

# Contents

Acknowledgements	5
<b>INTRODUCTION</b>	7
The bigger picture	7
Recent times	9
The fight back	11
Managing land for native wildlife	11
Why is biodiversity important?	12
Putting wildlife first	12
Different approaches	14
Does size matter?	16
A work in progress	17
What does the future hold?	18
<b>SETTING THE SCENE</b>	21
Humble beginnings	21
Pamber: a country parish	24
The cottage and garden	34
<b>ENVIRONMENTAL DECLINE AND FALL</b>	37
Overview	37
Basingstoke	39
The parish of Pamber	41
The cottage and garden	44
<b>PRACTICAL BIODIVERSITY GARDENING</b>	47
Basic principles	47
Soil	50
Grassland	53
Woodland	89
Freshwater	110
The cottage as a habitat	116
Managed retreat from conventional gardening	118
<b>THE NEW NATURALIST –</b>	
<b>A Biodiversity Gardener’s Wildlife Overview</b>	123
Garden wildlife classification	123
Flowering plant life histories, structure and tips for identification	126
Terrestrial Invertebrate classification and identification	135
Introducing Arthropods	135
<b>THE NEW NATURALIST – A Closer Look at Garden Wildlife</b>	139
Butterflies	139
Moths	155
Bees, wasps and allied insects	174
Beetles	186
True bugs and allies	198

True flies	203
Orthoptera	208
Terrestrial insect also-rans	210
Spiders and allies	212
Invertebrates of the underworld	219
Pond life	226
Amphibians and reptiles	241
Birds	247
Mammals	262
Pets and domesticated animals	277
Plants: a botanical overview	282
Fungi	288
<b>MONITORING AND RECORDING WILDLIFE –</b>	
<b>Making the Most of Your Garden, Both for Biodiversity and for You</b>	299
Nets	299
Pond-dipping	299
Binoculars	300
Photography	300
Foes become friends	306
Botanical survey and study	308
Fieldcraft	308
Keeping and submitting records	308
Freshwater pollution	311
<b>A CALL TO ACTION</b>	315
Troubling developments	315
Is resistance futile?	316
Escape to what was the country	316
Plan of action	318
Challenging planning	320
Protected and notable species	325
Statutory nature conservation bodies	326
The moral of the story	333
<b>I AM NOT ALONE</b>	335
Manor Farm <i>by Adam Rattray and Jenna Burlingham</i>	335
The Hughes Family Wilding Project <i>by Karl Hughes and Nicola Hughes</i>	337
An oak wood on the edge of Dartmoor <i>by Mic Cady</i>	339
<b>ASK NOT WHAT NATURE CAN DO FOR YOU, ASK WHAT YOU CAN DO FOR NATURE</b>	341
Historical perspective	341
Synergy	344
What's to be done?	346
References	347
List of species	350



Pheasant's-eye, a former arable 'weed' but nowadays to all intents a thing of the past on farmland around Basingstoke.

Today of course the birds of traditional farmland and the arable weeds are mostly gone; and the skies are empty of birdsong, their former haunts either destroyed by urbanisation or rendered worthless to their kind by modern farming practices. Nowadays, much of the farmland that immediately surrounded the pre-Second World War market town of Basingstoke has long-since



These days it is a cause for celebration to hear a singing Skylark in the borough of Basingstoke.

gone, destroyed by urban expansion. That which remains in the borough has lost most of the value it once had for wildlife: despite being green to the eye much of it is little better than concrete, bricks and mortar in terms of the biodiversity it supports. Consequently, I rejoice on the rare occasions I hear a singing Skylark or grasshopper in the borough, or come across a host of summer butterflies.



An indication of the urbanisation and expansion of Basingstoke over the last couple of centuries is provided by population figures, which are: 1801 – 2,589 (the first census); 1851 – 4,263; 1861 – 4,654; 1945 – 13,000; 1959 – 30,130; 2019 – in excess of 113,776.

# The parish of Pamber

In sociological terms, over the last two centuries the parish of Pamber has transformed itself from a feudal peasant-and-squire rural economy in which most of the population had close ties to the land into one largely comprising, amongst the working population, an aspirational tradesperson majority and a professional minority. In the main, all are well-off by comparison with previous generations. The former group are largely reliant on the economic pillars of house-building, and day-to-day property upkeep and maintenance. The parish has much in common with contiguous Tadley, and the social mix contrasts with the predominantly and defiantly middle-class neighbouring parishes of Silchester and Monk Sherborne. These have dodged the bullet of urbanisation and industrialisation probably because, collectively, their residents can afford to value the aesthetics of their surroundings more than the money they might make from developing the land. For now, at least ...

Predictably, the parish's human population has grown in line with the rest of the world. The 1841 Census for Pamber reports a population of 484 (263 male and 221 female); according to a more recent Census, Basingstoke and Deane Borough Council revealed that 2,631 souls were resident in 2011. The relationship between Pamber's human population and the land has also changed over time. Scrutinise the 1838 Tithe Map (HRO reference 21M65/F7/185/2) and Tithe Apportionment (HRO reference 21M65/F7/185/1) for the Parish and almost every scrap of land that was not wooded was exploited directly or indirectly in the production of food. Although much of this production benefited landowners, those who actually worked the land would have been reliant upon it for sustenance.

In an era that predated supermarkets and home deliveries, at the time of the 1841 census it is easy to imagine that smallholders, tenants and agricultural labourers had no option but to grow or raise what they

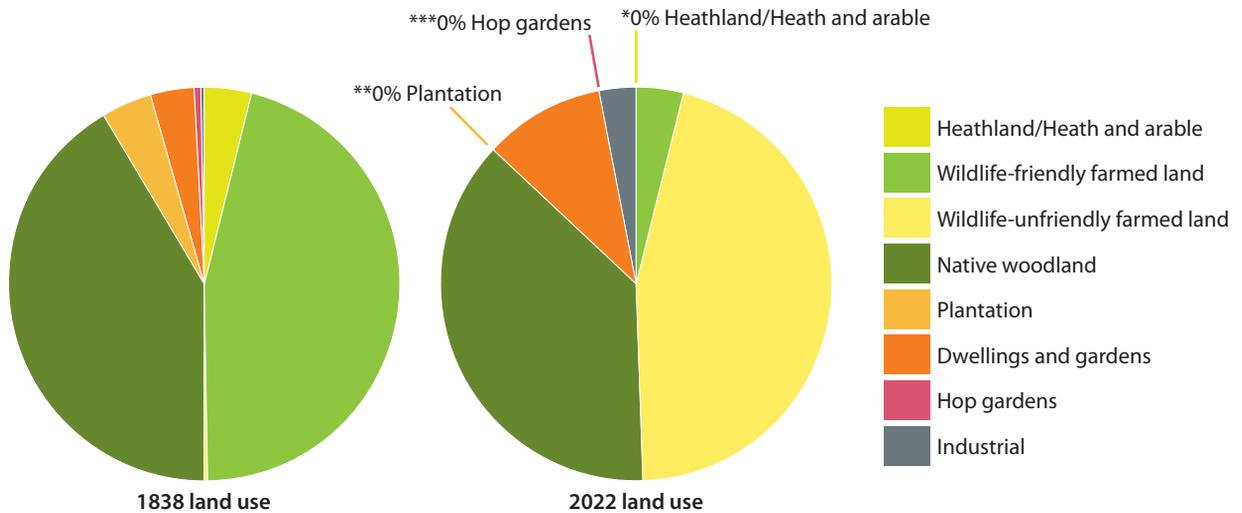


Photographed in July, three months after it had been sprayed with herbicides, this field in Pamber remained essentially devoid of plant life, indeed almost all life save for the occasional withering annual, destined to die. Neither producing food to feed the nation nor benefiting wildlife, it was in a state of intentional sterile limbo.

