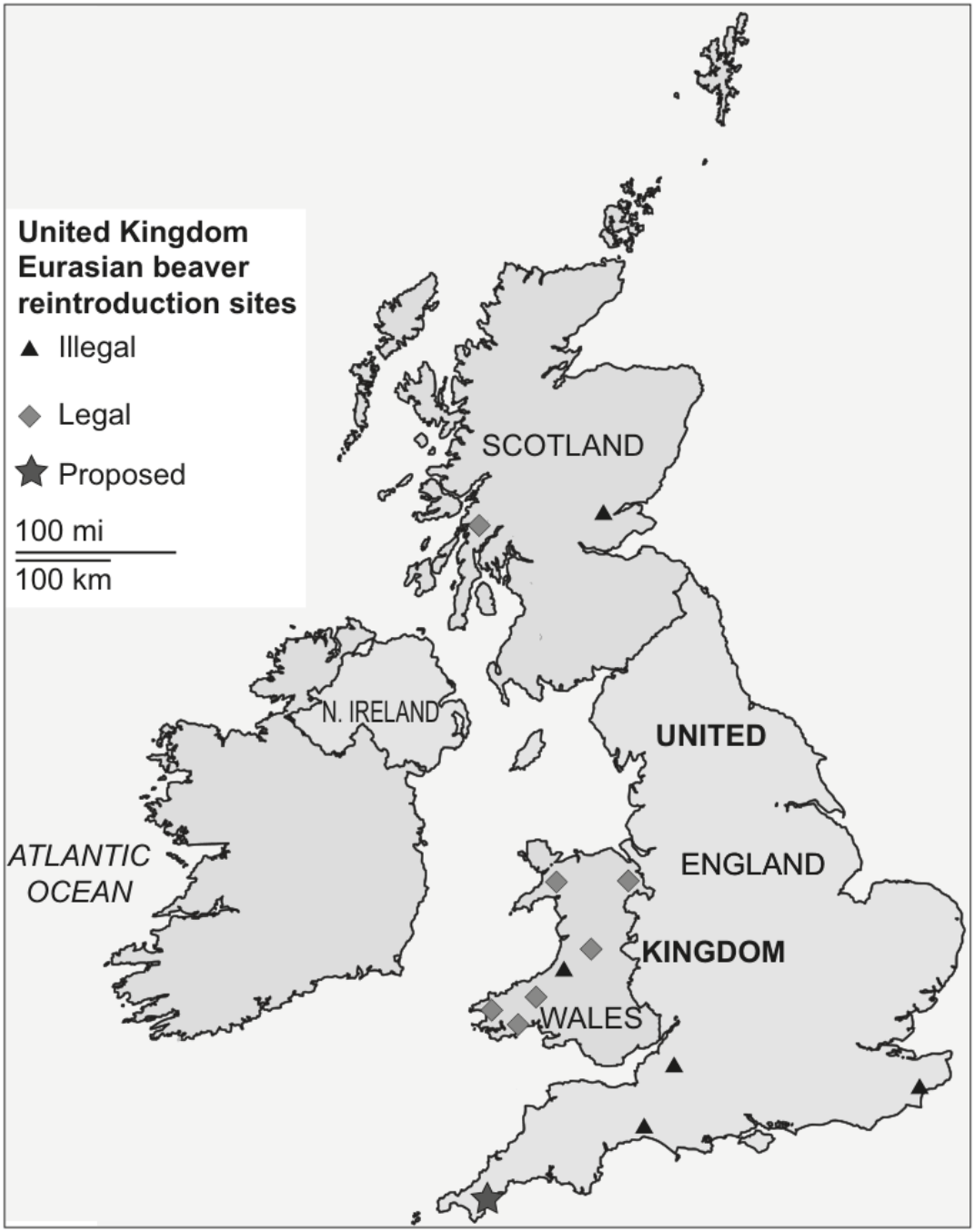
Human Impact on the Environment (1.6): Eduqas A Level Biology Exam Questions by Topic

18 questions · 37 marks · about 44 minutes. Answer in the spaces, then check the mark schemes at the end.

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1. The Eurasian beaver *(Castor fiber)*, a large, strictly herbivorous mammal, was formerly native to the UK. They played an important part in our landscape by felling trees to build dams. These dams block small streams, slowing their flow and forming small ponds and bogs. Beavers were hunted to extinction in the 16th century. The loss of this species led to the loss of many freshwater habitats.

