

1 • *Population Matters*

1.1 Problems with People

In the wilder parts of the UK, it is still possible to wander for many kilometres and not meet another living soul, but such places are increasingly rare and more or less non-existent in lowland England. The central theme of this book relates to that simple observation, focusing on human numbers and how they impact upon wildlife in Britain, and on other aspects of life in the UK and elsewhere. This first chapter's title matches that of a charity, Population Matters (<https://populationmatters.org/>), which has lobbied long and hard for the consequences of overpopulation to be taken seriously, and a gruelling task it has proved to be. Yet there are signs, discussed in later chapters, that awareness of population pressures is growing as the damaging effects of so many humans on the planet are increasingly hard to ignore. Whether this recognition leads to action designed to address population issues remains to be seen.

The evolutionary success of hominid apes would surely have defied the predictions of any computer model. Pathetically weak in tooth and claw, our early ancestors nevertheless managed to spread from the cauldron of their African birthplace across most of the Old World more than a million years ago. Small groups of hunter-gatherers used the products of burgeoning brain power to overcome a lack of inbuilt weaponry, and for untold aeons ranged over landscapes largely unmoved by their wanderings. There may have been fewer than 20,000 of these people breeding all over their range in those early days, a number smaller than current estimates of endangered apes such as chimpanzees (*Pan troglodytes*) today. But this was only the opening act of a play usurped by the products of another African genesis, this time of modern humans (*Homo sapiens*) some quarter of a million years past. With bigger brains and a correspondingly more sophisticated armoury, the newcomers followed their antecedents across Asia and beyond. By 15,000 years ago, every continent except Antarctica was home to *Homo sapiens*, while



Figure 1.1. Mammoth under attack by humans. Source: Wikipedia under CC Attribution-Share Alike 4.0 licence

the pioneering hominids that preceded them vanished in their wake. This new wave was altogether different from what had gone before. Although the evidence is debatable, it looks very much as if the increasing numbers of modern humans had a much greater impact on the environment than their predecessors. Not only did archaic human species disappear coincident with the increasing populations of modern man, but so did a range of megafauna including mammoths (*Mammuthus* spp.; Figure 1.1), mastodons (*Mammut* spp.) and the woolly rhinoceros (*Coelodonta antiquitatis*). Some of these animals were certainly victims of human predation, demonstrated by fossilised skeletons with associated spear points and damage from attack (Lister, 2014). Because many of these events coincided with dramatic climate changes through the Pleistocene glaciations, cause and effect can be difficult to establish but it looks very much as if human predation played a significant role in species extinctions from early in our history. And all this was long before human number escalated to multimillions, let alone the billions of us around today. We started as we meant to go on.

1.2 About This Book

It is all too clear that wildlife is declining in both species diversity and abundance across the globe, on a scale that looks increasingly like the start of a sixth mass extinction comparable with five others that ravaged the planet over the past 4 billion years. It is also indisputable that most if not all of the current declines are due, one way or another, to human activities. That a bipedal ape of no fixed abode could generate such overwhelming misery is astonishing and certainly without precedent. An important question is the extent to which this ongoing disaster relates directly to the numbers of people on the ground or in more complex ways to multifarious human activities. Conservation policies and actions have almost invariably focused on the latter issue, especially the ever-increasing consumption of global resources. Some prominent environmental campaigners such as George Monbiot have strongly emphasised the need to reduce resource exploitation and played down the role of an increasing human population:

It is true that, in some parts of the world, population growth is a major driver of particular kinds of ecological damage, such as the expansion of small-scale agriculture into rainforests, the bushmeat trade and local pressure on water and land for housing. But its global impact is much smaller than many people claim. The formula for calculating people's environmental footprint is simple, but widely misunderstood: $\text{Impact} = \text{Population} \times \text{Affluence} \times \text{Technology}$ ($I = PAT$). The global rate of consumption growth, before the pandemic, was 3% a year. Population growth is 1%. Some people assume this means that the rise in population bears one-third of the responsibility for increased consumption. But population growth is overwhelmingly concentrated among the world's poorest people, who have scarcely any A or T to multiply their P. The extra resource use and greenhouse gas emissions caused by a rising human population are a tiny fraction of the impact of consumption growth.