ate in order to survive, barter or buy what they could not produce, and if the opportunity arose glean, poach or steal. Today, offhand I can only think of a couple of Pamber residents who are largely dependent on parish land for the food they eat. And given the way that national food supply chains work, opportunities to buy and consume anything wholly parish-produced are extremely limited. Furthermore, the amount of land in Pamber devoted to food production in its varied forms has changed over the last two centuries. In 1838 (using Tithe records) around 800 acres were used in the direct or indirect production of food: roughly 680 acres of arable, gardens and allotments; and 320 acres used more indirectly, for example hop fields used in beer production, and pasture and hay for animals. In 2022 (using Google Maps area counter and field observations) around 615 acres were used in the direct or indirect production of food: 445 acres of arable land; 60 acres for hay and winter grazing; and 110 acres of mixed farming, including dairy. Excluded from the figures was land that had been sprayed into sterile limbo and fields devoted to supporting recreational ‘hobby’ horses.

For most twenty-first-century Pamber residents, the countryside, if accessed at all, is used as a human and canine recreational playground, an outdoor gym or for the pursuit of ‘getting in touch with nature’ well-being. The disappearance of an existential hands-on dependency on the land has shaped attitudes towards, and an ignorance of, both the land and its wildlife. Scratch the surface and apparent concerns about the local environment usually turn out to be superficial at best and more to do with the vista than any informed and meaningful understanding of conservation.

Financial wealth may reside in the adjacent parishes of Silchester and Monk Sherborne but the irony is that in biodiversity terms, poor old Pamber is still infinitely richer than its neighbours. Sadly, however, its biological assets are fast disappearing thanks in part to those of its landowners and residents who are indifferent to the environmental tides of change that sweep across the land. Their attitudes are emboldened, aided and abetted by the planning process. By my reckoning, the last five years saw applications to build around 80 houses (typically 4- or 5-bedroom homes) in open countryside in rural parts



The parish of Pamber covers roughly 2,100 acres and these charts show the major land uses as proportions of the total in 1838 and 2022. The figures for the former were derived using the 1838 Tithe Map and Tithe Apportionment for the parish of Pamber (see p. 2 for both details of both documents). Modern land use areas were estimated using Google maps and field observations. The assumption has been made that, by dint of history, in the absence of intensive agricultural methods most land farmed in 1838 would have been as friendly towards wildlife as farmland can ever be. Defining farmed land as being wildlife-unfriendly is subjective and in a contemporary context that would include seeding with vigorous grass cultivars, spraying with agrochemicals and year-round land-use. Between the two dates, the following changes occurred including those relating to land uses too small in terms of acreage to register on the charts. \*All 83 acres of heath/heath and arable were lost to housing development. \*\*All 85 acres of plantation were replaced by arable. \*\*\*All 9 acres of Hop gardens were replaced by arable or pasture. Roughly 870 acres of farmed land switched from wildlife-friendly to wildlife-unfriendly land use. Dwellings and gardens increased from roughly 80 acres to more than 190 acres and Industrial land use rose from 3 acres to 57 acres.



Question: When is green not a good environmental colour? Answer – when it is an intensively farmed arable field, or seeded and sprayed ‘grassland’ depleted of its natural biodiversity. The one saving grace of industrial farmland is that it is still *land* and could in theory be restored to have some semblance of value to wildlife. Once urbanised and covered by bricks, mortar and tarmac it is lost forever.

of the parish of Pamber, with additional proposals as replacements for agricultural buildings. Prior to that, I can only think of a handful of new-build houses being permitted in open countryside during the previous two decades, often new houses built to replace older dwellings. The planning floodgates appear to be open.

Away from land that has statutory protection, nominal or otherwise, Pamber’s natural environment is under threat like everywhere else. Apart from a few enlightened or selfless souls whose motives are not financial, most landowners in the parish use the countryside for profit or pleasure and retain ownership or purchase land as an investment, with short-term exploitation or longer-term gain in mind. At one end of the spectrum is a medium- to long-term commercial approach (farming and equestrian activities); at the other extreme is get-rich-quick exploitation, typically in the form of creeping industrialisation, the lure of developing land for housing or that latest agricultural cash crop, solar farms. Being of no commercial value, biodiversity is only grudgingly included in the planning equation; it is simply an annoyance to be dealt with via

the planning process, using the services of compliant ecologists.

In the parish of Pamber, low-impact land use was what shaped the landscape and created the mosaic of habitats that underpin the parish’s once-rich but now-dwindling biodiversity. What might loosely be termed ‘farming’ helped create the parish’s wildlife diversity, so there is an irony to the fact that ‘farming’ (or more precisely the use of open countryside) is the underlying cause of its destruction. Farming refers to itself as an industry and indeed in recent decades the approach to agricultural land use has been just that – industrial. Seemingly non-stop use of the land and application of everything from synthetic chemicals to human sewage sludge have all taken their toll on native wildlife. As a consequence, nowadays there is more biodiversity and wildlife abundance per square metre in my garden than on intensively farmed land in the parish of any sort – by an order of magnitude. The dispiriting trend continues, and as aspirational economic growth is pursued the parish is entering a new phase in its rural history: the transition of countryside into a more overtly urban and industrialised landscape.

Pamber is still nominally a rural parish populated in part by twenty-first-century 'country folk'. However, despite its apparently pastoral setting, many of its inhabitants have a rather sketchy and selective appreciation of the wildlife on their doorsteps. A consequence of a lack of natural history awareness is that for many residents the environment around

becomes just a 'view' or somewhere to walk and empty their dogs; and most live in blissful ignorance of the impact they have, directly or indirectly, on biodiversity around them and its decline. And there are a few for whom environmental contempt would seem to be a fair representation of their attitude towards the natural world.

## The cottage and garden

Within walking distance of my house, even today I can still find every widespread British reptile and amphibian species and almost all the butterfly species you could reasonably expect in lowland England on neutral and acid soils, not to mention birdlife ranging from Dartford Warbler to Woodcock. A Wild Service-tree grows in the hedge bordering my garden with more in nearby hedgerows. In spring, I hear the occasional Skylark singing overhead, and each year I receive visits from wandering Purple Emperors and see the occasional Kingfisher patrolling my stream.

Sounds idyllic, doesn't it? But the reality of living in this part of north Hampshire is slightly different. Until a decade or so ago, the ecological blight affecting the countryside around me seemed small scale, piecemeal

and something that in the grand scheme of things was having only marginal impact. With hindsight I was being naïve and deluding myself that all was well. The reality of the situation dawned on me with the loss of a nearby hay meadow. In previous years I had been the privileged beneficiary of clouds of Meadow Brown butterflies, plus all manner of other refugee species including Harvest Mice, that descended on my garden from this particular meadow at hay-cutting time. Now that is all gone.