The map below shows the sites where beavers from Northern Europe have been reintroduced into the wild in the UK together with some proposed sites.



(a) Beavers used to be an endangered species in Europe. Explain what is meant by an endangered species. [1]

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Question 2 · A level Component 1 · June 2025 · Q6(a)(i) · 1 mark

6. In any ecosystem, population numbers vary over time due to many factors. These factors can be biotic or abiotic and their effects can be density dependent or density independent. Increasing human pressures on the environment have increased the risk of extinction for many species.

(a) (i) State the term used to describe a species that is at risk of extinction. [1]

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Question 3 · A level Component 1 · June 2025 · Q6(b)(i) · 1 mark

(b) The population size of many species is now monitored to inform political decisions that could support conservation. The data collected is used to predict the time taken for a species to be no longer at risk of extinction.

The numbers of African elephants (*Loxodonta africana*) decreased rapidly in the 20th century, largely due to human activities. Conservation efforts are helping to restore population numbers in some areas of Africa.

(i) Suggest **two** human activities that could have contributed to the decline in the number of African elephants. [1]

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Question 4 · A level Component 1 · June 2017 · Q1(b) · 2 marks

(b) Give **two** advantages of using re-introduction of beavers from northern Europe as a strategy for conservation in the UK. [2]

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Question 5 · A level Component 1 · June 2017 · Q1(c) · 2 marks

(c) There has been some re-introduction of beavers into the UK, both legal and illegal. Give **two** reasons why people might be concerned about illegal, unregulated re-introduction of beavers. [2]

Question 6 · A level Component 1 · June 2019 · Q6(d) · 2 marks

Many Red Kite chicks are tagged so that their survival and lifespan can be monitored. Survival rates in Northern Scotland are poorer than elsewhere, mainly because of illegal poisoning and shooting on grouse-shooting estates.

(d) Suggest **two** ways in which society could improve the survival rates of Red Kites. [2]

Question 7 · A level Component 1 · June 2024 · Q5(c)(iii) · 2 marks

(iii) Some wild species of avocado show resistance to *P. cinnamomi*.
Current practices in establishing avocado plantations are leading to some wild species becoming extinct.
Explain why it is important that these wild species are conserved **and** suggest **two** ways of conserving them for the future. [2]

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Question 8 · A level Component 1 · Autumn 2021 · Q5(b)(i) · 2 marks

(b) Brown rats, polecats and gulls are also predators of wader eggs. An investigation into the effect of hedgehogs on wader eggs was carried out as follows:

- Two plots of land were enclosed by hedgehog-proof fencing and all the hedgehogs were removed from these plots.
- An area of land adjacent to each plot of similar size was not fenced. These acted as control areas.
- Egg loss in the fenced and unfenced areas was compared and the type of predator causing the egg loss recorded.

(i) State why it was necessary to carry out such a study before a decision was made to control the number of hedgehogs. [2]

