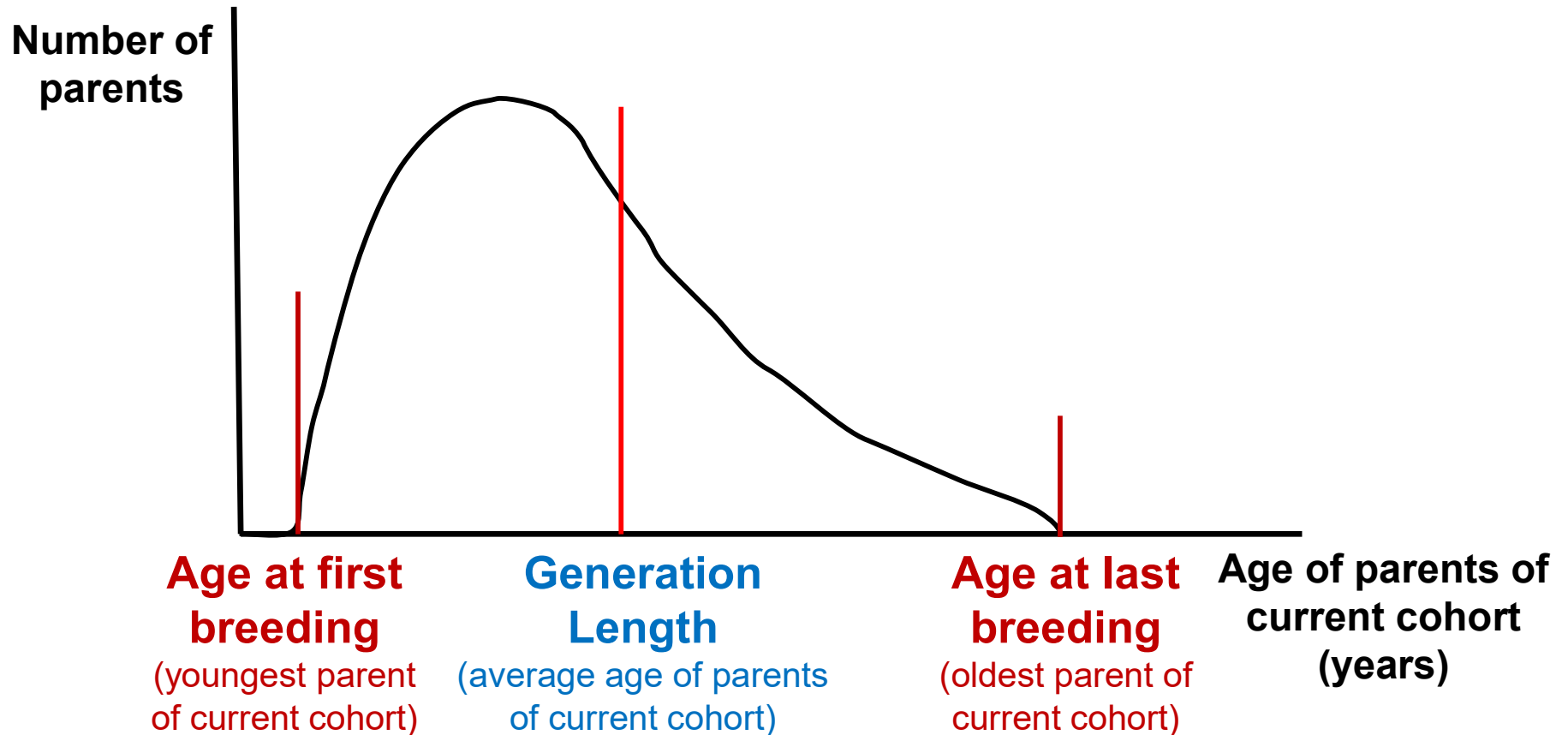
Used to scale time-based measurements to account for different survival and reproduction rates

e.g. $\geq 50\%$ population decline measured over 3 generations

Generation Length

Several definitions (all acceptable):

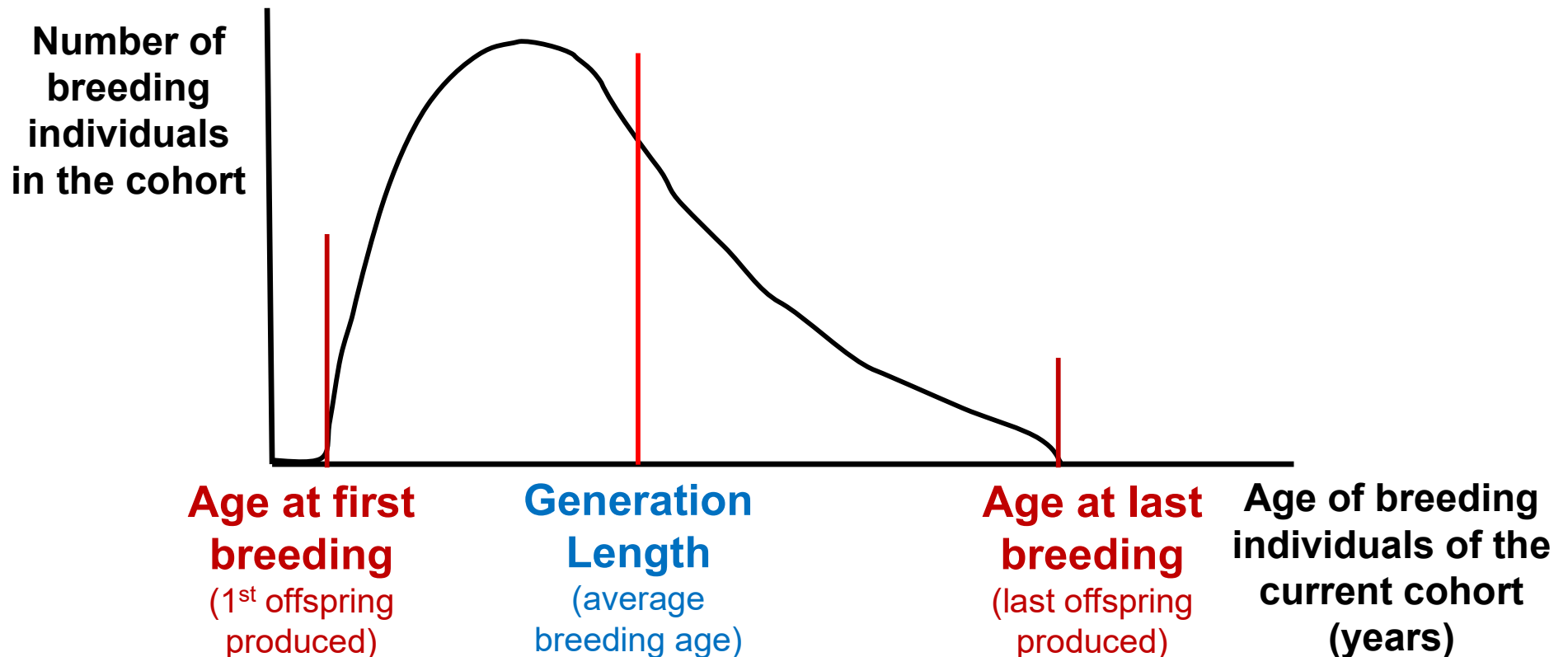
- Average age of parents of the current cohort (“cohort” = newborn individuals in the population)



Generation Length

Several definitions (all acceptable):

