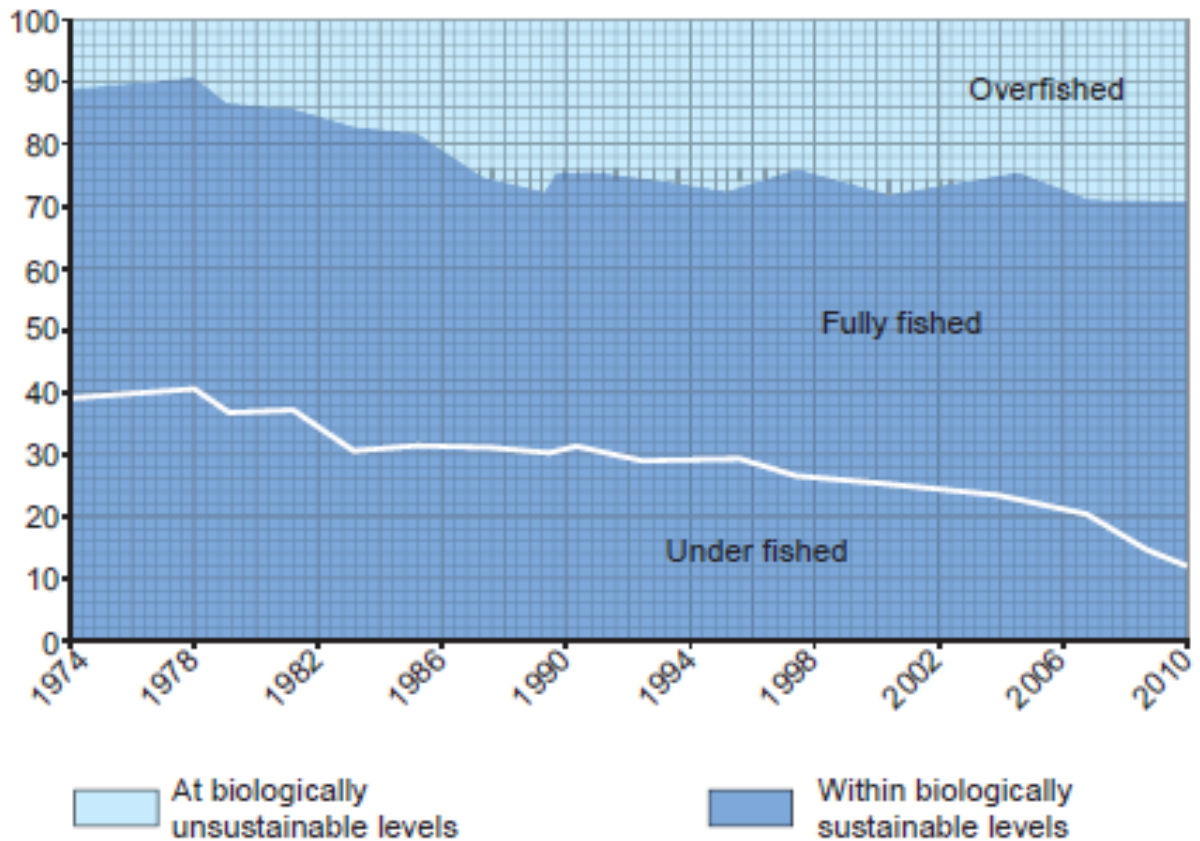


WJEC (Wales) Biology A-level
Topic 3.6: Human Impact on
the Environment
Questions by Topic

1. The graph below shows the trends in the state of world stocks of marine fish from 1974 to 2010.

Percentage of stocks assessed



Fully fished = fished at maximum sustainable yield

Underfished = currently believed to be fished at below maximum sustainable yield

(a) Using the data, what conclusions can be drawn about the world fishing stocks since 1974. [4]

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- (b) Describe three strategies, apart from aquaculture, which can be used to prevent overfishing and explain how each would help to conserve stocks. [3]

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- (c) One method of decreasing demands on wild fish stocks is the use of aquaculture. The Scottish salmon industry is one such example. One problem with raising salmon this way is the high build up of parasites, such as lice, which feed on the blood and tissue of salmon.

- (i) Why are the farmed fish more susceptible to infection by lice than wild fish and why is eliminating the lice a problem for fish farms? [2]

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- (ii) There are important environmental concerns that farmed fish can escape from their pens. Explain three reasons why it is important to the environment that the escape of farmed fish is prevented. [3]