By contrast, Paul Ehrlich, the early and eminent promoter of policies for population reduction in the 1970s, is unrepentant:

The human population has grown so large that roughly 40% of the Earth's land surface is now farmed to feed people – and none too well at that. Largely due to persistent problems with distribution, almost 800 million people go to bed hungry, and between one and two billion suffer from malnutrition. As a consequence of its booming population, *Homo sapiens* has taken much of the most fertile land to grow plants for its own consumption. But guess what? That cropland is generally not rich in food plants suitable for the caterpillars of the

15,000 butterfly species with which we share the planet. Few butterflies require the wheat, corn or rice on which humans largely depend. From the viewpoint of most of the Earth's wildlife, farming can be viewed as 'habitat destruction'. And, unsurprisingly, few species of wildlife have evolved to live on highways, or in strip malls, office buildings, kitchens or sewers – unless you count Norway rats, house mice, European starlings and German roaches. Virtually everything humanity constructs provides an example of habitat destruction.

From the point of view of this book, the fact that population growth is currently greatest in poor countries is not strictly relevant. What matters is that Britain has experienced a substantial growth rate for a long time, resulting in an extraordinarily high density of humans, particularly in England. Population growth and resource consumption are both problematic not just for the future of wildlife but also for that of our own species. However, in my view, the burgeoning human population is by far the most important driver of environmental damage in Britain. One way of addressing this controversy is to ask what exactly are the mechanisms by which humans damage wildlife in the UK, and to what extent would they be ameliorated if there were fewer of us around?

1.3 What Are the Issues?

People in Britain, as elsewhere, have ambivalent views about wildlife. For many, especially naturalists, there is unqualified pleasure in the countryside's plant and animal variety. For some, though, the opposite can be true. Farmers, for example, regularly wage an uncompromising war against arable weeds and insect pests. In Chapter 2, these relationships are explored, and the costs and benefits of wildlife in the UK are accounted. There is then an assessment of the current state of wildlife in our island archipelago, including documentation of the many ongoing species declines and of legislation put in place in attempts to protect them.

Three subsequent chapters outline the main human activities that impact adversely on wildlife, in increasing order of likely significance and where appropriate also in relation to Britain's increasing human population. Chapter 3 considers human activities that kill wildlife directly, including predation and collection. Evidently this kind of assault was in place millennia ago when Neolithic hunters took their toll of large Pleistocene mammals, but it has continued long after that. In relatively recent times, many species around the world have been exterminated or severely depleted by humans using increasingly effective armaments to

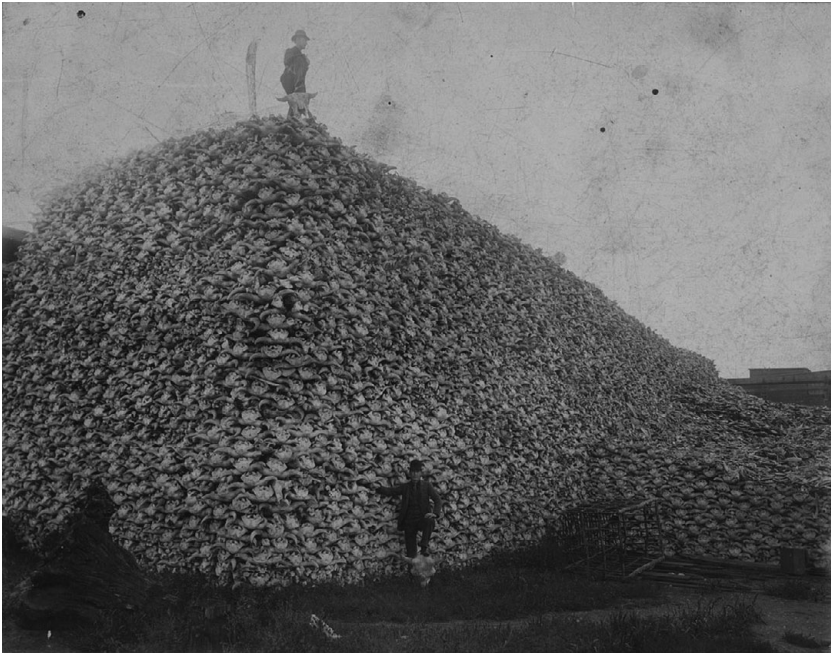


Figure 1.2. Bison skull pile. Source: https://en.wikipedia.org/wiki/File:Bison_skull_pile-restored.jpg; unknown author, taken in 1892