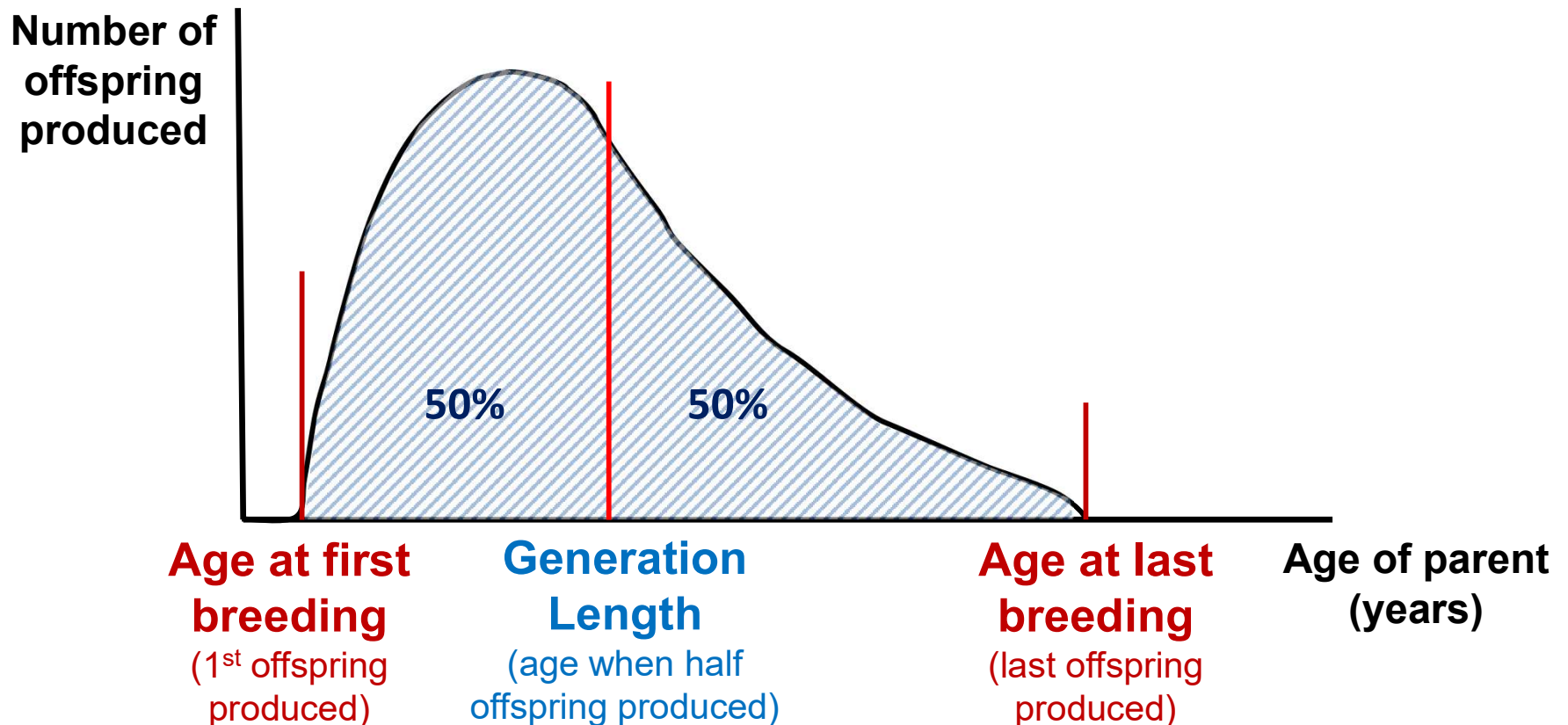
- Average age of parents of the current cohort (“cohort” = newborn individuals in the population)
- Mean age at which a cohort of newborns produce offspring



Generation Length

Several definitions (all acceptable):

- Average age of parents of the current cohort (“cohort” = newborn individuals in the population)
- Mean age at which a cohort of newborns produce offspring
- Age at which 50% total reproductive output is achieved



Generation Length

Several definitions (all acceptable):

- Average age of parents of the current cohort (“cohort” = newborn individuals in the population)
 - Mean age at which a cohort of newborns produce offspring
 - Age at which 50% total reproductive output is achieved
 - Mean age of parents in a population at the stable age distribution
 - Time required for the population to increase by the replacement rate
-
- **Scales time-based measurements to account for different survival/reproduction rates.**
 - **Reflects turnover rate of breeders.**
 - **Always use *natural* generation length.**

Generation Length

Life table data (e.g., survival rate and fecundity for all age classes)

Generation Length Workbook.xls

(<https://www.iucnredlist.org/resources/generation-length-calculator>)

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A

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I

J

K

L

M

N

O

P

Q

Calculating Generation Length

Enter information only in the cells labelled S(i) and F(i) (columns B and C).

See information on the right side.

Age class (YEARS)	Survival rate	Fertility or fecundity	Age	Survivorship	Maternity			
<i>i</i>	<i>S(i)</i>	<i>F(i)</i>	<i>x</i>	<i>lx</i>	<i>m_x</i>	<i>lx m_x</i>	<i>x lx m_x</i>	
0	0.1	0	0	1	zero by defn.	0	0	
1	0.1	0	1	0.1	0	0	0	
2	1	30	2	0.01	0	0	0	
3	1	30	3	0.01	30	0.3	0.9	
4	1	30	4	0.01	30	0.3	1.2	
5	1	30	5	0.01	30	0.3	1.5	
6	1	30	6	0.01	30	0.3	1.8	
7	1	30	7	0.01	30	0.3	2.1	
8	1	30	8	0.01	30	0.3	2.4	
9	1	30	9	0.01	30	0.3	2.7	
10	1	30	10	0.01	30	0.3	3	
11	1	30	11	0.01	30	0.3	3.3	
12	1	30	12	0.01	30	0.3	3.6	
13	1	30	13	0.01	30	0.3	3.9	
14	1	30	14	0.01	30	0.3	4.2	
15	1	30	15	0.01	30	0.3	4.5	
16	1	30	16	0.01	30	0.3	4.8	
17	1	30	17	0.01	30	0.3	5.1	
18	0	0	18	0.01	30	0.3	5.4	
19	0	0	19	0	0	0	0	
20	0	0	20	0	0	0	0	
21	0	0	21	0	0	0	0	
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26	0	0	26	0	0	0	0	
27	0	0	27	0	0	0	0	
28	0	0	28	0	0	0	0	
29	0	0	29	0	0	0	0	
30	0	0	30	0	0	0	0	
31	0	0	31	0	0	0	0	
32	0	0	32	0	0	0	0	
33	0	0	33	0	0	0	0	
34	0	0	34	0	0	0	0	

Generation length = 11 years

Survival rate, $S(i)$

Proportion of individuals surviving an age class; 1-(annual mortality)
e.g., $S(0)$ is the proportion surviving from birth to 12 months
 $S(1)$ is the proportion surviving from 12 to 24 months

Fecundity or fertility, $F(i)$

Average annual number of offspring produced per individual in that age class
e.g., $F(0)$ is the number of offspring produced per individual aged 0 to 12 months
 $F(1)$ is the number of offspring produced per individual aged 12 to 24 months

Generation length

There are several different definitions of generation length or generation time. The calculation here is for the mean age at which a cohort of individuals produce offspring.

Sum ($l_x m_x$)

Sum ($x l_x m_x$)

μ_1

4.8

50.4

10.5

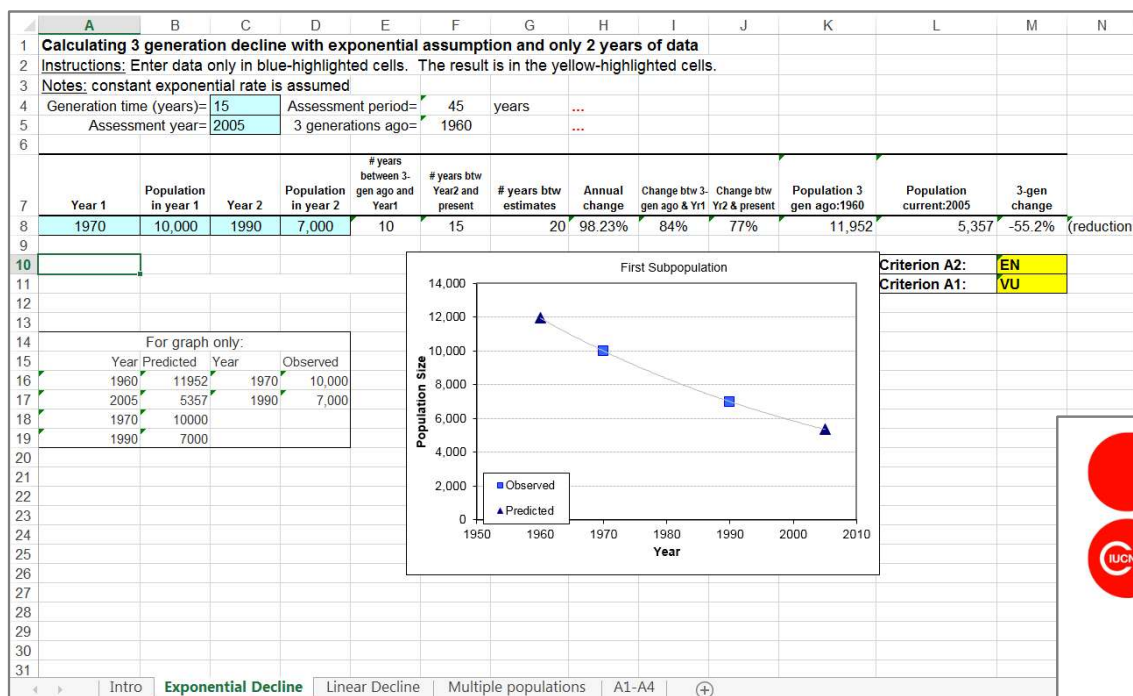
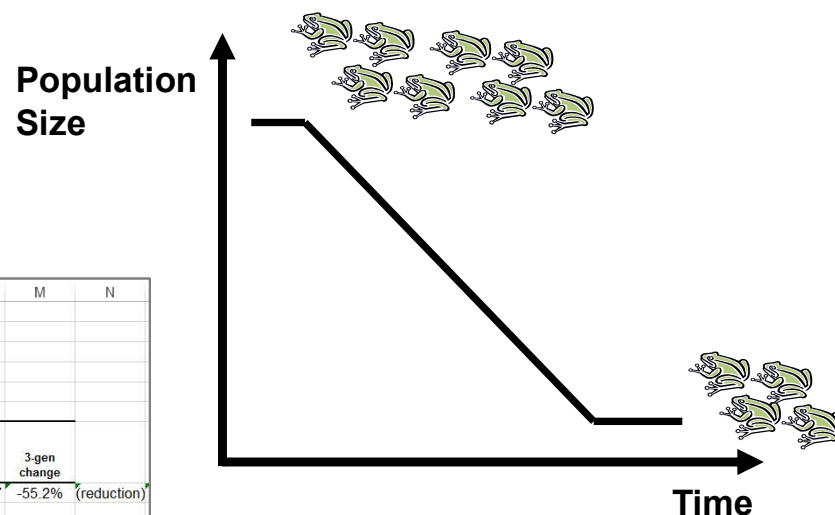
RED

LIST

Guidelines for Us

Reduction

Reduction is a % decline in population size over the time period specified in criterion A (10 years or 3 generations).