That nearby habitat destruction was the trigger for me to stop mowing a significant part of my lawn in an attempt to create my own meadow in miniature. At the time my expectations were low given that I planned to do nothing other than cut the grass once a year; in some ways my meadow started life as little more than a memorial to the fallen wildlife of the parish. However, the evolution of this grassland habitat has been as inspirational as it has been surprising and provided the impetus for me to embark on other biodiversity gardening projects.

As a footnote, the fate of Pamber's former hay meadows continues to evolve now that a much more reliably lucrative cash crop has appeared on the farming landscape: solar panels. Solar parks are without doubt eyesores, and their appearance in the neighbourhood has eroded further the illusion of living in the countryside. However, their presence presents the environmentalist in me with a dilemma. How can I object to the production of so-called green energy and not be accused of nimbyism?

Elsewhere, most objections to solar parks are argued on the basis that, when sited on farmland, they are destroying the British countryside. However, in intensively farmed locations where solar parks are proposed or have been built, the case may be more



This Woodlark was photographed on nearby Silchester Common, within walking distance of my cottage. On three occasions in the last decade, the species has graced my garden, on two occasions singing from the top of a Pedunculate Oak tree.

nuanced. The chances are that what matters to me about the countryside – its native biodiversity – will already have been degraded by modern farming practices and what remains will be an illusion of good health. Fields may look green but they are virtually sterile in terms of native biodiversity. Consequently, looking at the issue dispassionately, anything that replaces the chemical and physical abuse to which intensively farmed land has been subjected could in theory benefit some forms of native wildlife. And who knows, any decades-long solar park lease might just give the land and its native biodiversity breathing space to recover. Always assuming this part of the planet Earth is still habitable for future generations by that time.

That's the theory. The flaws in the plan are, of course, in the detail. There are instances near me when those responsible for managing the land on which solar parks sit spray the vegetation with herbicides, thereby rendering meaningless any aspirational biodiversity merits peddled as part of the planning process associated with their installation. A specific case in point was reported in the *Basingstoke & North Hampshire Gazette* on 5 May 2022, under the frontpage headline 'Anger

as energy firm kills flowers'. The solar farm in question is owned by the Octopus Energy Group, and is sited on 18 acres of land at Hill End Farm, a mile or so to the south of me. The publicly voiced 'anger' was that of the landowner James Bromhead, frustrated at his inability to ensure wildlife-friendly land management by reasoned argument and gentle persuasion. Unless by prior arrangement, once an agreement for a solar park has been signed the landowner relinquishes control over management of the land for the lifetime of the lease.

As a further twist, despite their overtly industrial appearance, solar parks are classed as agricultural in terms of land use and the planning process. There is a requirement that the land be returned to its previous agricultural state at the end of the project. A return to chemically abused, intensively farmed land would destroy at a stroke any biodiversity net gain and environmental enhancement achieved during the intervening years and render the aspirational greenwash start-up credentials of the project meaningless. For anything meaningful to come out of solar parks in the long term, these environmental flaws need to be acknowledged and addressed.



Sprayed with herbicide at the start of the floral season, the land beneath these solar panels provides few benefits for native biodiversity.



The Common Spotted-orchid occurs near where I live in good numbers in some fields but is completely absent from other apparently suitable and botanically rich sites nearby. There is obviously something not quite suitable about the locations from which it is absent – it might be previous land use, drainage or a subtle difference in the soil’s fungal component on which orchids are dependent.

# Practical Biodiversity Gardening

## Basic principles

What I have attempted to do in my garden, and the approach I invite others to consider adopting, is to create or encourage a microcosm of wildlife-rich habitats that occur in the local area. A lifetime of interest in, and spent searching for, British wildlife has taught me that we live in a landscape that comprises a patchwork of subtly different habitats-within-habitats, each component part having its own unique combination of plants and animals. This variety and lack of uniformity is what has driven the evolution of the rich diversity of British wildlife over the millennia.

The factors influencing the diversity of species, and their abundance and distribution across the British Isles, are varied and include underlying geology and soil type, topography, climate and historical land use. Taking plants as indicators, it can be puzzling why a given species is present in one location but absent from another apparently suitable site nearby. Sometimes the puzzle is too complex to fathom. Better to accept that complexity and variety exist even at the local level, and factor this into your expectations when managing your biodiversity plot and assessing the success or otherwise of your endeavours.

A consequence of this biological complexity for the prospective biodiversity gardener is that the ambitions for one garden will never be quite the same as those for another. There is no magic formula, just an approach; an underlying understanding of your local natural history is both crucial and empowering as a basic tenet. In terms of knowing what you want to achieve, a starting point is to locate wildlife-rich habitats in the vicinity and identify and record the species of locally appropriate plants and animals they host. With the notion of complexity and variety in mind, it is always a good idea to visit a number of sites to get a better

overall ‘feel’ for the environment around you. Although it may sound superficial, another essential ingredient is to appreciate *visually* what decent habitats look like throughout the year. You may need to abandon some of your preconceptions and you will certainly need to raise your awareness of seasonal ecological complexity.

### DO YOUR HOMEWORK

It can also be invaluable to understand the role that historical land management will have played in the evolution of biodiversity in your local area. No one location will be the same as another, and it can be a useful exercise to do a spot of historical research. A considerable amount of information is available online but a more hands-on approach might be to access your county archives. If Hampshire, where I live, is anything to go by, then tucked away somewhere in the vaults you will find local Enclosure Awards and Maps dating back hundreds of years, equally informative estate accounts, and Tithe Awards, Apportionments and Maps. In the case of Hampshire, the latter documents can also be purchased online from their Record Office for each parish, and provide field-by-field detail about land use. The level of detail extends to the use of fields as arable, pasture, or for growing Hops; whether plots of land were homesteads and gardens or orchards; and insights into the nature of wooded land. Enclosure maps give an indication of the location of extant and lost hedgerow field boundaries.

The phrase ‘abandon preconceptions’ is a fitting slogan for prospective biodiversity gardeners to keep in mind. Another bit of advice is to acquire a healthy dose of scepticism when it comes to what you are told or read about native component species and the ways



Pamber's 1838 Tithe Map and Tithe Apportionment contain incredibly detailed information. Each field or woodland plot on the map is given a number that corresponds to its appearance in the ledger, organised by owner alongside a precise measurement of the land area, its agricultural use, and the tithe due. Areas were specified in the ledger as acres (A), roods (R) and perches (P). An acre is a unit of land area measured as one furlong (660 feet) by one chain (66 feet). There are 4 roods in an acre, and 40 perches in a rood. A sample page from the Tithe Apportionment (opposite) and an enlargement of the relevant part of the Tithe Map (above) provides an idea of the detail that the documents contain.

No. 4.—LONDON: Sold (By Authority) by ROUTLEDGE, 11, Blyde's Court, Leicester Square.