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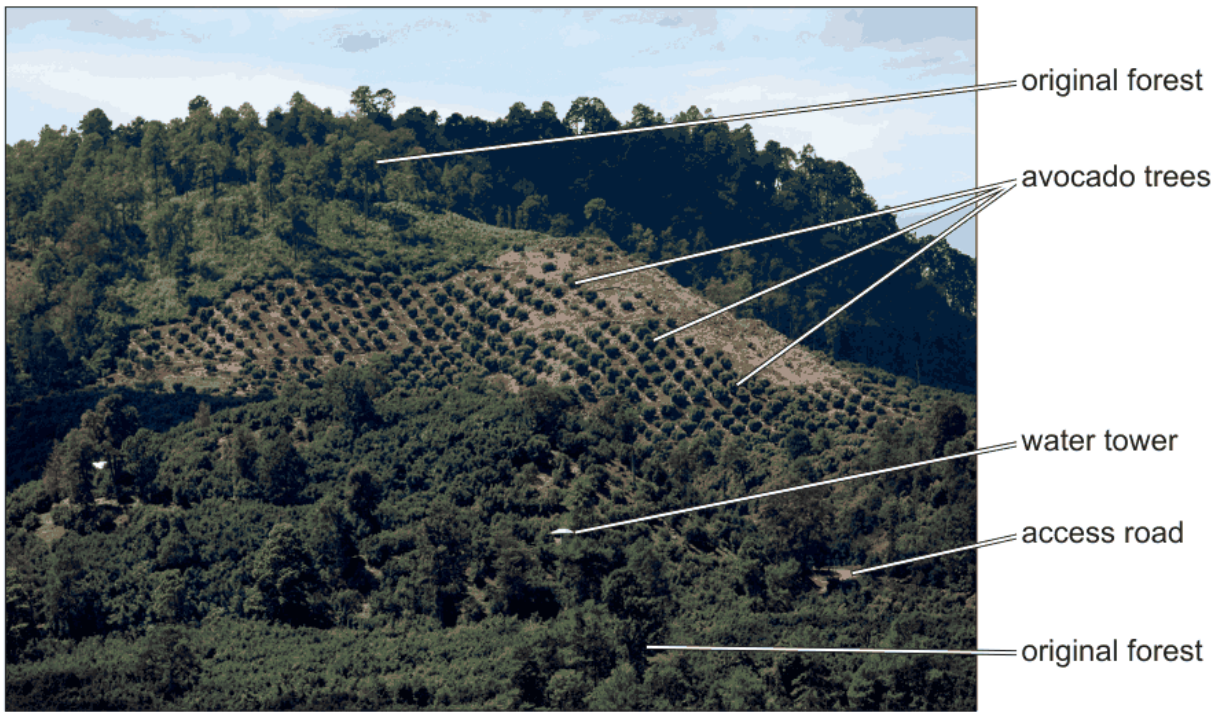
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5. Avocados (*Persea americana*) have become a popular food in all parts of the world. More than 50% of world production is based in one Central American country and most are grown in a single region of this country.
To meet global demand, nearly 90 000 hectares (900 000 000 m^2) of land have been converted to avocado plantations. **Image 5** shows an avocado plantation.

Image 5



(a) With reference to **Image 5** suggest how avocado production may have contributed to:

(i) biodiversity loss; [2]

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(b) Cod continue to grow throughout their lives. The older the cod, the larger they will be. **Image 4.2** and **image 4.3** show how the age of cod affects the number of eggs released and the mean percentage of fertilised eggs developing into embryos.