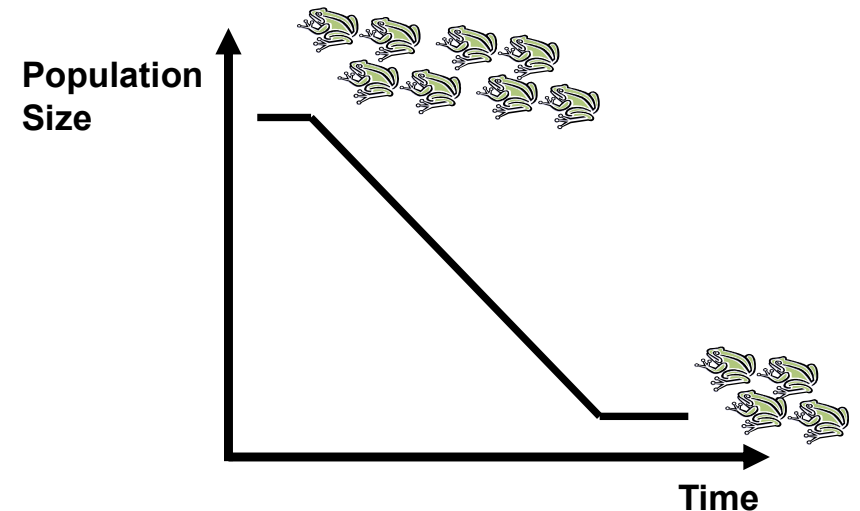


CriterionA_Workbook.xls

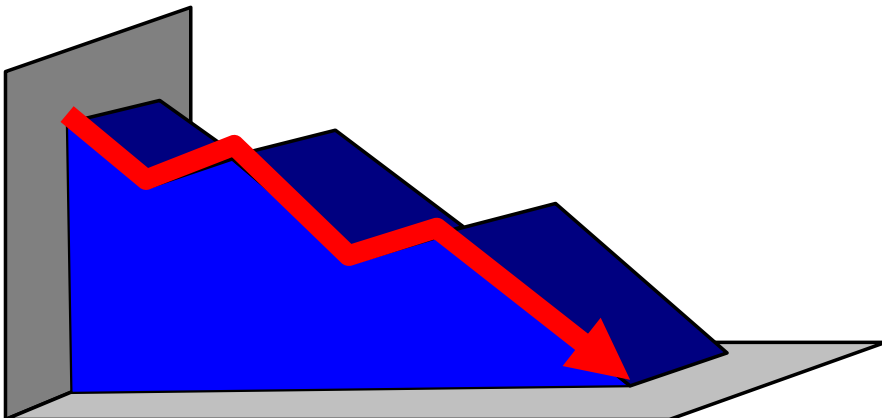
(<https://www.iucnredlist.org/resources/criterion-a>)

Reduction

Reduction is a % decline in population size over the time period specified in criterion A (10 years or 3 generations).



Continuing Decline

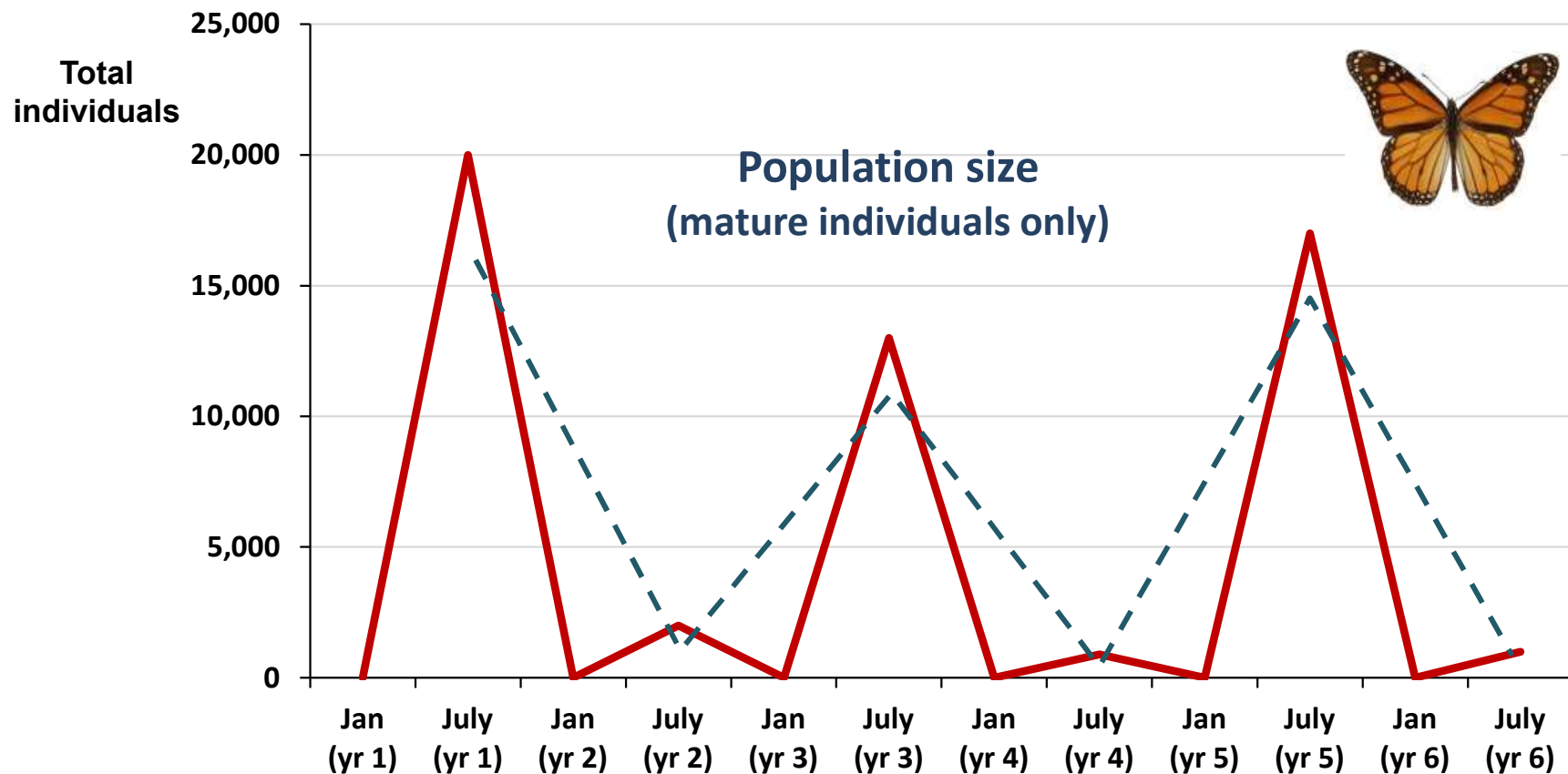


Continuing Decline is a recent, current or projected future decline which is liable to continue unless remedial measures are taken.