bring down their prey. Examples are legion. Dodos (*Raphus cucullatus*) in Mauritius, thylacines (*Thylacinus cynocephalus*) in Tasmania, Steller's sea cow (*Hydrodamalis gigas*) and all too many others have gone down as a result of overkill. A striking example of how effective firearms can be was the almost total annihilation of bison (*Bison bison*) on the North American plains. It has been estimated that some 50 million of these extraordinarily abundant animals were shot by white settlers in the nineteenth century (Figure 1.2), depriving native peoples of a staple food and leaving only a few hundred of them alive. Fortunately, the species has recovered substantially since this nadir, but the example shows how astonishingly devastating direct predation by humans can be.

Animals are not the only organism imperilled by direct persecution. Plant diversity is declining fast everywhere, and although this is mostly due to habitat change, some species are also at risk from collection or overharvesting. The Himalayan may apple (*Sinopodophyllum hexandrum*), which produces a chemotherapeutic chemical (podophyllotoxin) useful in cancer treatments, has suffered from overharvesting as well as habitat

loss and is currently classified as endangered. The question is to what extent has direct persecution caused wildlife declines in Britain, and how does it relate to the numbers of people still engaged in doing it?

Arguably the most obvious signs of human impact on the countryside relate to increases in infrastructure, notably the ongoing expansion of urban sprawl together with road and railway networks across the countryside. These causes of wildlife declines are discussed in Chapter 4. When the Nature Conservancy was created in the aftermath of the Second World War, ever more building over our green and pleasant land was perceived to be by far the greatest danger to our native plants and animals. Of course, human infrastructure is not a new phenomenon. However, mediaeval and earlier dwellings, with trackways interconnecting them, were in most places too sparse to impact significantly on the landscape. Indeed, Roman roads may have inadvertently facilitated the spread of so-called archaeophyte plants, including some of our most attractive wildflowers, brought over by the invaders from mainland Europe. This innocuous situation was set to change by the start of the eighteenth century, since when increasing numbers of people have created much larger settlements – ultimately great cities – with networks of busy roads between them. The industrial revolution added bustling factories, the combined results of all this being a reduction in land space for wildlife, effective fragmentation of previously interconnected habitats, and an onslaught of air and water pollution spreading way beyond the infrastructure itself. Nor is damage restricted to terrestrial and freshwater ecosystems. Offshore pollution has also been extensive. And there have been other undesirable consequences of these developments, including disturbance of sensitive species by increased background noise and by the footfall of more people walking, sailing and swimming in previously quiet places. Once again, the question becomes how much of the UK's declining biodiversity is due to these causes and to their relationship with an increasing human population?

What the newly established Nature Conservancy failed to anticipate were the ramifications of a nascent agricultural revolution, just getting underway in the mid-twentieth century with the advent of artificial fertilisers and pesticides. Omission of this risk assessment was understandable. The wider countryside was surely a haven for wildlife, more so than ever following the farming depression of the 1930s, and this benign situation was expected to continue. Chapter 5 describes what actually happened. Alarmed by a U-boat offensive that substantially reduced Britain's food imports during the war, it was judged politically imperative

to prevent any future recurrence of such a threat. An attempt began to make the UK self-sufficient in food, and to that end farmers would receive government subsidies to industrialise the countryside with heavy machinery, large quantities of fertilisers, and the newly available herbicides and insecticides. Over subsequent decades, this intensification of farming has continued apace, and wildlife has paid the price for it. Impacts are not only evident at the level of hostile fields and declining hedgerows. Aquaculture with offshore fish farms require overharvesting of food species, while dredging has canalised rivers and wreaked havoc among sensitive marine communities on sea beds. Problems in other parts of the countryside started even earlier in the twentieth century. This time, in response to timber shortages during the First World War, it was decided to greatly increase plantation woodland across the country. Serried ranks of conifers sprang up, often in places with rare species unable to cope with such a dramatically changed habitat. Here, too, wildlife declines inevitably followed. Altogether, this range of major changes, extending over large swathes of the UK, has had the most serious consequences for our wildlife heritage fuelled by the dependence of increasing numbers of people on countryside products.