Image 4.2

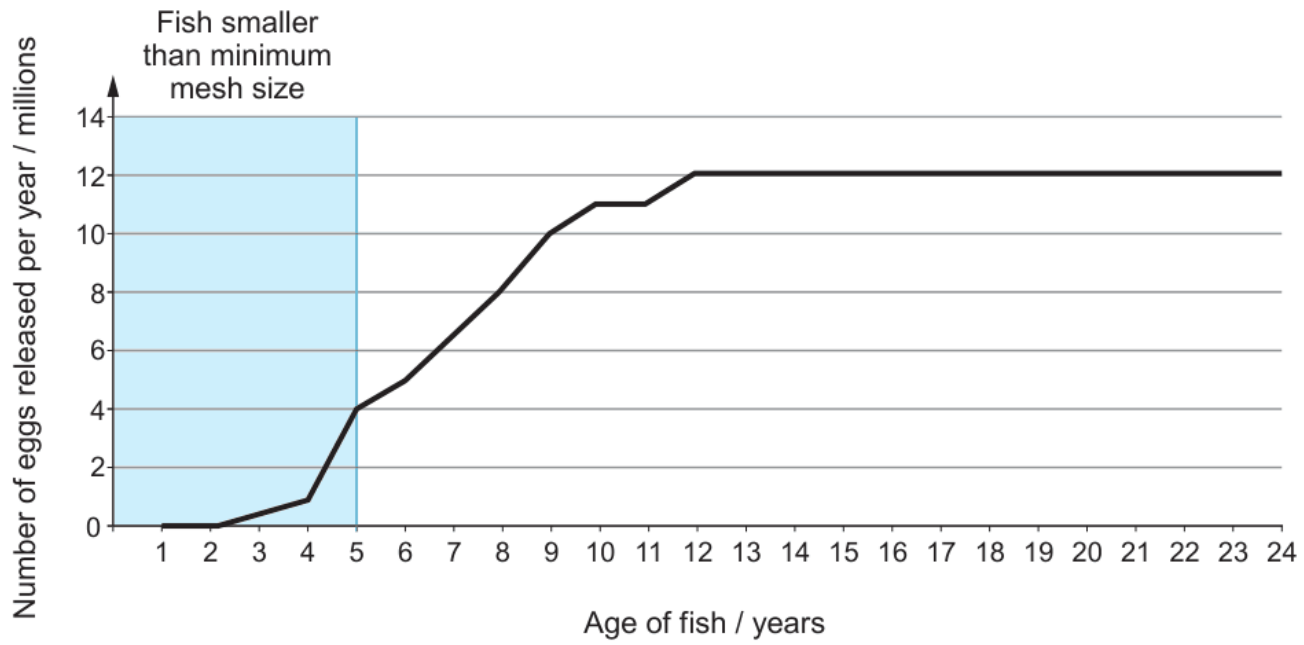
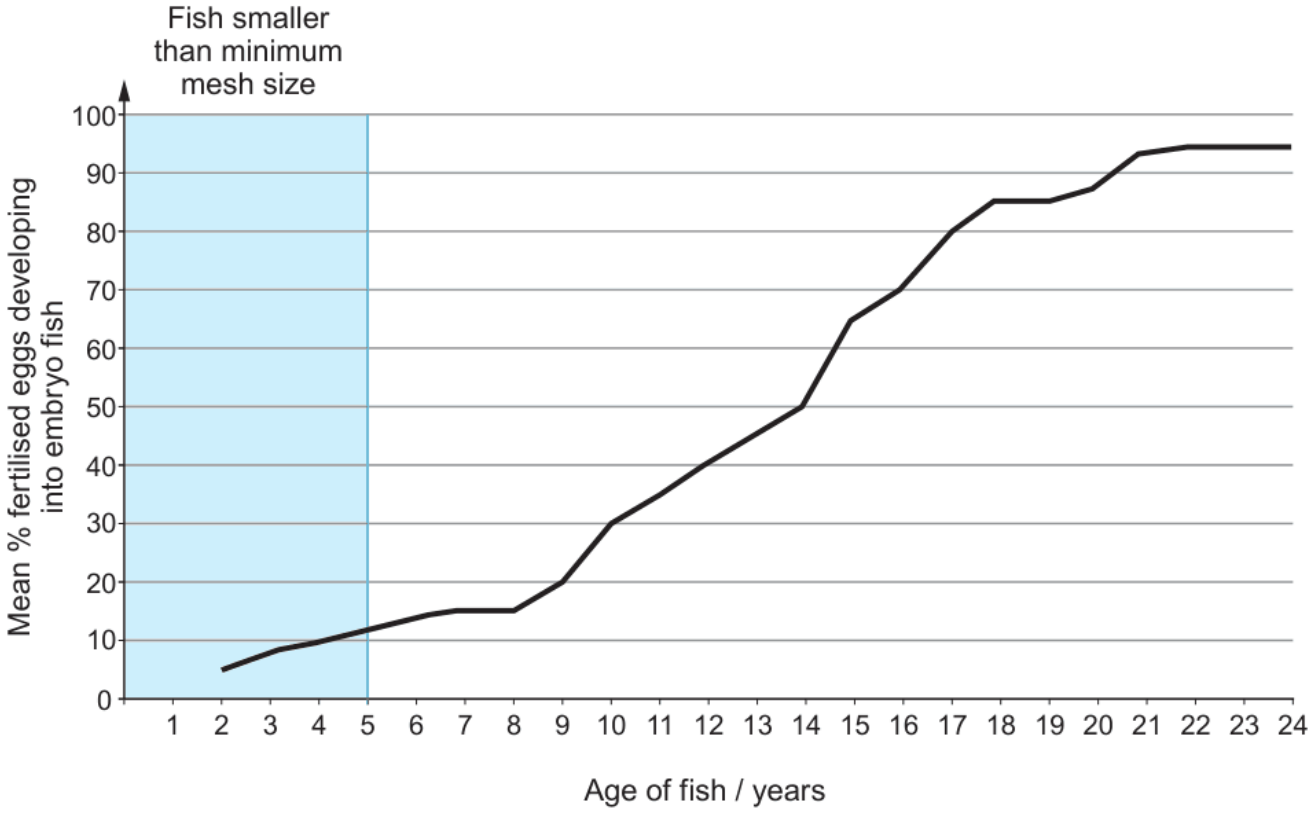


Image 4.3



There is a minimum mesh size for the nets used for trawling for cod so that only larger fish are caught.