	Reduction	Continuing Decline
Timing:	<ul style="list-style-type: none">• One-off event• Ongoing	<ul style="list-style-type: none">• Decline is expected to continue unless something is done to stop it.
Applies to:	<ul style="list-style-type: none">• Population size	<ul style="list-style-type: none">• Population size• Extent of occurrence• Area of occupancy• Area, extent and/or quality of habitat• Number of locations• Number of subpopulations

Extreme Fluctuations

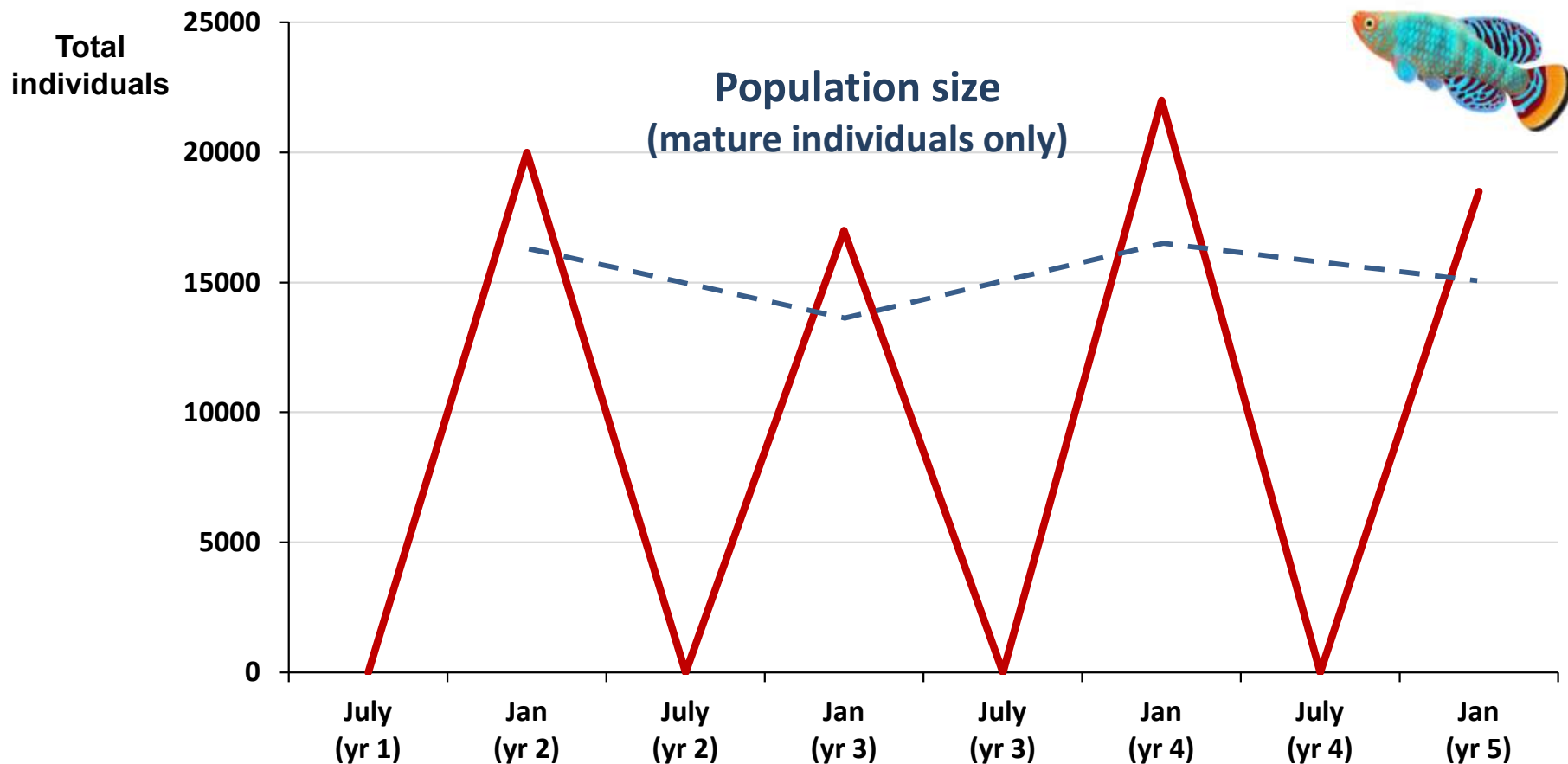
Wide, rapid and frequent variation in population size, or subpopulations, or locations, or distribution (typically tenfold increase or decrease)



Real changes in total population size; **extreme fluctuation**

Extreme Fluctuations

Wide, rapid and frequent variation in population size, or subpopulations, or locations, or distribution (typically tenfold increase or decrease)



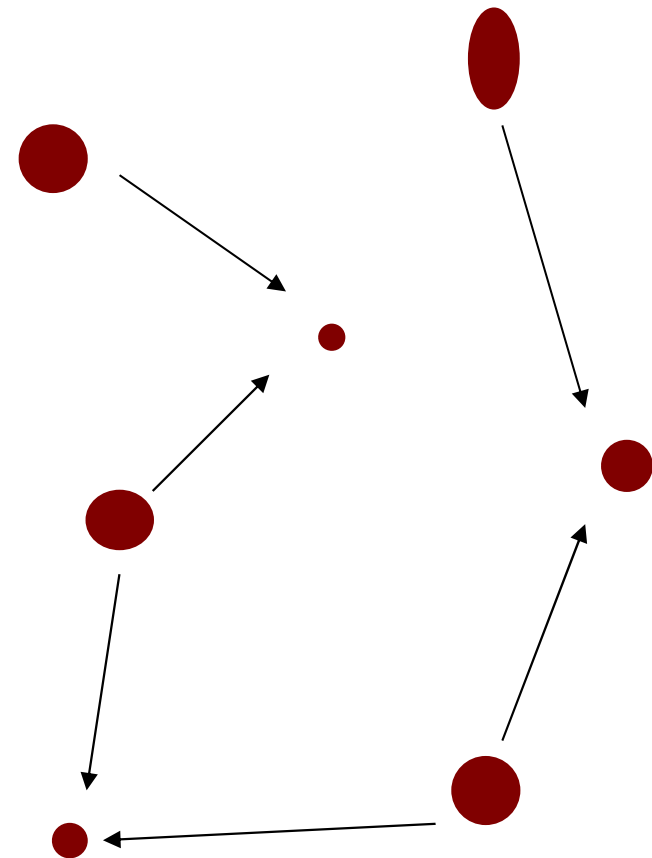
Natural seasonal fluctuations; **not extreme fluctuation**

Severely Fragmented

Most individuals (>50%) found in **small, isolated subpopulations** between which there is **very little dispersal**. These subpopulations may be **too small to be viable**.

Taxa with highly mobile adult stages or producing large numbers of small, mobile diaspores can disperse more easily and are not so vulnerable to isolation through fragmented habitats.

Taxa producing small numbers of diaspores (or none at all), or only large ones are less able to disperse over wide areas and are more easily isolated.

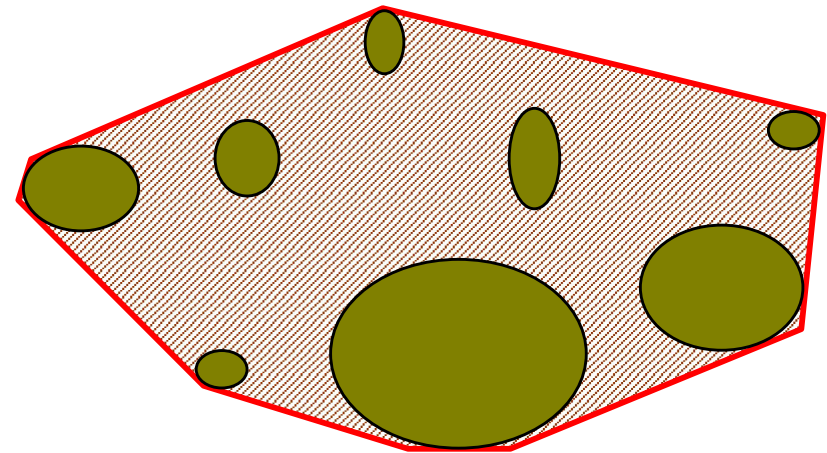


Extent of Occurrence

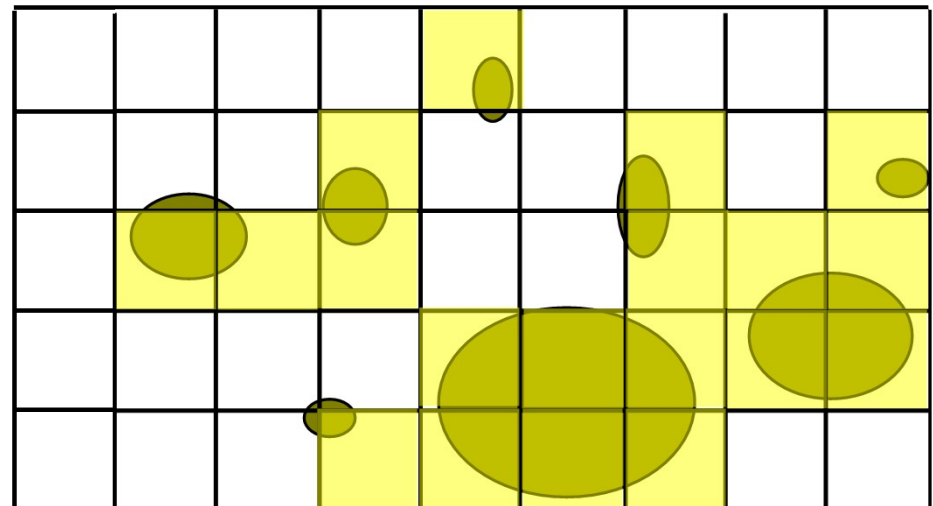
Area of Occupancy

Extent of Occurrence: area within the shortest continuous imaginary boundary drawn around all known, inferred, or projected sites presently occupied by the taxon.