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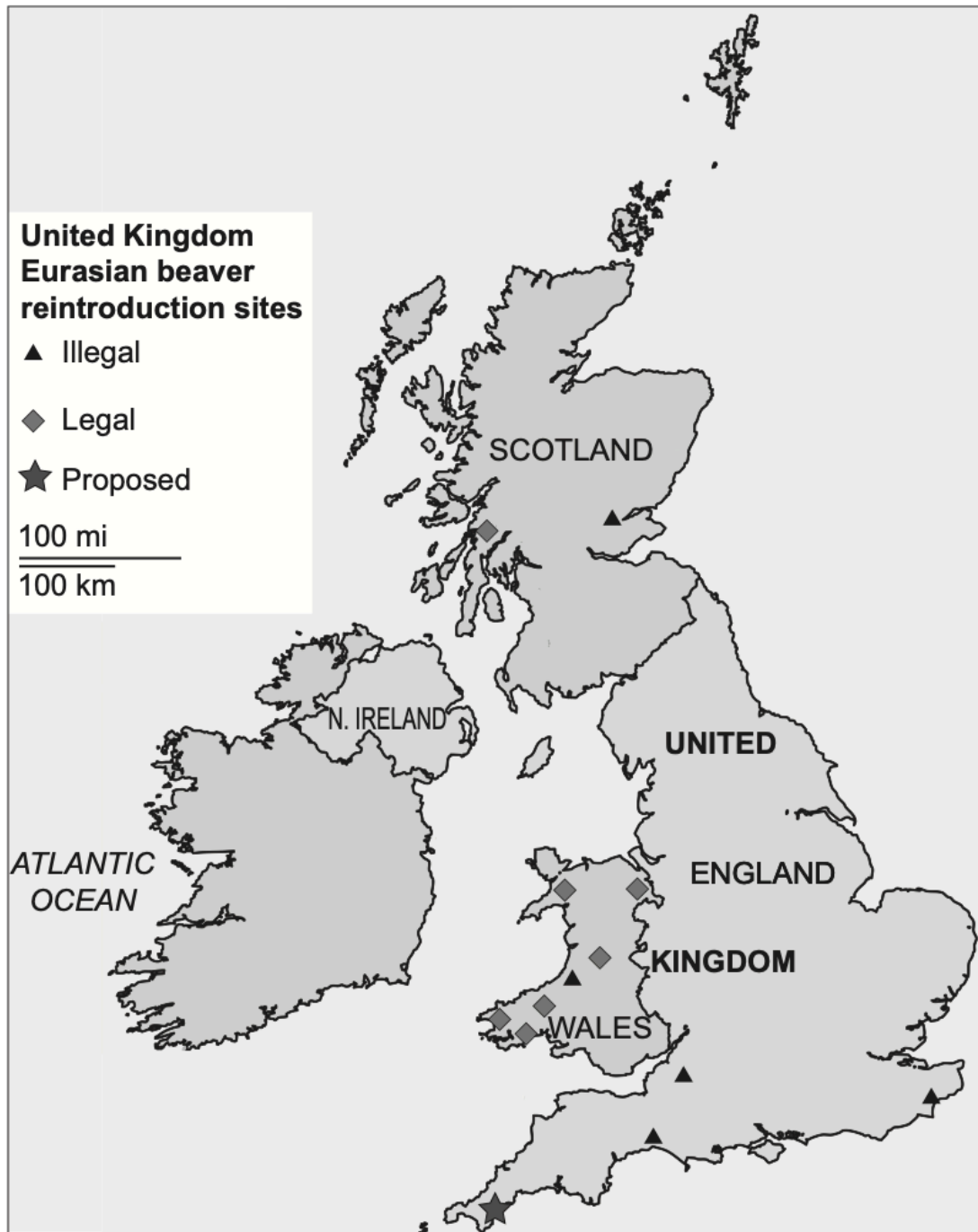
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2.

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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(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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(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]

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(d) Environmental conservation decisions can only be made on the basis of sound scientific principles. Give **two** factors that scientists would have to consider when planning the successful re-introduction of beavers. [2]

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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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(b) Calculate the percentage by which the current atmospheric carbon dioxide concentration exceeds the boundary, giving your answer to one decimal place. Show your working in full. [2]

Percentage = %

(c) Explain how deforestation can directly affect the planetary boundary for climate change. [3]

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(d) Using your knowledge of natural selection, explain why more species have become extinct recently, compared to pre-industrial times. [3]

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(e) Suggest how biodiversity loss may be delayed using conservation methods. [4]

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4.

In the past, Red Kites (*Milvus milvus*) almost became extinct in the UK and by 1905 there were estimated to be only three breeding pairs in the UK, all of which were in West Wales.



It has taken a century for the UK Red Kite population to recover from the few remaining birds. In 1986 the recovery was helped by the re-introduction of some Red Kites from Wales to England and Scotland. Although they are still rare, between 2008 and 2011 they were found breeding in over 700 areas that were sampled across the UK.

The population recovery has involved keeping nest sites secret and round-the-clock protection by volunteers.

- (a) In 1995 there were 284 Red Kites in the UK with numbers increasing to 1025 per cent of the original population between 1995 and 2017. Calculate the approximate **number of breeding pairs** of Red Kites present in 2017. [3]

..... breeding pairs

- (b) In areas where Red Kites were absent and then re-introduced the numbers increased much more rapidly than in areas where they were already established. Explain the reasons for this. [3]

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- (c) Explain why the location of nest sites needed to be kept secret with round-the-clock protection. [1]

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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]

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Red Kites have often bred successfully in woodland SSSI's.

- (e) State what is meant by an SSSI and why Red Kites may breed more successfully in these sites. [2]

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5.

Fish farming is an important industry in Scotland, producing almost 180 000 tonnes of fish in 2014. It provides employment and financial gain for the areas where it is carried out. The number and size of fish farms has increased as one way of preventing overfishing.

The table below shows the estimated use and loss of two elements during the production of fish in Scotland by fish farming.

Nutrient output per tonne of production	Nitrogen	Phosphorus
used in feed (kg)	86	18
lost as uneaten food (kg)	4	1
lost as organic matter in faeces (kg)	12	3
lost as inorganic products (e.g. ammonium ions and phosphate ions) (kg)	37	9

Adapted from “The Interaction between Fish Farming and Algal Communities of the Scottish Waters – A Review”, Rydberg, Sjoberg and Stigebrandt. Research report 2003/04.

With reference to the information provided in the table and your own knowledge, explain the possible ecological impacts of fish farming in the areas where it takes place. Describe other ways to overcome the problem of overfishing. Explain how these methods are used to prevent overfishing. [9 QER]

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