(i) Evaluate the effectiveness of using this minimum mesh size in allowing the recovery of the cod population. **[4]**

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Question 11 · A level Component 1 · Autumn 2020 · Q4(b)(ii) · 1 mark

(ii) Other than restricting the mesh size of nets, give **two** methods which are used to prevent overfishing. [1]

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Question 12 · information from earlier in the question

5. Currently, a million tons of wild fish are harvested from the oceans annually. Of these, 80% are used to feed fish reared in farms.
Fish do not make their own omega-3 fatty acids, they get these by eating algae. For farmed fish to be as nutritious as wild fish, they need to be fed a diet rich in omega-3 fatty acids. Algae are hard to culture on a large scale, so wild fish provide a more convenient source.

Scientists have identified and spliced genes from algae that code for producing high levels of omega-3 fatty acids into *Camelina* plants. The genetically modified *Camelina* plants now produce seeds that contain 26% omega-3 fatty acids, so are useful for fish farm feed.

Question 12 · A level Component 2 · June 2017 · Q5(b) · 1 mark

(b) Explain why feeding genetically modified *Camelina* seed to farmed fish could benefit biodiversity. [1]

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Question 13 · A level Component 1 · June 2018 · Q3(c) · 4 marks

(c) Given that one effect of global warming appears to be more flooding in the UK, discuss why the government is encouraging landowners to preserve and re-instate such meadows in certain areas by compensating them for the loss of productive farm land. [4]

Question 14 · A level Component 1 · June 2017 · Q3(a) · 2 marks

3. The planetary boundaries framework was first introduced in 2009. A group of scientists identified nine planetary boundaries within which humanity can develop and thrive for generations to come. Crossing these boundaries could generate irreversible environmental changes.

The table below shows two planetary boundaries and their current values.

Planetary boundary	Variable(s)	Boundary	Current Value
Climate change	Atmospheric CO_2 concentration, ppm	350 ppm CO_2	396.5 ppm CO_2
Change in biosphere integrity	Genetic diversity: Extinction rate	less than 10 extinctions per million species per year	100-1000 extinctions per million species per year

ppm = parts per million

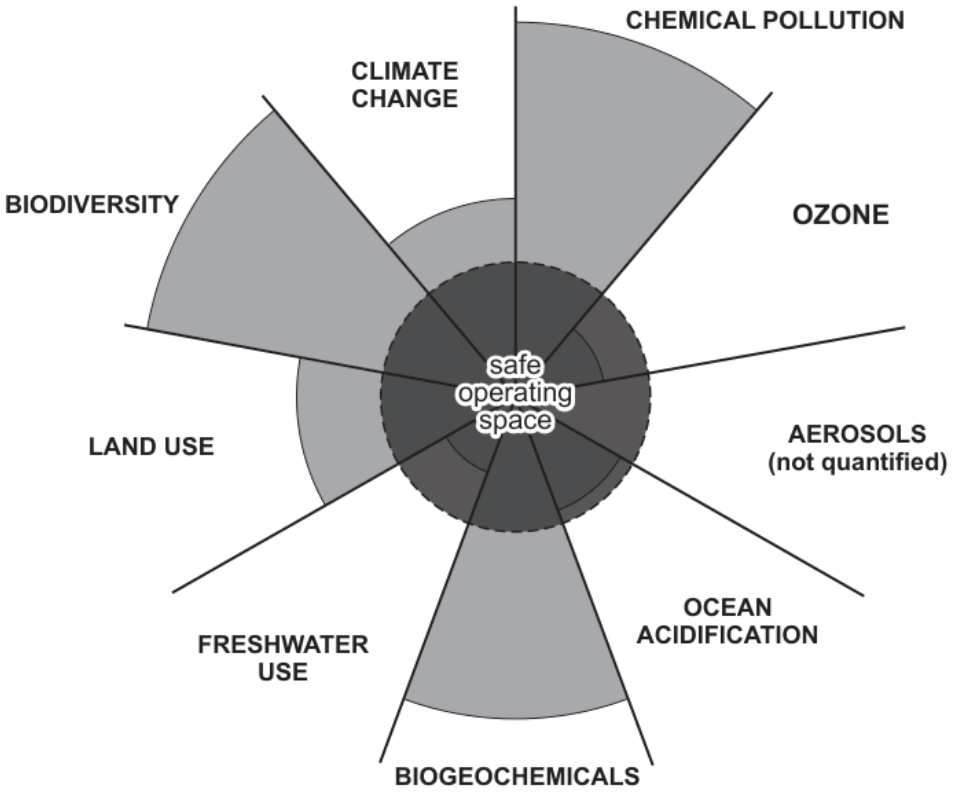
(a) Explain what the term "planetary boundary" means. [2]