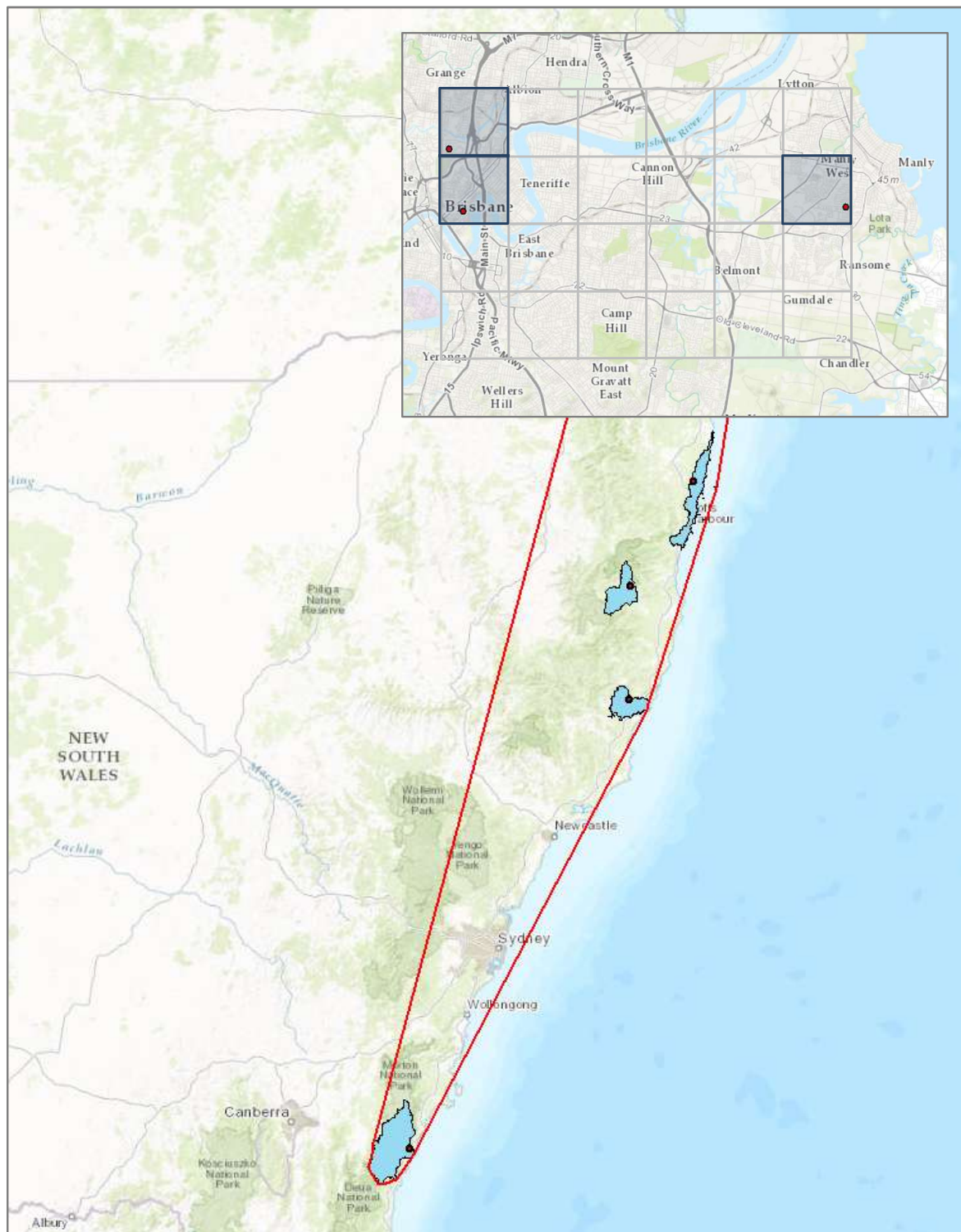
...EEO \neq the species' range.



Area of Occupancy: area within the extent of occurrence which is actually occupied by the taxon (measured by **overlaying a 2x2 km grid and counting number of occupied cells**).

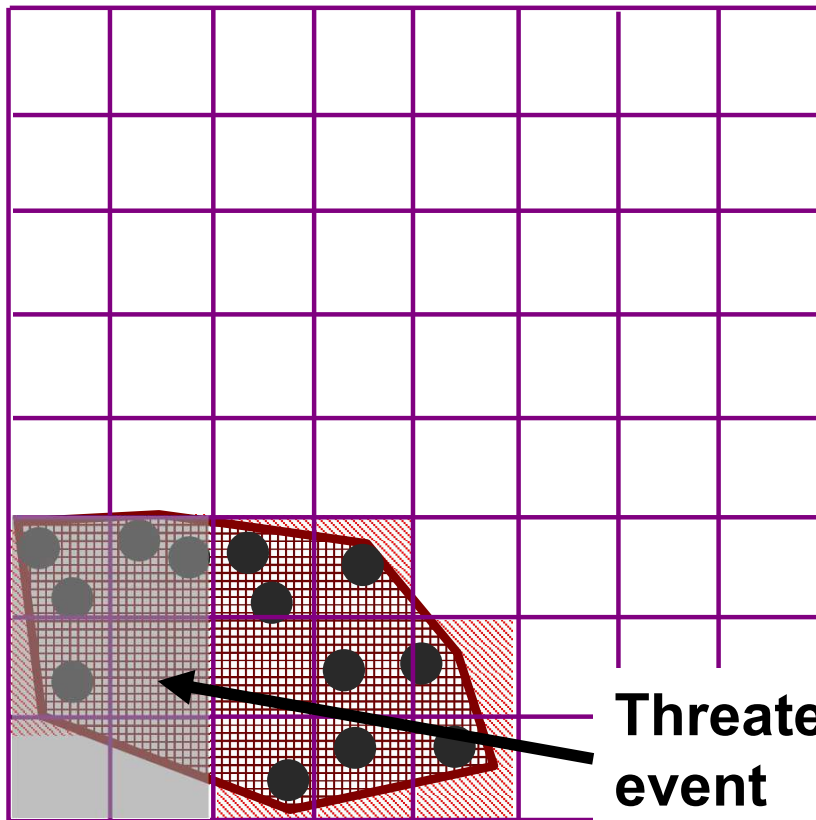


- **Distribution map**
 - Data points (red dots)
 - Limits to distribution (blue polygons)
- **Extent of occurrence (EOO)**
 - Entire area within the minimum convex polygon (e.g., 121,536 km²)
- **Area of occupancy (AOO)**
 - Total occupied 2x2 km grid cells (e.g., 40 km²)

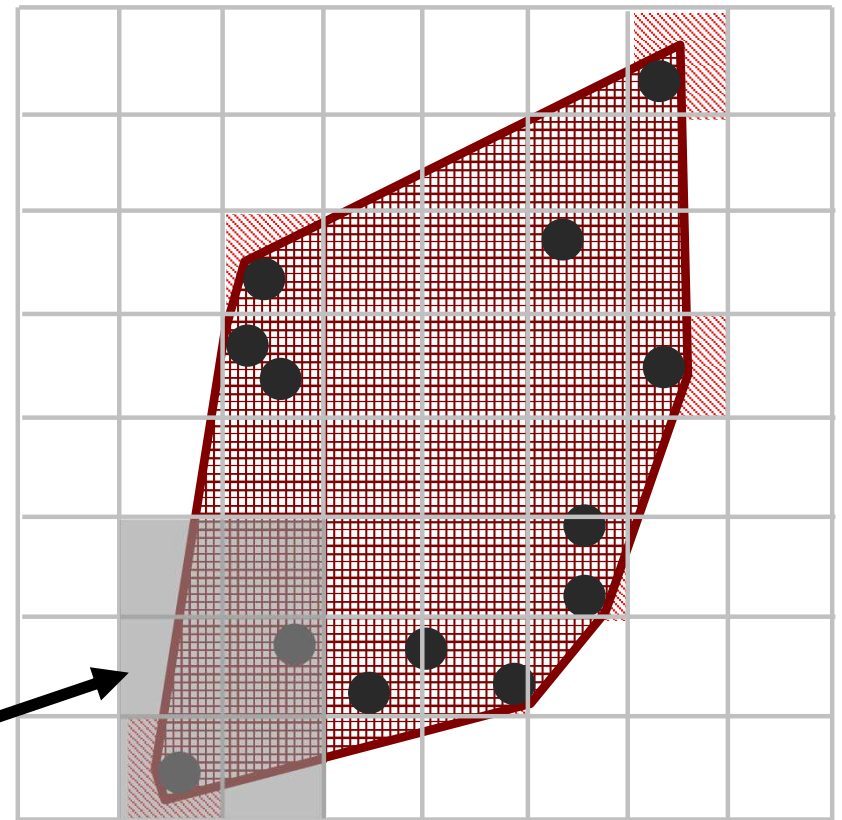


Extent of Occurrence

Comparison of taxa with same AOO but different EOO – a single threatening event is more likely to impact the taxon with the smaller EOO:



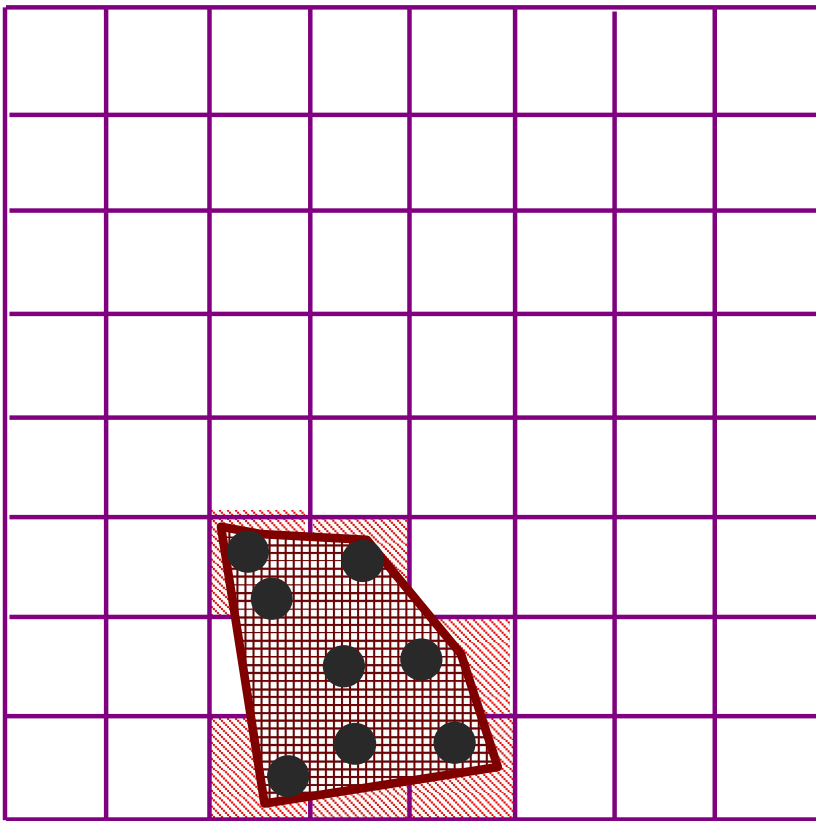
$AOO = 10 \times 4 = 40 \text{ km}^2$
 $EOO = 44 \text{ km}^2$



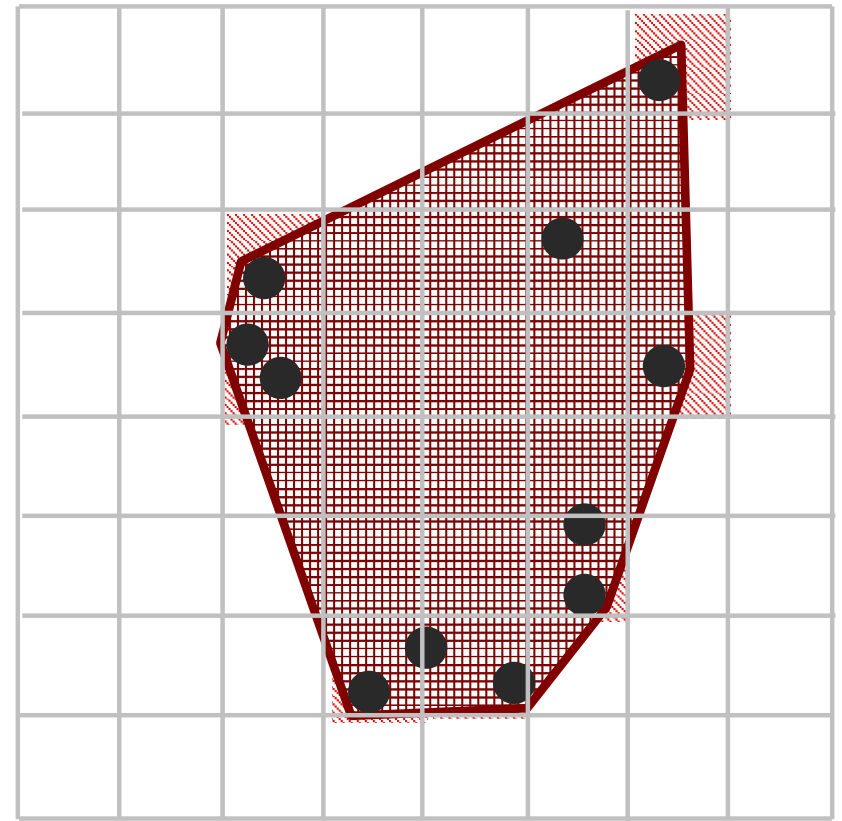
$AOO = 10 \times 4 = 40 \text{ km}^2$
 $EOO = 105 \text{ km}^2$

Extent of Occurrence

Comparison of taxa with same AOO but different EOO – a single threatening event is more likely to impact the taxon with the smaller EOO:



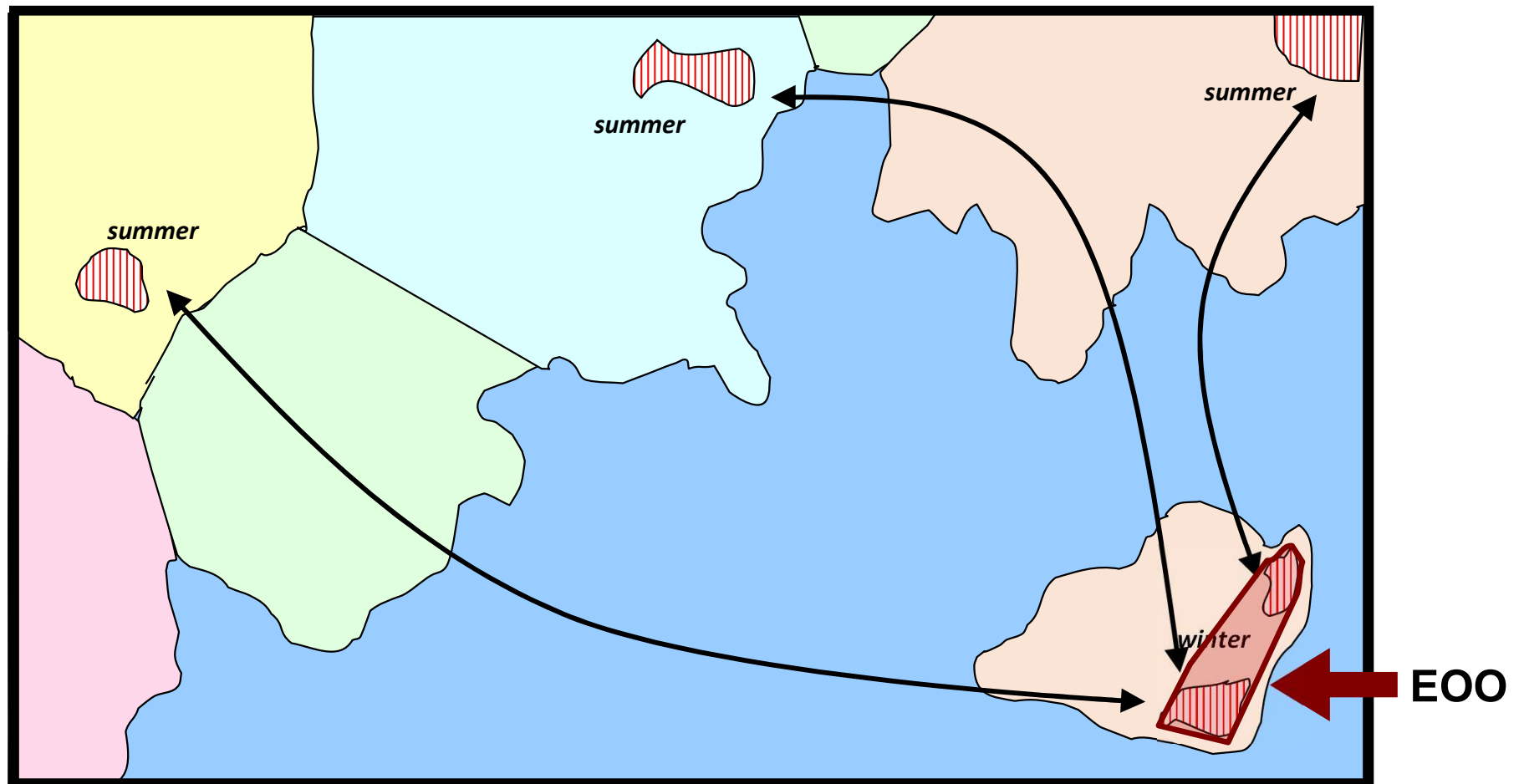
$$\text{AOO} = 7 \times 4 = 28 \text{ km}^2$$
$$\text{EOO} = 28 \text{ km}^2$$



