

RADLEY

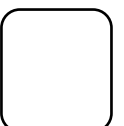
2022 Scholarship Examination Paper

BIOLOGY

Time allowed – 30 min

Total marks: 33

PLEASE WRITE IN BLACK INK



How Rewilding Brought Nature Back to England's Knepp Estate



Our inspiration for **rewilding** came from a Dutch ecologist named Frans Vera who says, we've forgotten that vast numbers of large herbivores like aurochs or tarpan, both now **extinct**, drove our ecosystem. Their impact on vegetation—grazing, browsing, trampling, rootling, wallowing, tree-breaking, debarking, transporting seeds in their gut, hooves, and fur—once created a kaleidoscope of complex, open, dynamic **habitats** (very different from the ancient vision of Europe's ubiquitous closed-canopy forest we often hold in our heads). Their dung,

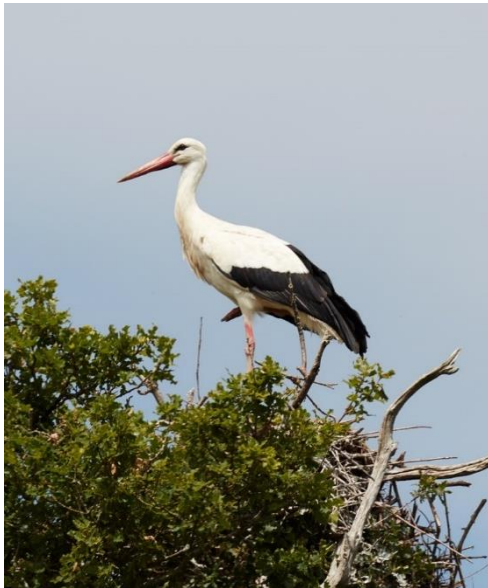
urine, and carcasses were a vital part of the **soil-nutrient cycle**. This is the secret of biodiversity: we must allow large herbivores to roam free.

So we fenced our boundaries and introduced English Longhorn cattle, Exmoor ponies, Tamworth pigs, red and fallow deer—and their disturbances opened up opportunities for insects, fungi, **lichens**, wildflowers, small mammals, and birds. Mindful of overgrazing we kept the stocking densities low by culling. What you want is a battle between herbivores and vegetation in which neither side wins.

At first some **pioneer plants** like creeping thistle took over. Then, one warm Sunday morning that May, we woke to see tens of thousands of painted lady butterflies descending on the plants to lay their eggs. Weeks later, spiky black caterpillars were swarming over the thistles, spinning silken webs like tents. By autumn, they had devoured the leaves, **pupated**, and left—and just like that, nature had solved our problem. As the new year began, the 60 acres of thistle were gone. No need for weedkiller – nature did our job for us for free.



Today our land is a breeding hot spot for **critically endangered** nightingales, turtledoves, and purple emperor butterflies. We have 13 out of the U.K.'s 18 bat species; we have peregrine falcons and all five of the U.K.'s species of owl. Numbers of more common species of birds are rocketing too. In spring, the dawn chorus is so loud it vibrates in your lungs. Hundreds of farmers and land managers now visit us every year, inspired to create something similar on their own land. Nature itself seems to be willing us on.



We've started to lend a helping hand where species aren't able to return under their own steam. In March 2020, free-flying white storks reared in our **reintroduction** pen at Knepp began making messy nests in the tops of our oak trees. They are part of a project with Cotswold Wildlife Park and the Durrell Wildlife Conservation Trust to re-establish this extinct species in Britain. One bill-clattering female even managed to attract a wild bird flying over from Europe as her mate. It was the first time white storks had bred in the wild in the U.K. since 1416. Feasting on multitudes of grasshoppers, earthworms, grass snakes, small fish, and field mice, the fledglings are now beginning to stretch their wings, and their parents are teaching them how to glide on **thermals**. In the autumn we hope to release our first beavers, and one day, perhaps, we'll have bison and elk—creatures that have been missing from our landscape for centuries. Rewilding has opened our eyes to all sorts of possibilities. The sky is the

limit.

Adapted from an Article By Isabella Tree, photography by Simon Upton

Using the information in the passage and your own knowledge, answer these questions:

1. What is meant in the passage by the words underlined as follows:
 - i. Rewilding
 - ii. Extinct
 - iii. Habitats
 - iv. Soil-nutrient cycle
 - v. Lichens
 - vi. Pioneer plants
 - vii. Pupated
 - viii. Critically endangered
 - ix. Reintroduction
 - x. Thermals[10]
2. Aurochs and Tarpan were the original native cattle and horses in Europe. Describe the impact they are believed to have had on the landscape. [3]
3. Name **three** vertebrates and **three** invertebrates mentioned in the passage. [4]
4. Describe **two** differences between birds and amphibians. [2]
5. The story of the painted lady butterfly / creeping thistle is an example of what's called a "biological control". Give at least **two** reasons why this is better than weedkillers. [2]
6. Use the species names in the last paragraph to construct a simple food web. [3]
7. Explain factors which might have originally caused white storks to go extinct in the UK in 1416. [2]
8. Cotswold Wildlife Park and Durrell Wildlife Conservation Trust are two Zoos that have been involved with the reintroduction of white storks back to the UK. Give **two** reasons how might Zoos help such a project? [2]

9. Biodiversity loss is one of the biggest challenges facing the Earth and its ecosystems today. Explain in as much detail as you can how rewilding can redress the balance. What are the positive and what are the problems with it?

[5]

TOTAL = 33 MARKS

End of Paper