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Question 15 · A level Component 1 · June 2025 · Q4(a)(i) · 1 mark

4. (a) Planetary boundaries represent the central concept in an Earth system framework proposed by scientists. **Image 4.1** shows the status of the nine planetary boundaries in 2022.

Image 4.1



(i) State the expected consequence of crossing the safe threshold for any planetary boundary. [1]

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Question 16 · A level Component 1 · Autumn 2021 · Q7(a)(iv) · 2 marks

(iv) Explain why an increase in global warming could have been a contributory factor in the planetary boundary for biodiversity being crossed. [2]

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Question 17 · A level Component 2 · Autumn 2021 · Q3(d) · 4 marks

(d) Apple trees produce pollen grains that are chemically self-incompatible with their own stigmas. To produce apples their flowers must be pollinated by pollen from a different variety of apple tree.

Flowering, including pollen production and the development of receptive stigmas, is triggered in some varieties of apple by warmer air temperatures but in others is triggered by increasing day length between March and June.

Cross-pollination often occurs between a variety in which flowering is triggered by longer day length and a variety in which flowering is triggered by warmer temperatures.

Using this information, conclude why commercial apple growers in the UK are concerned that crossing the climate change boundary could result in a lower yield of apples. [4]

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Question 18 · A level Component 3 · June 2018 · Q6(c) · 3 marks

(c) Until recently, the main species of *Erwinia* that caused soft-rot in the UK was *E. carotovora*. This species spreads rapidly in the cool, wet conditions usually found in this country in the spring. Recently, infections caused by another species of the same genus, *E. chrysanthemi* has been identified at over 40 sites in the south of England and Wales but so far has not been found in the colder climate of Scotland. *E. chrysanthemi* is more common in warm countries where it causes far more destruction of fruit and vegetables than *E. carotovora*.

Suggest how human impact on the climate change planetary boundary could be a reason for the distribution of *E. chrysanthemi* in the UK. [3]

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Mark schemes

Question 1 · A level Component 1 · June 2017 · Q1(a) · 1 mark

1	(a)			(A species that is seriously) at risk of extinction	1		1			

Question 2 · A level Component 1 · June 2025 · Q6(a)(i) · 1 mark

6	(a)	(i)	Endangered / vulnerable (1)	1		1

Question 3 · A level Component 1 · June 2025 · Q6(b)(i) · 1 mark

(b)	(i)	**Any two for 1 mark**: • {poaching / hunting} • {farming / competition from domestic animals} / • {deforestation / habitat destruction} / • pollution	1	1

Question 4 · A level Component 1 · June 2017 · Q1(b) · 2 marks

(b)			**Any 2 (x1)from:** • {restores/ increases/ improves} biodiversity/ increases (fresh)water habitats (by pond formation)/ increases shrub growth/insect life (1) • Reduces flooding/ reduces damage to habitats/ slows water flow/ filters sediment from water (1) • Use of European beavers: maintains correct genetics of population/ well adapted to environment/ take up correct niche (1)	2	2		

Question 5 · A level Component 1 · June 2017 · Q1(c) · 2 marks

(c)		**Any 2 (x1) from:** • Introduction of {disease/TB} (1) • {Destruction/ loss} of {land/ habitat} due to {flooding/ bogs/ reduced flow of rivers (below the dams)/ deforestation} (1) • The wrong species would not be so well adapted/ inappropriate habitat for beavers (1)	2	2		

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Question 6 · A level Component 1 · June 2019 · Q6(d) · 2 marks

	(d)	Any **two** (×1) from A. Prosecution/ legislation/ ban hunting (1) B. Education/ increase awareness/ ecotourism (1) C. Making holding of poisons illegal/difficult to obtain (1) D. Feeding sites (1) E. Breeding programmes (1)	2	2	