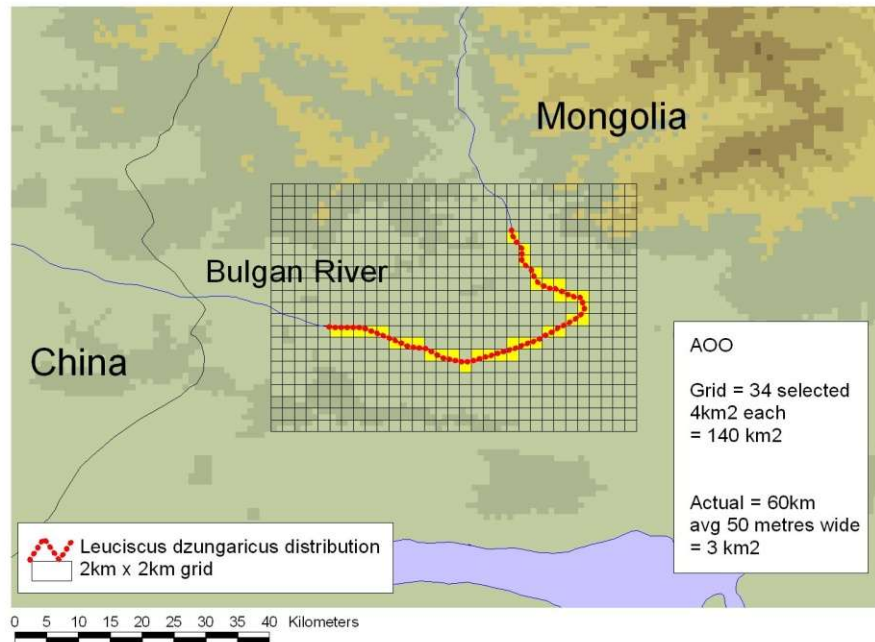
$$\text{AOO} = 8 \times 4 = 32 \text{ km}^2$$
$$\text{EOO} = 82 \text{ km}^2$$

Extent of Occurrence

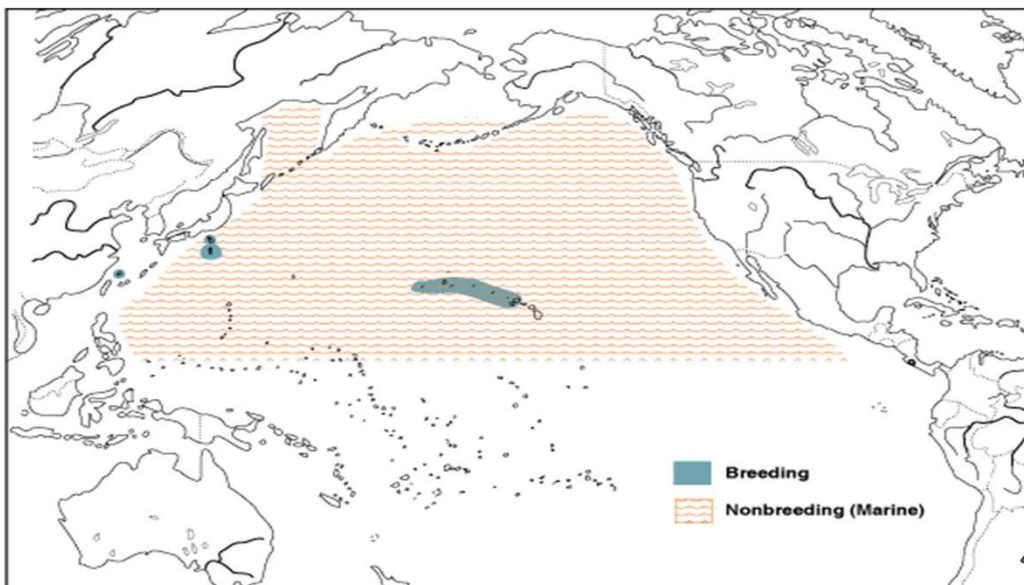
Migratory species:



Area of Occupancy



- Linear habitats: AOO measurement must be **consistent with threshold values** – use a 2x2 km grid for AOO estimates.



- AOO can also be measured as the **smallest area essential at any stage to the survival**