Not all threats to British wildlife are home-grown. Chapter 6 documents the consequences of three relatively new developments, climate change, an upsurge in pathogenic diseases and increases in disturbance. A warming world is witnessing substantial alterations in plant and animal populations, especially across the Arctic where temperatures are rising most steeply. Polar bears (*Ursus maritimus*) and walrus (*Odobenus rosmarus*) are increasingly vulnerable to decreases in the extent of summer sea ice, but wildlife in warm countries is also feeling the effects of greater heat. Extensive wildfires in eastern Australia during 2019–2020 are reckoned to have killed 3 billion animals, mostly reptiles, and several species may have been completely exterminated. The inhabitants of California, unlike some of their compatriots in Washington, need no convincing that climate change is real (Figure 1.3) as every year more of their houses go up in flames. In the UK climate change has resulted in milder winters, new species arriving from warmer climes, and declines in Arctic–alpine plants and some coastal seabird colonies. Wildlife diseases are also on the march, facilitated by increasing international trade and air travel. Among the most devastating of these is the pathogenic fungus *Batrachochytrium dendrobatidis*, a native of eastern Asia that has spread across the globe with devastating effects on many amphibians, some of which it has totally wiped out. Novel diseases such as this have arrived in



Figure 1.3. Wildfires raging in California. *Source:* Kent Nishimura/Los Angeles Times/Getty Images (A black and white version of this figure will appear in some formats. For the colour version, please refer to the plate section.)

the UK in recent decades, and here too there have been severe consequences for several species of plants and animals. The human population size in Britain is not directly linked to these developments, but connections with human numbers at a global scale can certainly be made.

1.4 About People Numbers

The final four chapters focus on various aspects of the human population size. That this has been growing exponentially across the world in recent decades is common knowledge. In late 2020, the estimated global total exceeded 7.8 billion people, with several extra mouths to feed being added every second. The pattern in Britain has broadly mirrored that in the rest of the world, and recent trends in the constituent countries of the UK are outlined in Chapter 7. The changes have been dramatic, with more than twice as many people living in Britain in 2020 than were present as recently as the Second World War. This doubling has happened within a single human lifetime. Previous and contemporary predictions of population growth are discussed with special consideration of how accurate, or otherwise, they have proved to be. Changes in

population size are driven by three main factors: birth rate, death rate and levels of immigration/emigration. The relative importance of these drivers dictating events in the UK are considered, together with an assessment of how these factors have changed over time. Finally, there is a comparison of the human population size and extent of wildlife declines in Britain with the same features in some other countries. To what extent do such comparisons confirm or refute major impacts of human numbers on wildlife?

Chapter 8 is about people's perceptions of the UK population size. Impressions of the general public on this topic have been obtained via opinion polls, sampled at various times over the years. More selective assessments have investigated the views of particular factions within society. Many naturalists and scientists have long considered overpopulation as a matter of concern, while others, including conservation-based non-governmental organisations (NGOs), have often taken a more cautious approach. Various religious organisations have decried attempts by individuals to control family size, while economists have been generally hostile towards any limitation of population growth because of its demographic consequences: an increased proportion of elderly people would need support from a relatively smaller workforce. Politicians of all parties have mostly shied away from the topic altogether. Yet impacts on wildlife are only a small part of the price paid for high human numbers in Britain. Pressures on housing, road and airport expansion continue to increase with concomitant exacerbations of traffic jams, air pollution and overstretched public services. Is there an increased realisation that human population increase is not indefinitely sustainable in the UK?