LANDOWNERS.	OCCUPIERS.	Numbers referring to the Plan.	NAME AND DESCRIPTION of LANDS AND PREMISES.	STATE of CULTIVATION.	QUANTITIES in STATUTE MEASURE.			Amount of Rent-Charge apportioned upon the several Lands, and Payable to the Rector.			REMARKS.	
					a.	r.	p.	l.	s.	d.		
<i>Beach, William Ricks Esq<sup>r</sup>.</i>	<i>Himself</i>	15	<i>Common Piece</i>	<i>Heath</i>	27	3	39					
		49	<i>Plotment in Black Lane</i>	<i>Arable</i>	12	1	22					
		59	<i>Plotment in Binstley Green</i>	<i>Arable</i>	14	1	3					
					54	2	24	5	2			
				371	<i>Upper Hazells</i>	<i>Pasture</i>	10	2	16			
				372	<i>Muttards Meadow</i>	<i>Meadow</i>	5	3	26			
				374	<i>Pinns Grove Coppice</i>	<i>Wood</i>	0	3	36			
				375	<i>Pinns Grove Puddle</i>	<i>Wood</i>	2	1	4			
				376	<i>Little Chalgrove</i>	<i>Pasture</i>	2	3	17			
				377	<i>Great D<sup>o</sup></i>	<i>Arable</i>	14	2	16			
				379	<i>Part of Hog Park</i>	<i>Wood</i>	3	0	22			
				380	<i>Orchard</i>	<i>Pasture</i>	2	0	12			
				381		<i>Water</i>			2	20		
				382	<i>Yard and Riattyard</i>			3	25			
				383	<i>Pasture and Kitchens</i>	<i>Wood</i>		2	5			
				384	<i>House and part of garden</i>				36			
				385		<i>Wood &amp; Water</i>		3	24			
				386		<i>Meadow</i>			27			
				387	<i>Part of Old Orchard</i>	<i>Wood</i>		1	1			
				388	<i>Part of Little Hop Garden</i>	<i>Twize</i>		1	24			
				389	<i>Part of the Pits</i>	<i>Wood</i>		1	16			
				390	<i>Part of Black Close</i>	<i>Pasture</i>		2				
				391	<i>West Heath Lane &amp; Waste</i>		1	1	20			
				392	<i>Part of Yew Tree Piece</i>	<i>Meadow</i>	3	0	16			
				393	<i>West Heath</i>	<i>Arable</i>	10	3	35			
				394	<i>Graffage Piece</i>	<i>Arable</i>	1	3	30			
				395	<i>Chamberlains Close</i>	<i>Meadow</i>	11	1	10			
				396	<i>Chamberlains Meadow</i>	<i>Meadow</i>	14	3	22			
				397	<i>Corner Piece</i>	<i>Wood</i>	1	2	25			
				398	<i>Drove Puddle</i>	<i>Meadow</i>	3	1	12			
				399	<i>Butcher's Close</i>	<i>Pasture</i>	10	2	36			
				400	<i>Four Acres</i>	<i>Pasture</i>	3	3	16			
				401	<i>Lower Hazells</i>	<i>Pasture</i>	10	1	10			
				402	<i>Hazells Ness</i>	<i>Wood</i>		2	36			
				403	<i>Little Clapper Hill</i>	<i>Pasture</i>	5	1	28			
				404	<i>Wyford Lane</i>		5	1	22			
				405	<i>Gr. Clapper Hill</i>	<i>Pasture</i>	9	1	36			
				406	<i>Clapper Hill Coppice</i>	<i>Wood</i>	11	2	10			
							161	2	11	24	17	

in which you might manage your plot for wildlife. Keep an open mind when it comes to advice from single-interest conservation sources who may, for example, focus on what is best for their favoured animal group at the expense of others. Don't assume that wildlife and conservation bodies necessarily know best when it comes to the management of your land, in particular regarding grassland management. In addition, where natural history is concerned it is always dangerous to make generalisations and to decide on your habitat priorities and component species based on extrapolating from other geographically distant locations. And lastly, it seldom hurts to ignore advice that comes from those who manage land commercially, pundits with a conventional gardening mindset, and those who stand to benefit

financially from you accepting what they have to say.

So, the moral of the story is decide for yourself, and for that you need to be informed at the local level and have honed your identification skills and broadened your understanding of the complexity and inter-relatedness of all aspects of British wildlife. As one last tip, it cannot hurt to cancel subscriptions to gardening magazines in favour of signing up to the likes of *British Wildlife* magazine; to consign gardening books – specifically ones about garden makeovers – to dark cupboards in favour of field guides and books about natural history and ecology; and shun garden centres as purveyors of all things horticulturally generic and mass-produced in favour of specialist nurseries and seed catalogues of responsibly produced native species.

Although driven to biodiversity gardening as a response to environmental degradation going on around me, I was lucky in one sense. My tiny parcel of land still retained latent biodiversity and for the most part all I did was unlock its potential as I retreated from conventional gardening into a world of biodiversity and habitat enhancement. Not everyone is so fortunate, and some plots of land will have had the disadvantage of having been farmed industrially in a previous life.

However, no plot of land is beyond environmental redemption. Based on local evidence and observation, the speed of recovery will depend on the degree of agricultural chemical and physical abuse to which the land had been subjected prior to it becoming a garden – that includes the application of herbicides, fungicides, pesticides, fertilisers, and deep ploughing. Gardens that came into existence prior to the 1940s are unlikely to have been exposed to industrial agrochemicals. Those built on more recently farmed land are likely to need more time to recover.

## TIPS FOR CREATION

Conventional gardening wisdom for new occupants of a plot is to do nothing to the garden for a year and see what appears: unless or until you know what in

horticultural terms you've got, you won't know how to plan for the future without undoing the past. The principle of environmental benign neglect can also be an informative approach for budding biodiversity gardeners at the outset of their personal journeys. For example, when I began to encourage meadow habitat in my garden, I just left the grass uncut to see what appeared. The same light-touch, hands-off approach also serves the biodiversity gardener well when it comes to overall guardianship of the land. Generally speaking, as regards managing land for wildlife, my experience is that less is more and inaction will often provide a better outcome than over-action. Test the water when it comes to changing your management regime and do not undertake wholesale changes unless you are absolutely certain you are not doing more harm than good.

By considering my local area and the limitations of my plot of land, elements of the following wildlife-rich habitats are ones I chose to represent in my garden: soil; grassland; ponds; hedgerows; and woodland in a general sense. With the proviso that no one place is exactly the same as another, those habitats might be starting points for other prospective biodiversity gardeners. However, if your garden sits on chalk or on land that might have been heathland in a past life, then your ambitions would be different.

# Soil

It may seem odd to begin a section on 'practical biodiversity gardening' with the subject of soil, or include it at all. However, this part of the equation is crucial to the success of any project and needs to be treated with the same respect as any other component of a healthy biodiversity garden. It is the soil that unifies the whole plot, and indeed healthy natural habitats everywhere. Skin is the largest organ of the human body and the one most often overlooked or taken for granted; it might help to think of soil as its ecological equivalent. The treatment of soil as nothing more than a growing medium for agriculture and cultivation, rather than as a habitat, is a contributory factor in the decline of native biodiversity.

Sooner or later, anyone with a plot of land, time to spare and a concern for native biodiversity will be faced with a dilemma. One approach to minimising your

environmental impact and reducing carbon consumption is to grow your own food. If native biodiversity is at the forefront of your ambitions, then managing your space in terms of natural habitats instead of agricultural output will be the goal. There is a hybrid approach, of course, one that I adopt. I supplement my diet with a few vegetables grown without chemical input, and allocate as much as possible of the garden space – including soil – for the benefit of native wildlife.