Location

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

Location



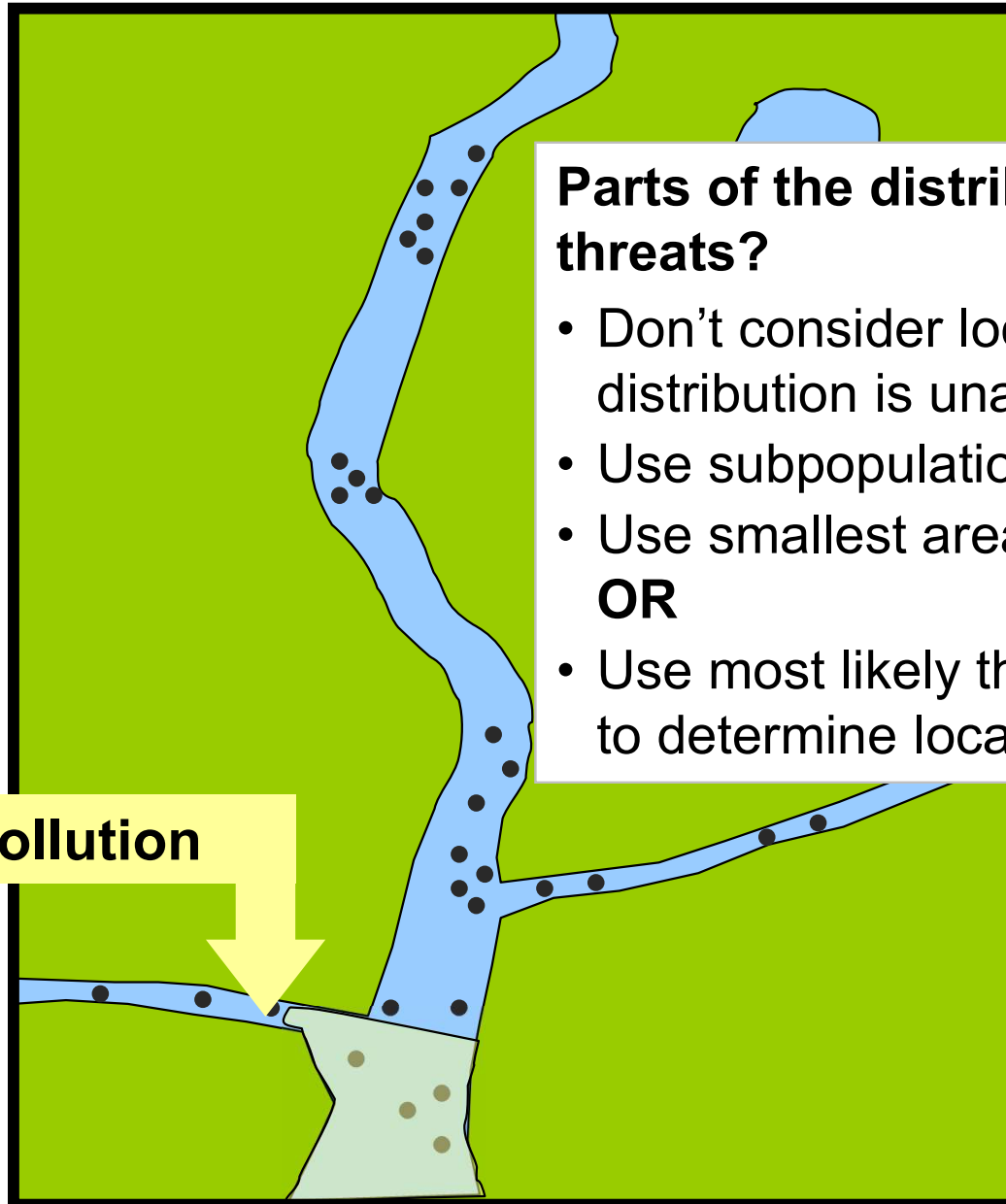
2 locations

Location



4 locations

Location



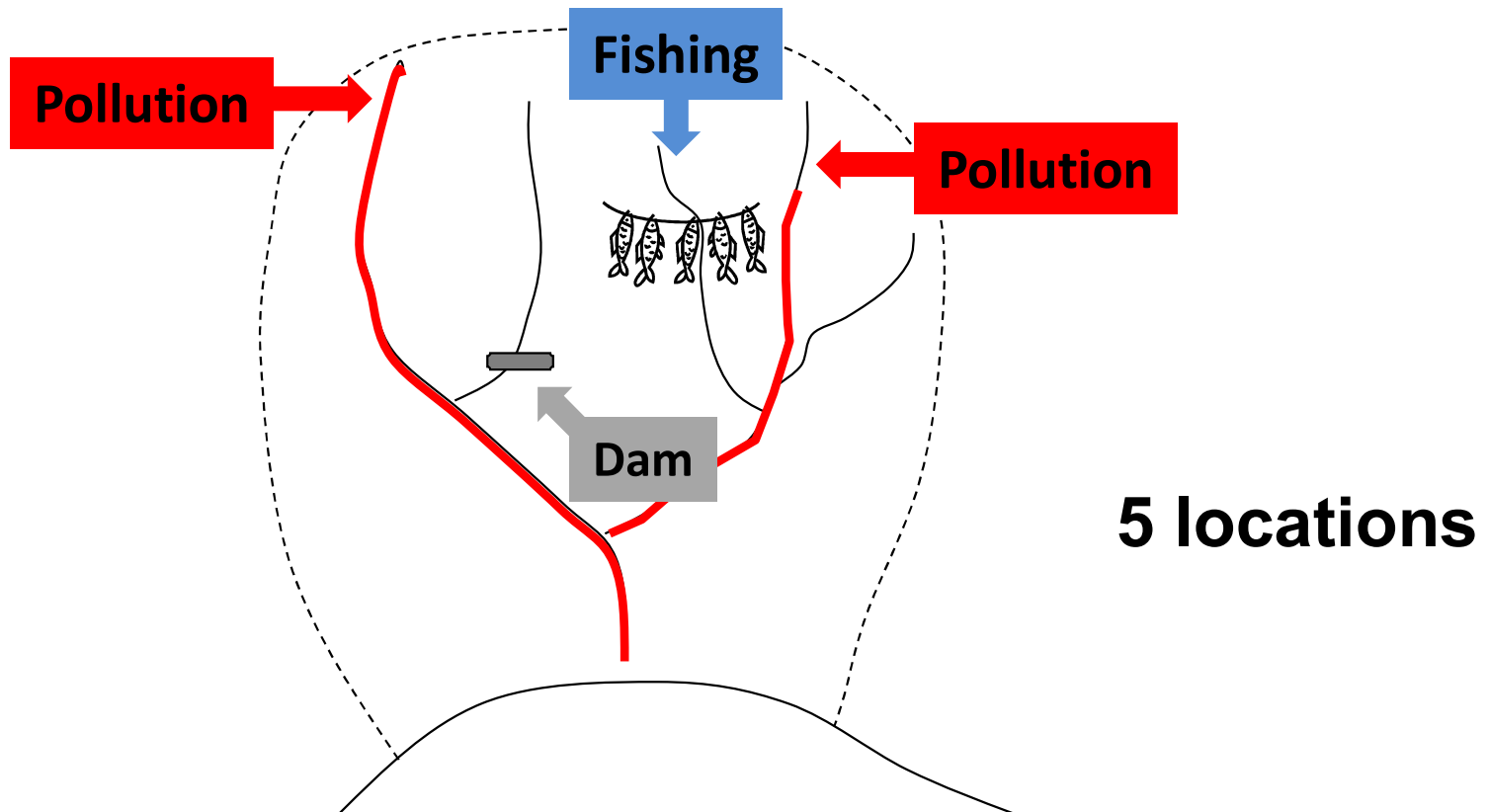
Parts of the distribution not affected by any threats?

- Don't consider locations at all (if >50% of distribution is unaffected); **OR**
- Use subpopulations as surrogate for locations; **OR**
- Use smallest area affected to determine locations; **OR**
- Use most likely threat to occur in unaffected areas to determine locations there.

4-5 or >5 locations...?

Location

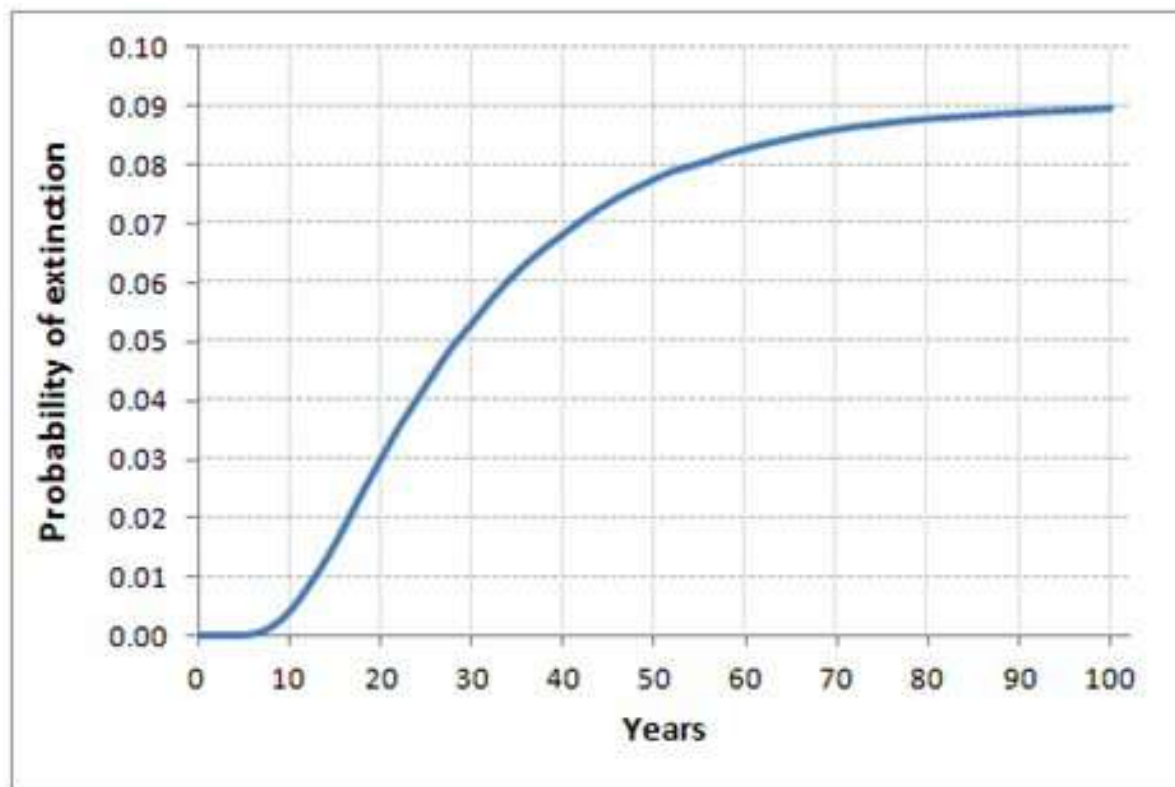
If most serious threat does not affect entire distribution: can use other threats to count locations in areas not affected by most serious threat.



If there are no plausible threats, do not consider locations at all.

Quantitative Analysis

Quantitative Analysis is any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options (e.g., Population Viability Analysis (PVA)).



<https://www.iucnredlist.org/resources/redlistguidelines>



Guidelines for Using Red List Categories

Version 1.1
(January 2017)

Prepared by the Standards
Committee of the IUCN Species

Citation: IUCN Standards and Petitions Committee. IUCN Red List Categories and Criteria, Version 1.1. Available from: <https://www.iucnredlist.org/documents/>

THE IUCN RED LIST OF THREATENED SPECIES™

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Key terms and Concepts exercise (20 minutes)

1. Work in groups of 2-3 people.
2. You will be given a card with a Red List term on it.
3. You have 20 minutes to:
 - Discuss the meaning of the term within your group.
 - Give **one example** (real or fictional) that demonstrates the term, explaining what it means in your own words
4. After 20 minutes, each group will present their example.

Location

Example:

Key terms and concepts

Severely Fragmented:

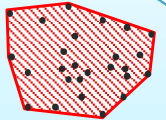


Increased extinction risks due to the fact that most individuals are found in small and relatively isolated subpopulations, and *dispersal is limited* between these subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonization.

Location:

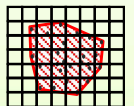
Geographically or ecologically distinct area in which a *single threatening event* can rapidly affect all individuals of the taxon (*not* a locality or site).

Extent of Occurrence (EOO):



Area contained within the shortest continuous imaginary boundary (*minimum convex polygon*) which can be drawn to encompass all known, inferred, or projected sites presently occupied by the taxon.

Area of Occupancy (AOO):



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

Key terms and concepts

Generation Length:

Average age of parents of the current cohort, reflecting the turnover rate of breeding individuals in the population

Extreme Fluctuations:

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)

Continuing Decline:

A recent, current or projected future decline which is liable to continue unless remedial measures are taken

Reduction:

A specific (%) decline in the number of mature individuals; the decline can be caused by a one-time event

Mature Individuals:

The number of individuals known, estimated or inferred to be capable of reproduction

Population Size:

Number of *mature* individuals only

Subpopulations:

Geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange

Key terms and concepts

Five Year Rule:

Uplist to a higher threat category *immediately*. *Downlist* to a lower threat category only when the higher category thresholds have not been met for *five years*.

Benign Introduction:

An attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area

Quantitative Analysis:

Any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options