Question 7 · A level Component 1 · June 2024 · Q5(c)(iii) · 2 marks

(iii)	To conserve {gene pools / valuable alleles} / Source of resistant alleles / Maintain genetic {diversity / variability} (1) **Any 2 (for 1 mark) from**: • (Habitat protection through) {nature reserves / SSSIs} • (Breeding / reintroduction programmes by) botanic gardens • Seed stores • Relevant legislation / compensation for farmers	2	2	

Question 8 · A level Component 1 · Autumn 2021 · Q5(b)(i) · 2 marks

	(b)	(i)	To confirm that hedgehogs were responsible for decline (1) To assess impact of other predators (1)	2	2	2

Question 9 · A level Component 1 · June 2024 · Q5(a)(i) · 2 marks

5	(a)	(i)	Deforestation / description of e.g. old forest cut down (1) Loss of habitat / fewer (ecological) niches / monoculture (1)	2	2	

Question 10 · A level Component 1 · Autumn 2020 · Q4(b)(i) · 4 marks

(b)	(i)	Any **four** (×1) from Would have very little effect. (1) Bigger mesh size still catches older fish (1) Egg production reaches maximum at 12 years (1) Older fish produce far more eggs (1) Eggs from older fish far more likely to develop into embryos (1) ref to data. (1)	4	4

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Question 11 · A level Component 1 · Autumn 2020 · Q4(b)(ii) · 1 mark

(ii)	Any **two for one mark from** Restrict fishing period/ Seasonal restrictions Have protected areas where no fishing Limit size of catch/ quotas Restrict number of boats	1	1

Question 12 · A level Component 2 · June 2017 · Q5(b) · 1 mark

(b)	Less wild fish will be harvested (to feed farmed fish)	1	1	

Question 13 · A level Component 1 · June 2018 · Q3(c) · 4 marks

	(c)		1. Land retains the water / acts as sponge (1) Not store flood water 2. Which is only released slowly into the rivers (1) 3. Reducing (flash-)floods (1) 4. Conflict between loss of farmland and conservation/cost of damage from flooding is more than farmers compensation for the loss of use of land(1) 5. Conservation (of rare species/example/ biodiversity) (1)		4 4	

Question 14 · A level Component 1 · June 2017 · Q3(a) · 2 marks

3	(a)		Safe operating level for humanity/ a threshold value for a global process that is affected by human activity/ limits that global processes or systems must stay within (1) Above this value, the global process will not be stable / below this value the global process will be stable /exceeding boundary leads to gross global environmental change/ irreversible damage if exceeded (1)		2 2	

Question 15 · A level Component 1 · June 2025 · Q4(a)(i) · 1 mark

4	(a)	(i)	(if planetary boundary crossed we risk) {irreversible / abrupt} environmental change / damage to the planet} owtte (1)	1	1

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Question 16 · A level Component 1 · Autumn 2021 · Q7(a)(iv) · 2 marks

(iv)	**Any one factor (×1) + explanation (1) from:** Sea temperature increases (1) To above what is suitable for organisms, e.g. algae in corals (1) OR Atmospheric temperature increasing (1) Faster than organisms can adapt (1) OR Ice caps melt/ expansion of water leading to higher sea levels (1) Causing destruction of habitat /owtte (1)	2	2

Question 17 · A level Component 2 · Autumn 2021 · Q3(d) · 4 marks

(d)	**Any four (×1) from** A. Increased atmospheric temperatures (1) B. Trees that flower due to warmer air temperatures could flower earlier / trees with different environmental triggers flower at different times / pollinating insects appear earlier (1) C. Day length not affected by climate change (1) D. Cross pollination cannot take place / receptive stigmas not present (1) E. Lower rates of pollination / description of decreased rate of pollination (leading to reduced crop yield) (1) Reject references to greenhouse effect changing day length Accept reverse arguments if state that crossing climate change boundary could result in decreased atmospheric temperatures	4	4

Question 18 · A level Component 3 · June 2018 · Q6(c) · 3 marks

(c)	**Any three (x1) from** A. Named human activity (e.g. combustion/ deforestation/ agriculture) which (1) B. increased {CO_2/ greenhouse gases} in atmosphere causing global warming (1) C. warmer climate in **south** of UK favours E. chrysanthemi (1) NOT UK unqualified D. not in Scotland yet as temperatures still too low (1)	1	2	3	

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