## WHAT IS SOIL?

In the context of biodiversity gardening and the history of land use it is perhaps helpful to go back to basics. Soil is the top layer of ground, usually several inches (occasionally feet) deep, that sits on top of a layer called subsoil, which in turn resides on the underlying

bedrock. Subsoil is a relatively inert layer in biological terms, composed mainly of leached material – minerals, clay and humus fragments – that have filtered down from above, with a component of fragmented bedrock at its lowest level. It lacks most of the essential ingredients for plant growth. Soil (sometimes referred to as topsoil) is the interesting layer from the perspective of the biodiversity gardener and the one where all the biological action takes place.

## PLANT BIOLOGY

Following on from this, a spot of plant biology may help the prospective biodiversity gardener understand the needs of plants. It will also provide insight into what has driven humans through the ages to want to alter the soil for their own benefit.

There are four main building blocks when it comes to the growth of plants, and indeed their very existence: these are the elements carbon (C), hydrogen (H), oxygen (O) and nitrogen (N). Plants obtain carbon and oxygen by absorbing carbon dioxide (CO<sub>2</sub>) from the atmosphere via their leaves, and they obtain hydrogen from water (H<sub>2</sub>O) via their roots. These are the ingredients needed for photosynthesis, the process by which sugars (the building blocks of carbohydrates) are created using sunlight energy, captured by the green pigment chlorophyll, to fuel the reaction. Oxygen is liberated as a by-product of this chemical reaction. Plants also need to respire and during the daytime the requirement for oxygen is satisfied by photosynthesis. After dark, oxygen is absorbed from the atmosphere through the leaves. In addition, uptake also occurs via the roots.

Despite its comprising 78 percent of our atmosphere, most of a plant's nitrogen requirements are obtained not from the air but by root absorption of dissolved salts called nitrates. In natural circumstances nitrates result from the decomposition of organic matter, be that plant remains or animal remains and waste, the process being undertaken by soil bacteria. This nitrogen-fixing reaction is vital to all life on earth, nitrogen being a crucial component of amino acids and proteins, without which life cannot function. In nature, nitrates are relatively hard to come by and some plants – members of the pea family for example – have harnessed nitrogen-fixing bacterial power by hosting colonies that live in root nodules.

In addition to these building blocks, a number of other elements are essential for plant growth. The main ones are

calcium (Ca), iron (Fe), magnesium (Mg), phosphorus (P), potassium (K) and sulphur (S). As examples of their importance, magnesium is a constituent of chlorophyll, without which photosynthesis cannot function and plants cannot live; phosphorus is a key component of chemicals that control and regulate cellular-level energy storage, release and transfer; its significance is obvious. There are other trace elements whose presence, as the name suggests, is only necessary in minute amounts, some of which are not necessarily a requirement in all plant groups. These include manganese, boron, zinc, copper and molybdenum.

## SOIL STABILITY

Left to its own devices, soil is a complex web of life, one that builds up year on year and depends on stability to function properly. It is the layer from which plant roots gain most of their nutrition and water. Soil is a mix of mineral components (eroded rocks, in essence) and organic matter, sometimes referred to as humus; the latter comprises the organic remains of plants and animals. There is huge variation, however, in the precise make-up of any given patch of soil, influenced by a range of factors including soil acidity or alkalinity (pH), the nature of the mineral component, geological past, organic input and of course any history of land use. Binding the organic and inorganic elements of soil together, literally and metaphorically, is a framework of organisms that call the soil home. At the microscopic level there are bacteria and thread-like webs of fungal mycelium that among their decomposing and recycling virtues include making nitrogen available to plants. Earthworms, nematodes and a myriad of other invertebrates circulate organic matter through the soil, help aerate it, and affect water retention and drainage. This latter function is vital for all forms of life in the soil, including plants, which need air spaces, albeit minute ones, in order to take up oxygen and 'breathe'.

That is the stable side of the story of the soil. Plough soil and you not only disturb or destroy the web of life that comprises the soil layer, but you also mix what remains with subsoil, the layer that has little value in terms of plant growth. Why do it then? The cultivation of soil provides an opportunity to favour individual species: seeds of a specific plant can be sown which produce a crop to feed people or livestock. It is a practice that post-glacial colonisers of Britain probably

brought with them and it is steeped in history. Without intervention, consequences are impoverishment of the soil and the need to fertilise the land if you want to continue the process of producing viable harvests. Long before the concepts of elements and the Periodic Table became known, those working the land were aware that the addition of organic matter – be it rotting vegetation, manure or other animal matter such as bone meal – often had a beneficial effect on plant growth. The realisation that the beneficial agents – nutrients – had to be dissolved in water for plant uptake to be achieved came later. It was followed by an appreciation that soil pH affected the solubility of some ‘salts’ and hence their availability to plants.

Put at its simplest, a good soil for native biodiversity is stable, undisturbed soil. Disturbance, be it digging at the small-scale end of the spectrum or ploughing at the other end, at best interferes with the fragile web of life the soil harbours and at worst has the potential to destroy it. This web of life and the soil structure that stability helps create and support is more than just a curiosity. It is essential for the cycle of life and death, with decomposition and the recycling of nutrients at its core. Soil stability also plays a key role in that other buzzword phrase of our time, carbon sequestration. Dieter Helm’s *Green and Prosperous Land* is a must-read for anyone wanting to know more about the subject.

However, if your garden or plot of land has been disturbed in the past, do not despair. I have no doubt that over the centuries mine has served as a garden for the cottage’s inhabitants, and every scrap of soil will have been disturbed, dug or even ploughed at some time. And garden manure – animal and probably human in origin – and compost will have been added to the mix. Despite this (and maybe in part because of this), when I embarked on the project it turned out that my garden still harboured native biodiversity in abundance, in part dormant and just waiting to be unlocked by a change in management. Two details may have had a bearing on its pace of recovery: ploughing, if that occurred in times past, is likely to have been far shallower than mechanisation permits today, hence soil and subsoil mix is likely to have been less drastic; and modern era agrochemicals have never been used as far as I am aware, and so the seed bank and soil fauna are less affected.

As an aside, in earlier agricultural times, ploughing powered by horse or ox was rarely deeper than six inches. Seeds buried deeper than that would have survived for decades until brought to the surface inadvertently; some species only germinate on exposure to light. The disadvantage of this method to the farmer was that in some soils it created a hardpan leading potentially to water-logged ground. This was eventually solved by the invention of the semi-digger plough pulled by a tractor or traction engine, which broke the pan and allowed deeper cultivation. The greater depth of disturbance had an adverse effect on the survival of the soil’s seed bank.

Commercial farming is another matter. The dawn of manufactured fertilisers began in earnest with the Industrial Revolution in the early nineteenth century, underpinned by advances in our understanding of chemistry, and plant composition and requirements. This led inevitably to the dominance of, and farming’s reliance on, manufactured chemicals, including fertilisers. As an example, the application of ammonium nitrate provides the crop with an artificial source of nitrogen. A consequence of disrupted soil structure is enhanced run-off into waterways, bringing with it elevated levels of nitrogen, along with phosphorus. This leads to a process called ‘eutrophication’ that results in excessive growth of algae and plants inappropriate to the water body in question – that is, pollution by another name – and phosphorus is especially implicated as a significant culprit.

