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1 **Commentary**

2

3 **The changing cultural dimensions of biodiversity conservation**

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14

## 15 Standfirst

16

17 **Agriculture involves the redirection of wild ecosystems to the production of food. This**  
18 **trade-off between farming and biodiversity conservation is often discussed in terms of**  
19 **land sharing, or land sparing and rewilding. However, this choice also reflects**  
20 **perceptions of ideal landscapes, which are partly based in culture and memory.**

21

22

23

## 24 Main Text

25

### 26 Once upon a time ...

27

28 Once upon a time, in the 1990s, I was involved in a European Union-funded project on  
29 landscape ecology. There was an ongoing debate as to which was the more important  
30 determination of species distribution in agricultural landscapes; some people felt that it was  
31 really down to the landscape composition, while others felt it was more down to landscape  
32 history. I found this debate confusing; I thought both were important, and it would be down  
33 to the individual context and how the problem was framed that would determine which  
34 mattered the most. But then, as part of our working, we were taken to a field excursion to  
35 Belgian woodland, very close to the border with the Netherlands. Our Belgian host, who felt  
36 that history was the more important, pointed out historical features in the landscape. Here is a  
37 trench from the First World War. These plants show that this area is an ancient woodland.  
38 Then, we move forward to look across the flat landscape of the Netherlands, a landscape  
39 which has been redesigned over the centuries according to need, where space is more  
40 important than time. It was the Dutch scientists who were the most fervently in favour of the  
41 importance of contemporary landscape design. It struck me that the way they framed their  
42 view of their science seemed to reflect their cultural heritage, their different shared memories  
43 about the relationship between people and environment.

44

45 Another snapshot. I am about 10 years old, walking in the fields of my family farm in  
46 northern England. I can hear birds and insects, and I can see primroses in the field and other  
47 flowers in the field margins. There are rabbits, occasionally hares and foxes. The farm  
48 landscape is pretty untidy, we have a few cows grazing the land and a few half-decent cereal  
49 crops, but it is noisy and insects and birds are moving around. I later moved away from  
50 farming to become an academic, but that 1960s farmed landscape never really left me. I  
51 ended up working on landscape ecology and land management policy, promoting a  
52 biodiverse but productive agricultural landscape for England [1], a vision shared by many of  
53 my friends and contemporaries who also had enjoyed a rural upbringing. Were we all trying  
54 to recreate the landscapes of our childhoods?

55

56 A final snapshot, just a couple of years ago, here in my office at Leeds University,  
57 back in northern England. I have a small group of ecology tutees, and the task is to get them  
58 to think about the potential impacts of Brexit on wildlife conservation in Britain (hint: many  
59 of our conservation laws and regulation are based within the EU). But this is going nowhere.  
60 So I try another tack. Where would you look for wildlife in Britain? They look at each other,  
61 starting to panic. Eventually, a tentative answer comes. "The zoo?" I ask my whole lecture  
62 group of undergraduates, how many have been on safari to see wildlife overseas? Around a  
63 third of them. I asked, how many go to see wildlife in the UK? Two out of around 150. Even  
64 the ones from small towns did not have the habit of enjoying the wildlife around them

65 (though admittedly these were small towns in the crowded and highly managed landscapes of  
66 southern England). In my experience, many potential students on open days want to help  
67 animals (ideally slightly ill, cuddly ones) rather than get to grips with the extinction crisis.

68 Across all of these examples, personal experiences are central to how views on  
69 conservation are formed. Whilst those like myself have experiences nature through our ties to  
70 the agricultural landscape, I wonder, for others has wildlife watching become an extension of  
71 TV documentaries, a sort of “Living Planet” theme park experience? If so, this is a huge  
72 cultural shift in the relationship between people and environment.

73

### 74 **The need for popular support for conservation**

75

76 Currently, the most important driver of global biodiversity loss is agriculture. As demand for  
77 food and other agricultural products have increased, agricultural land has moved into new  
78 lands to satisfied demands. The conversion of ecosystems to farmland has had the largest  
79 negative impact on global biodiversity since 1970, including the loss of 100 million ha of  
80 tropical forest from 1980 to 2000 [2]. But in many places, such as the UK and across many  
81 parts of Europe, there has been a shift to more homogenous, controlled and financially  
82 efficient forms of farming. This has led to further loss of biodiversity, including a 56%  
83 decline of farmland birds between 1970-2017 [3]. The diversion of land, a limited resource,  
84 to the production of food and other goods and services creates inevitable tension with the  
85 conservation of species and ecosystems. The increasing demands from agriculture are likely  
86 to result in yet more biodiversity loss, whilst people continue to call for better protection of  
87 biodiversity.

88

89 I argue that biodiversity conservation needs a broad degree of public support for it to  
90 happen at the necessary scale across agricultural landscapes. This is because utilitarian  
91 arguments for biodiversity conservation only go so far. Policies aimed at supporting habitats  
92 because of their provision of ecosystem services and public goods are not enough by  
93 themselves, as in practice many of these goods and services can be provided by ecosystems  
94 that are quite impoverished. The conservation of biodiversity needs to call on other, less  
95 utilitarian, values [4].

