# 3.2 Human impact on biodiversity

Name: _____ Class: _____ Date: _____ **Total: 28 marks**

**KEY WORDS** habitat loss • fragmentation • invasive species • overexploitation • IUCN Red List IUCN • edge effect

## Objective

Build the skills to answer exam questions on **human impact** on biodiversity: the causes of biodiversity loss, **habitat fragmentation** , **invasive species** and the **IUCN Red List** IUCN .

**You must be able to:**

- explain the main human causes of biodiversity loss
- explain the effects of habitat loss and fragmentation
- use IUCN Red List criteria and categories
- explain why some species are more vulnerable to extinction than others

## 1 Key knowledge and worked examples

### Human impact on biodiversity

| cause | example |
|---|---|
| **habitat loss** and fragmentation | forest cleared for palm oil, soy or cattle |
| **invasive species** | cane toads in Australia; rats on islands |
| **pollution** | pesticides, plastics, nutrient runoff |
| **overexploitation** | overfishing, hunting, the pet and medicine trade |
| **climate change** | coral bleaching; species moving or unable to move |

**Fragmentation** splits a habitat into small patches. Effects: smaller populations (more inbreeding, more risk from chance events); more **edge**, where light, wind and predators differ from the interior; animals cannot move between patches.

**Invasive species** are brought by humans to new areas, where they spread with no natural predators and out-compete or prey on native species.



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**IUCN Red List:** assesses the risk of extinction using criteria such as **population size**, **rate of decline**, **geographic range** and degree of **fragmentation**. Categories, from least to most at risk: Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, Extinct.

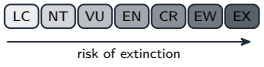
Species most at risk are often: large, slow-breeding (K-strategists), top predators, specialists with narrow niches, found in one small area (endemic), or valued by people (hunted).

**Worked example.** The passenger pigeon numbered in the billions in 19th-century North America, but hunting and forest clearing made it extinct by 1914.

**Answer shapes:** name the cause, explain how it reduces survival or reproduction, and give a named example.

## 2 Practice

**2.1** State **two** criteria used by the IUCN to decide a species' Red List category. [2]



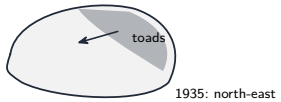

**2.2** A forest of 100 km$^2$ is cut into four patches of 5 km$^2$ by roads and farms. Explain **three** effects on the species living there. [3]




**2.3** Explain why large, slow-breeding species such as rhinos are more vulnerable to extinction than small, fast-breeding species. [3]



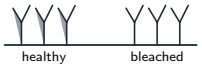
**2.4** Cane toads were brought to Australia in 1935 to control beetles in sugar-cane fields. Explain why they became a problem. [3]



## 3 Exam-style questions

**3.1** Coral reefs cover less than 1% of the ocean floor but hold about a quarter of marine species.

(a) Explain how rising sea temperatures cause coral bleaching. [2]

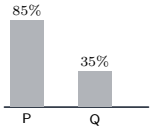



(b) Describe **two** other human threats to coral reefs. [2]

**3.2** The table shows Red List data for two species.

| | **species P** | **species Q** |
|---|---|---|
| decline over 10 years | 85% | 35% |
| range | one island, 40 $km^2$ | three countries |

(a) Suggest which species would be placed in the higher category, with **two** reasons. [3]




(b) Suggest **two** human causes that could explain species P's decline. [2]



**3.3** An area of tropical rainforest is to be cleared for an oil-palm plantation.

(a) Explain **two** ways the plantation reduces biodiversity. [4]



(b) Discuss whether certification schemes for "sustainable palm oil" can protect rainforest biodiversity. [4]



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## Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

**2.1**

any two: population size; rate of population decline; geographic range; degree of fragmentation; quantitative probability of extinction

**2.2**

populations in each patch are small, so inbreeding and chance events make local extinction likely; a larger share of each patch is edge, with more light, wind, predators and invasive species; animals cannot move between patches to find food or mates, and species needing a large area are lost

**2.3**

they have few young, with long gaps, so populations recover slowly from losses; they need large areas of habitat, which are easily lost or split; they are valuable to hunters (horn), so they are targeted

**2.4**

they have few natural predators or diseases there, and breed fast; they spread over a large area and compete with native animals for food; their skin is toxic, so native predators such as quolls and snakes that eat them die

**3.1**

(a) corals live in mutualism with algae that give them food and colour; high temperature makes the coral expel the algae, so it turns white and may starve

(b) any two: ocean acidification makes skeletons harder to build; overfishing removes grazers that keep algae down; nutrient and sediment runoff; destructive fishing with dynamite or poison; tourism damage

**3.2**

(a) species P: its population fell much faster, 85% against 35%; its range is tiny and in one place, so one event could wipe it out

(b) any two linked to an island: habitat cleared for farming or tourism; an invasive predator such as rats or cats; hunting or collection; pollution

**3.3**

(a) a forest with many layers and species is replaced by one crop: habitat loss and lower habitat diversity; remaining forest is fragmented, and pesticides, fires and roads harm species nearby



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(b) award up to [4]: for: certified growers must not clear primary forest or peat, and must protect high-conservation-value areas; buyers can choose certified oil, giving a market reward; against: checking is weak in some places, and certified farms may still have been cleared in the past; demand pushes clearing elsewhere; conclusion: helps, but needs strong law, monitoring and lower demand too