## SOIL WATER RETENTION

A stable soil structure serves another function, the significance of which is increasingly recognised. Grassland with a long-established and healthy layer of soil (as opposed to a disturbed soil/subsoil mix) and a blanket of vegetation is likely to retain water to a greater degree than ploughed farmland. From an environmental perspective the benefit is a soil that acts like a sponge during periods of heavy rainfall, slowly releasing water over time, rather than as a waterboard that speeds up the process of surface run-off. The implications for flooding are obvious. As a responsible landowner, the biodiversity gardener should consider the consequence of their actions on the wider environment and perhaps factor the soil’s water retention into their personalised conservation equation.

# Grassland

In the context of southern England at least, grassland is a man-made habitat that requires regular intervention for it to remain in that state and for the land not to transition to scrub and eventually woodland. Historically, grassland biodiversity was an unintended consequence of a farming regime that, near where I live, would have involved cutting a hay crop and subsequent winter grazing of the sward by livestock. In more recent times – particularly in the last half century – the industrialisation of grassland management has caused a severe decline in the very biodiversity that the original farming practices inadvertently encouraged.

## NO ROOM FOR IMPROVEMENT

To an untutored eye, one bit of grassland looks superficially much like another, but in terms of biodiversity and its significance for native wildlife this is an illusion. Perhaps counter-intuitively as far as the layperson is concerned, ecologists refer to good-quality grassland that is rich in wildlife as ‘unimproved’ where it has not been ploughed, artificially seeded or treated with agricultural chemicals. I will return to the ploughing side of things later, because in certain circumstances historical ploughing may not necessarily be as damaging as it might first appear.

Unimproved grasslands rich in native biodiversity are a rare commodity these days in my part of the world. Most of what we see today in southern England is so-called ‘improved’ grassland, which is unfriendly to wildlife, having been seeded by farmers with vigorous grass cultivars and treated with agrochemicals to promote selective growth and kill any plants that might compete; predictably the knock-on effect is significantly depleted biodiversity across the spectrum. Near where I live, this sort of grassland typically hosts just a handful of flowering plant species. In the main these are either aliens, or the born-survivor ‘weeds’ of agricultural land. Invertebrate life is greatly impoverished as well. The scale of the loss of unimproved grassland is as staggering as it is depressing. As far back as 1987, a review by R. M. Fuller alerted the conservation world to the fact that 97 percent of wildlife-rich unimproved grassland in England and Wales had been lost between 1930 and 1984; see Further Reading section for details. Things

have only got worse since that time, if where I live is anything to go by.

Before embarking on a meadow restoration project, it is a good idea to get an idea of what a really good unimproved meadow looks like, both in terms of overall appearance and species composition – and not just its plants but other forms of wildlife too. Bear in mind that no one meadow will be quite like another. Even in your local area, its floral (and hence biological) composition is influenced by a range of factors such as soil type and pH, drainage and the regime of historical land use. Therefore, try to get an idea of what several good unimproved meadows in your neighbourhood look like during



Yorkshire-fog growing in unimproved and hence botanically complex grassland.



In my meadow, floral interest begins in April with the appearance, from left to right, of Field Wood-rush (also known as Good Friday Grass), Sweet Vernal-grass and Glaucous Sedge.

the summer months. Sadly, in most parts of lowland Britain, it will be a challenge to find even one nearby. Nevertheless, that is your task. One aspect of grassland management where you might want to keep an open mind is the cutting regime – both timing and technique. That even applies to locations that are nominally managed for wildlife, for reasons I will come to later.

Good quality meadows will not have appeared overnight, but will have acquired their species diversity over time, in some instances over centuries. This knowledge tells us that it is unrealistic to expect to be able to simply plant some flowers and create a mature meadow. A meadow is a habitat, and so much more than its floral component species. You might be able to buy some of the seeds, but you cannot purchase the myriad other species that constitute the web of life of a mature meadow. All you can do is prepare the ground and give nature the time it needs to complete the task of creating a habitat.

Study good meadows close up and you will discover that they are seldom uniform in terms of

floral composition. Even within a single field or field complex, subtle variations in soil structure and topography can, for example, result in underlying pockets of damp ground, with adjacent drier areas. A good example of this range can be found, not too far from my cottage, at Ashford Hill Meadows National Nature Reserve. Here, varied topography and historical land use means that at one extreme there are hollows wet enough to support Water-violet; elsewhere there is inundated grassland with Marsh Stitchwort, Ragged-robin and Southern Marsh-orchid; and there are dry slopes with anthills adorned by Dyer's Greenweed and Mouse-ear Hawkweed, that's when the grazing regime is managed correctly. All of this is set against an expansive backdrop of commercially cut hay meadows adorned with Bulbous Buttercup and Yellow-rattle. This mosaic of habitats-within-a-habitat jostle side by side.

Even within my tiny garden meadow there is variety. The garden slopes south and at the meadow's lowest point, closest to the stream that defines the boundary,

the ground is damp. This is where species such as Cuckooflower and Greater Bird's-foot Trefoil thrive best. Towards the upper end of the slope, where the soil is drier, Common Toadflax and Hedge Bedstraw flourish.

## INSPIRATION AND ROLE MODELS

Inspiration for meadow restoration came in part from visiting SSSI-designated fields in the parish, roughly 1.7km from my garden. These were the subject of an article in *British Wildlife* magazine by Alan Albery entitled 'Agriculture and wildlife conservation: accident or design?' (see References for more information). It turns out that as recently as the 1950s, some of these were arable fields that were ploughed occasionally and farmed in a non-intensive manner. Their 'restoration' occurred naturally without any intervention other than a sympathetic vegetation-cutting regime. The most significant factors aiding meadow recovery at this site were that agricultural sprays and artificial fertilisers had never been used (hence the soil seed bank remained intact), and a rotation of land use meant there had always been fallow pockets of land to act as reservoirs of biodiversity, allowing recolonisation to occur elsewhere subsequently.

These fields received their SSSI designation *after* the restoration process had begun, a measure of just how rich in biodiversity they had become and the success of the project. At the last count they harboured more than 250 species of flowering plants, plus all the associated invertebrate life you could expect, not to mention thriving populations of Adder, Grass Snake, Slow-worm and Common Lizard and a suite of mammals that includes Harvest Mouse. I was encouraged – it seemed that by doing nothing, or very little, there was a chance I really could create a positive outcome for biodiversity. In terms of management, I also had a vision of what I wanted to avoid. Specifically, an approach where hay production was the primary goal; and where the timing and method of haymaking literally cut short floral diversity and wrecked the life cycles of grassland creatures, specifically meadow-breeding butterflies. From the outset I knew I wanted to adopt a more nuanced approach to managing my small meadow, one that maximised biodiversity rather than a commercial hay crop.