96

### 97 **Wild – cultural – intensive - urban landscapes**

98

99 Where I was brought up, I would often look across my home landscape north to  
100 Middlesbrough in the distance, with its docks and factories, through the farmed landscapes  
101 and into the uplands of the North York Moors, beautiful but (as I now see) ecologically  
102 degraded. There was no such as thing as wild nature anywhere in my direct experience, but it  
103 had existence value to me even as child from my books and TV programmes. Much of  
104 temperate Europe and many parts of Asia are characterised by agricultural land use that has  
105 similarly gone back centuries, in which biodiversity has not been actively promoted for its  
106 own sake. But certain species did thrive in these landscapes, whenever their traits have been  
107 in synchrony with the structure and management of the landscape at the time [5]. The  
108 challenge across much of Europe is that so many changes associated with farming from the  
109 1970s-1990s reduced the resources and habitats for non-cropped species [6], inspiring in  
110 Europe the development of agri-environment schemes to try to conserve the best of the  
111 traditional landscapes and their associated biodiversity. Unfortunately biodiversity declines  
112 have continued despite these efforts, with important exceptions when there have been large  
113 inputs of enthusiasm, knowledge and resources. My concerns that agricultural landscapes  
114 would become cleaner but more sterile [1] are sadly being borne out in fact.

115

## 116 **Land sparing - land sharing**

117

118 The practices of my childhood farm would now be considered as extensive, and lend  
119 themselves for both biodiversity conservation and food production (land sharing). But recent  
120 decades have seen new innovations, increasing farmland productivity, but often in conflict  
121 with even the biodiversity that had previously flourished in agricultural landscapes. For  
122 example maintaining habitats used by insect pests does not typically complement a strategy  
123 of maximising short-term profits. It has been suggested that it may be better for biodiversity  
124 if farmland is managed to increase food production per unit area, enough to meet demands for  
125 products, so that excess land may be left for biodiversity (land sparing) [7]. To a natural  
126 scientist like myself, the desired balance depends on which taxa are being addressed, on the  
127 levels of food production under a land sharing or land sparing system, the spatial and  
128 ecological relationships between taxa, habitats and food production and on the efficiency of  
129 exchange between farmland and wild areas – whether or not ‘spared’ areas are actually made  
130 available for wildlife. It also depends on whether land sparing creates conflicts at the  
131 boundaries, for example with large predators and livestock [8], or whether it encourages  
132 management practices that are unsustainable over time.

133

134 But such assessments neglect the cultural dimension to conservation. For those who  
135 grew up with agricultural landscapes with ‘land-sharing’ and passive ‘land-sparing’, there is a  
136 cultural desire to conserve these systems and their biodiversity. It may be telling that the new  
137 narrative on large scale areas for biodiversity is not the passive ‘land sparing’ but the much  
138 more active concept of rewilding. Rewilding is the “large-scale restoration of ecosystems  
139 where nature can take care of itself”; it is “not geared to reach any human-defined endpoint”  
140 [9]. A quick search through the refereed literature shows that rewilding barely existed as a  
141 concept in the 20<sup>th</sup> Century, but in 2018 there were 76 publications and over 1100 citations of  
142 rewilding papers. Rewilding represents a rejection of the managed agricultural landscapes of  
143 my childhood; such a rejection can easily be seen as a cultural loss, even in agricultural areas  
144 that have been abandoned [10]. But it can also represent a rejection of the formal  
145 conservation manager’s view that biodiversity management should entail active efforts to  
146 meet certain conservation objectives [11]. Indeed, the rapid uptake of rewilding is part of a  
147 broader shift in conservation thinking that reflect individual’s ethical values, that vary with  
148 gender, age, educational background and other social factors [12]. I wonder if urbanisation  
149 has brought with it a detachment from the farmed landscapes of the past, and increased  
150 accessibility of wild nature experiences has brought closer engagement with the rewilding  
151 agenda.

152

153 It strikes me that the rewilding movement represents a way of creating new cultural  
154 landscapes in which people can link with nature. And so to be successful, rewilding areas  
155 must be accessible to people, and able to conserve biodiversity and habitats. Attention is now  
156 being paid to the complex, interacting factors that shape human-nature interactions [13],  
157 providing the evidence needed to plan areas that show different levels of wildness and  
158 remoteness, integrated urban wildlife arks through to large areas of remote wilderness.  
159 Participatory land use planning can help reconcile different visions of landscapes [14].  
160 However, such areas will not remove the threats to biodiversity; climate change will remain  
161 important, and I worry that some of the global drivers of insect declines might be more  
162 ubiquitous and difficult to manage than currently thought. But it neglected the social and  
163 cultural aspects of conservation, which could be included through participatory land use

164 planning [14]. Perhaps it is too much to expect biodiversity to thrive in typical contemporary,  
165 intensively farmed landscapes (Sutherland [15]).

166

## 167 **Where next?**

168

169 The world is changing, and as the demand for land increases, reconciling agriculture and  
170 conservation remains as vital as ever. To me, the land-sparing land-sharing debate opened up  
171 a valuable dialogue about priorities for conservation in a changing and increasingly crowded  
172 world. Cultural connections to biodiversity are important for public support of conservation,  
173 and should be fostered over the long term through the ongoing creation of new forms of  
174 contact between children (and their parents) and the natural world. These cultural  
175 connections, often rooted in childhood experiences, may need to evolve with, and draw upon,  
176 digital media. This could mean a scaled approach to rewilding, with small, accessible urban  
177 parks, zoos and gardens, all the way to larger and more remote areas, some of which perhaps  
178 should only be visited virtually after appropriate technology for tracking and visualisation has  
179 been installed. Expertise in public engagement and innovation will rank alongside expertise  
180 in conservation biology as being vital for effective conservation.

181

182 Whatever route we take, we need to defend and augment our connections with nature, and  
183 help shape a culture that benefits from nature, and recognises the need to conserve  
184 biodiversity. Doing this will help us in our question of ‘how’ to conserve biodiversity.  
185 Sounds challenging, but fun.

186

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190 wildlife and made my visits to wonderful places to see wonderful creatures so joyful. And a  
191 special mention for all those responsible for the release of Red Kites in Yorkshire, some of  
192 which I see most days.

193

194

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