Human population trends are increasingly of international concern. Several countries have implemented attempts at population control, the best known of which is China's one-child policy. The successes, failures and human rights issues of these efforts are considered in Chapter 9. International conventions, declarations and frameworks of varying relevance to population growth include the 2015 Paris Agreement on climate change and a Global Assessment Report on Biodiversity and Ecosystem Services by the Intergovernmental Science-Policy Platform. International summit meetings in Cairo and more recently in Nairobi specifically addressed population issues and made recommendations about future action to tackle associated concerns. To what degree have these exercises translated into meaningful action in the face of the continuing increase in human numbers around the world?

Finally, Chapter 10 provides an overview of population increases in relation to the specific causes of wildlife decline in the UK discussed in Chapters 3–6, as well as a comparison with reasons for wildlife declines in other countries. How much commonality is there? To what extent can the international and British biodiversity crises be related to human overpopulation as a primary cause? What humane strategies are available for controlling population growth? In the immediate and long-term futures, how can conservationists best improve the prospects for British wildlife in the face of increasing human numbers?

1.5 The UK as an Example of Population Pressure

In 2020, the UK had the 14th highest population density in the world, and the third highest in Europe after the Netherlands and Belgium (<https://statisticstimes.com/demographics/countries-by-population-density.php>). However, most people in the UK live in England, which has the fifth highest density in the world (after Bangladesh, Taiwan, South Korea and Rwanda), and the highest within Europe (www.statista.com/statistics/281322/population-density-in-the-united-kingdom-uk-by-country/). Scotland, Northern Ireland and Wales are home to inspiring plants and animals in spectacular countryside vistas, but it is in the warm lowlands of England that most of the UK's biodiversity resides. Some examples of population densities in a range of countries are shown in Table 1.1.

Population density is a more appropriate indicator of environmental impact than population size because in some countries with big populations, people are spread over very large areas. Thus, the USA has a population of 330,000,000, which is about five times that of the UK but ranges across 9,000,000 km² of land compared with just 250,000 km² in the UK. Human encroachment on wildlife habitats is commonly associated with East African savannahs, but, as shown in Table 1.1, the population densities of Kenya and Tanzania are only a quarter of that in the UK as a whole and perhaps 16 per cent of that in England. Habitats and ecosystems in the tropics are very different from those in Europe, and it is comparisons within that densely peopled continent that are most relevant to investigating impacts of human numbers in Britain. Community ecologists have long recognised the importance of population densities in the dynamic processes of competition and predation. Wildflower diversity in meadowlands is quickly diminished by heavy competition from grass encroachment unless this is constrained by

Table 1.1. *Examples of human population densities in a range of countries around the world*

Country	No. of people per km ² in 2020
Bangladesh	1175
South Korea	516
Netherlands	421
India	416
Belgium	377
China	377
Japan	338
UK	280
England	430
Scotland	70
Wales	151
Northern Ireland	136
Pakistan	275
Germany	233
Nigeria	217
Italy	200
Denmark	135
France	123
Portugal	111
Austria	106
Spain	93
Kenya	82
Ireland	70
Tanzania	59
USA	34
Brazil	25
Sweden	23
Norway	17
Canada	4
Australia	3
'World' average	58

suitable management (Peterken, 2013). Predation and/or competition from an increasing population of badgers (*Meles meles*) is associated with drastic declines in hedgehogs (*Erinaceus europaeus*) in England and Wales, although this species interaction is certainly not the only factor involved in hedgehog declines (Williams et al., 2018). Humans constitute another species with rapidly increasing numbers and the potential to precipitate damage to biodiversity. Subsequent chapters therefore focus on the main

causes of wildlife declines in Britain and how they relate to population pressures there and in other European countries. Even so, invoking human numbers as the root cause of major wildlife declines should be treated as a hypothesis and not as a given fact. As science pioneer Francis Bacon warned as long ago as 1620:

The human understanding, once it has adopted an opinion, collects any instances that confirm it, and though the contrary instances may be more numerous and more weighty, it does not notice them or else rejects them, in order that this opinion will remain unshaken.

This is all too true in so many walks of life, as political and environmental lobbyists still find to this day.