When I embarked on my do-little approach to grassland management, what I didn't know for sure was



Germander Speedwell puts on a colourful show in my meadow in late spring, favouring drier parts of the plot.

the history of land use of my patch of meadow. I knew that I had never sprayed it with anything, and historical mapping evidence seemed to suggest that it had never been anything other than a garden in the past. However, in the back of my mind, I knew from local examples that I would have to take a longer-term approach if the land had been subjected to past agrochemical abuse. Only time would tell if it harboured environmental riches or an impoverished flora.

Here are some interesting comparisons, which are personal and anecdotal observations that are not backed up by rigorous science. This proviso notwithstanding, they do provide insight into the consequences of land

management, past and present, for wildlife. Apart from the SSSI grassland, the figures were determined by 'field walk' counts across or alongside the fields in question, on public footpaths in May and August 2021.

**1. SSSI grassland, 1.7km from my garden** (see article in *British Wildlife* magazine by Alan Albery entitled 'Agriculture and wildlife conservation: accident or design?', volume 11, no.1, 1999).

<b>Land-use history</b>	A network of meadows where, until the 1950s, low-impact non-intensive farming took place.
<b>Management regime</b>	Managed for wildlife.
<b>Agrochemical history</b>	The land has never been sprayed with agrochemicals; meadow restoration has occurred through intentional relative inaction and without any introductions.
<b>Botanical outcome</b>	250 native species of flowering plant at the last count.
<b>Grassland butterflies (as invertebrate indicators of biodiversity)</b>	10 species.

**2. Meadow, 500m from my cottage.**

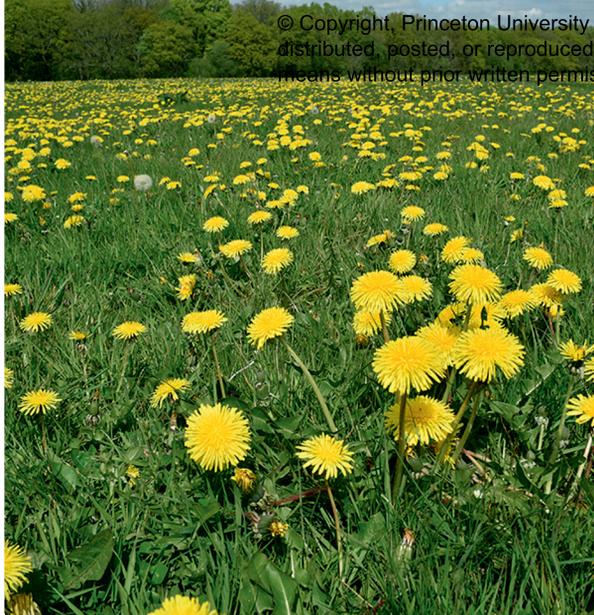
<b>Land-use history</b>	Former intensively farmed land, seeded with a bizarre mix of species in 2003, almost all of which failed to reappear in subsequent years.
<b>Management regime</b>	Cut commercially for hay, usually in July, then grazed by sheep for varying periods from autumn to late winter.
<b>Agrochemical history</b>	Sprayed with agrochemicals until 2003, currently not sprayed.
<b>Botanical outcome</b>	31 native species of flowering plant nearly 20 years later.
<b>Grassland butterflies (as invertebrate indicators of biodiversity)</b>	6 species, only 3 of which occur in good numbers.

**3. Meadow, 100m from my cottage.**

<b>Land-use history</b>	Shown as woodland on the 1827 Pamber Enclosure Map and replaced by grassland since that time.
<b>Management regime</b>	Cut commercially for hay, usually in July
<b>Agrochemical history</b>	Unknown.
<b>Botanical outcome</b>	47 native species of flowering plant.
<b>Grassland butterflies (as invertebrate indicators of biodiversity)</b>	6 species, 4 of which occur in good numbers.

**4. Grassland, 500m from my cottage.**

<b>Land-use history</b>	Shown as 'arable' on the 1838 Pamber Tithe Apportionment and Map, now replaced by seeded grassland.
<b>Management regime</b>	Cut for silage, usually in May.
<b>Agrochemical history</b>	Sprayed with herbicides, fertilisers and fungicides.
<b>Botanical outcome</b>	Seeded grass cultivar dominates. 11 other flowering plant species present in low numbers.
<b>Grassland butterflies (as invertebrate indicators of biodiversity)</b>	0 species.



This meadow, on land that was intensively farmed in the past, puts on a colourful show of dandelions in spring but contains far fewer species overall than are found in genuinely unimproved grassland in the area.

## A BIODIVERSITY WORK IN PROGRESS

When it came to my meadow, by the end of the first year I had my answer. More than 40 species of flowering plant and grasses had appeared along with meadow butterflies that I suspected might be breeding and not just visiting. As the years have passed the numbers have risen in terms of floral composition. The tally exceeded 100 flower species at the last count, and new ones appear now and then. In addition to anticipated arrivals, strange and surprising additions (given the soil type) have included Wild Basil and Pyramidal Orchid both of which persist; and in 2022, three plants of Corky-fruited Water-dropwort. On the invertebrate front I have had confirmation that ten species of grassland butterfly actually breed in this tiny pocket of grassland, and they contribute to the more than 450 species of Lepidoptera (both butterflies and moths) that have been recorded in my garden over the last two decades.



In terms of what might be expected from good-quality lowland unimproved grassland on neutral loamy soil in southern England, I would say there are strong indications that my garden's meadow-restoration project is on its way to being a success. Rather than slavishly mowing the grass once a week from spring to autumn, I now cut what was previously lawn once a year with the satisfaction of having a wonderful grassy meadow in miniature as my view in the summer months.



A few years ago, Grass Vetchling made its first appearance and is now positively rampant.

## STARTING FROM SCRATCH

If there is any possibility that the site of your prospective meadow might have been grassland in a former life, or is currently a lawn, my advice would be to do what I did: let nature take its course, and let the grass grow literally and metaphorically with only light intervention and see what appears. However, although I suggest you do not let impatience get the better of you, there will always be situations where positive intervention is needed to kick-start the genesis of a meadow. These might include areas where tarmac or concrete has been removed to

reveal bare earth, or gardens located on land that was previously intensively farmed, or indeed farmland itself where the landowner wants to restore the environment to something that intentionally encourages wildlife.

There is plenty of advice available in print and online – a bewildering array of options, actually. As a starting point for scrutiny one example might be guidance offered by Warwickshire County Council, a link to which is listed in the References section. Ultimately, however, you alone should make the decision about how to manage your own prospective biodiversity garden, having considered all the options and weighed up what's best in your situation. Bear in mind, however, that many of the examples and outcomes cited use floral diversity as their marker, and intensively farmed land as a starting point. If your preference is to look at the bigger picture, beyond the scope of just flowers, then you need to consider what might be the desired outcome if, for example, there was chance that Harvest Mice might take up residence in your plot.

First of all, it is useful to picture the desired end result, which should be a stable, undisturbed soil structure protected by a modest blanket of decomposing vegetation and a carpet of mosses; and a seasonal floral diversity that comprises native species appropriate to the soil type and geographical location. When you

### ● ASSET STRIPPING

The term 'soil fertility' is used to describe levels in the soil of nutrients needed to support plant growth. Farmers and conventional gardeners who want to encourage particular crops or flowers usually go to great lengths to enhance soil fertility, often with the aid of chemicals or organic matter. When it comes to meadow restoration or creation, however, conventional wisdom has it that soil fertility is the enemy. The reasoning behind this is that most native component meadow species are adapted to nutrient-poor soils and cannot compete with the few vigorous 'botanical thugs' that benefit from enrichment. As a consequence, wholesale soil-stripping is sometimes advocated as a way of removing fertility (especially with fertiliser-saturated farmed land) to create a blank canvas for sowing. It is saying something when, in essence, the advice is that the soil is too polluted for nature

to thrive so let's remove it. However, it also feeds into the line of thinking that says instant meadow makeovers should be the goal. I wonder whether the main beneficiaries are the businesses advocating such an approach and wholesale suppliers of seeds. Personally, I would avoid anything as drastic, in the main because my aim would be not just to maximise floral diversity but to benefit biodiversity as a whole; in that regard I see the residents of the soil as having a say in the matter. Besides, if your environmental thinking is joined up, you need to consider where the stripped soil would go and what the environmental consequences would be for the recipient land. No, if I was giving advice to myself, I would suggest, at most, light scarification and seed scattering. The same advice might work for you, perhaps employing alternate strips of scarified and undisturbed soil if you think there is chance the soil's seed bank retains plant species of interest.

have created your own Field of Dreams in floral terms, with the phrase ‘build it and they will come’ in mind, the associated invertebrate life will appear or colonise over time.

It is human nature to want to feel you are doing something and, influenced in part by a conventional gardening mindset, there is often a sense that meadows need to be created rather than being left to create themselves. The truth is that there is no shortcut to producing a meaningfully biodiversity-rich grassland: it has to develop over time. However, in some situations, there may be an ecological imperative to kick-start the process, albeit with as light a touch approach as possible.

If you do decide you want to catalyse your meadow creation or restoration project, then I would suggest the absolute ‘nos’ are: don’t spray and don’t plough. And yes, I have come across instances where landowners wanting to ‘create’ a meadow have sprayed the ground with herbicides and deep-ploughed the soil; their aim had been to produce what they saw as a blank canvas to work with, little realising they had all but destroyed any remaining native biodiversity and soil health that would have been their allies in the recovery process.

## SOWING THE SEEDS

Although by and large I leave my meadow to do its own thing, I have been known to scatter a few seeds from elsewhere. Examples include Yellow-rattle, which I wanted to encourage to spread, and the occasional handfuls of seeds from end-of-season meadows nearby. However, in all instances I have had the landowner’s permission to collect, and to do otherwise would constitute botanical theft. It goes without saying that under no circumstances should seeds be collected from nature reserves, sites where wildlife is prioritised; or private land without the owner’s permission.

The main route taken by prospective meadow restorers is to buy commercially produced seeds, which are widely available. The choice and range can be bewildering. General advice would be to avoid companies for which so-called ‘wildflower seed mixes’ are a minor part of their commercial profile, and a token nod to the aspirations of conventional wildlife gardeners. There are specialists out there who supply the seeds of individual species, which will allow you to customise your choice, and who offer mixes tailored to suit reasonably specific soil types. There are danger signs

## ● BOTANICAL SCAR TISSUE

An inevitable consequence of soil disturbance, be that ploughing or scarification, will be the appearance of a range of plants, notably thistle species, that thrive on the resulting topographical chaos. Rather than throw your hands up in horror, an alternative approach is to view them as appropriate elements in the evolution and development of stable grassland communities. If you take the long view, you will find that those species that depend on disturbance will be ephemeral and diminish over time. Thistles, and other disturbed ground specialists, are in a sense botanical scar tissue, species that are a natural response to the wounds of disturbance, part of the healing process, and ones whose significance will diminish as soil and grassland recovery takes hold. While you have thistles in abundance, learn to enjoy them for their place in the ecology of the British Isles. They are wonderful sources of nectar and foodplants for insects, with seeds that are a natural mainstay for birds such as Goldfinches and Linnets.



*Marsh Thistle, one of several species that thrive on disturbance and whose importance for native wildlife is often overlooked.*

to watch out for, however, in the choice of descriptions and the sometimes misleading and inaccurate use of words such as 'wild', 'native', and 'natural'. It never hurts to scrutinise the claims made by commercial outlets with a sceptical eye.

Personally, I have slight misgivings when it comes to wildflower mixes in general, and in particular an almost pathological dislike of those mixes that describe themselves as colourful. More often than not they comprise alien species and former agricultural 'weeds' which have no place in a stable grassland habitat. Generally speaking, they offer a botanical conjuring trick, an illusory fix to convince the unwary that they have created something worthwhile for nature. Good quality chalk downland and hay meadows in the Yorkshire Dales can be visually stunning. However, the reality for prime unimproved grassland on neutral soil in the part of southern England where I live is that it is seldom going to be like the spectacle of colour depicted on seed mix packets. An acceptance of that fact, and an appreciation of native plants for their own sake, is part of the learning curve associated with embarking on meadow management.

I have come across rather odd examples of wildflower mixes marketed as appropriate to a meadow in the part of England where I live. Many are short-fix annuals associated with the disturbed ground of historical arable farmland, species that hark back to the days when agrochemicals had not obliterated them from the



It may be tempting to sow the seeds of colourful flowers such as Corn Marigold. However, like other former arable 'weeds', the species thrives only where the ground is routinely disturbed and has no place, and will not persist, in the stable soil structure of a meadow where the aim is to provide meaningful long-term benefits to native wildlife.



If you go down the route of creating your own mix, arguably the best approach is to put conventional flowers to the back of your mind and concentrate on the botanical backbone of any meadow: its grasses. And if grassland-breeding butterflies are a priority, then favour their larval foodplants above promoted nectar sources.

landscape. Others have dubious native status and a few are exotic aliens. From the perspective of someone who wants to promote native biodiversity appropriate to my particular location, inappropriate species mixes often include: Common Poppy, Cornflower, Corn Marigold, Corn Chamomile, California Poppy and Phacelia.

As a prospective seed buyer you would do well to adopt a degree of scepticism regarding any mix that calls itself 'local'. Do your homework and check the species composition against what grasses and other wildflowers grow near you on verges and nearby grassland nature reserves. 'Locally sourced' is another sales description to be scrutinised carefully, and bear in mind that just because a species is native to the UK it does not mean it is necessarily appropriate for your area or particular soil type. Almost all the plants we grow in our gardens grow 'wild' somewhere in the world. Using the word in the context of 'wildflower' can mislead people into

equating the term ‘wildflower’ with something that is native, appropriate or indeed desirable.

Having shattered some of the illusions of prospective seed buyers it is worth mentioning that there are some good mixes available. As a starting point, those that lack a gaudy, disturbed-ground annual-species component are the ones to consider. A few reliable outlets adopt a more nuanced approach and sell mixes tailored for particular soil types. This is still a slightly scattergun approach to seeding the land, and not all species will ‘take’ in the long term. I have tried sowing mixtures designed for my soil type (neutral loam, which is fertile clay and sand containing humus) in an abandoned vegetable plot; roughly 60 percent of the species in the mixes flourished, initially at least, while the others failed. If you opt for surveying nearby verges and good quality meadows and choosing the species yourself, some seed sellers offer a range sufficient to cover most eventualities in terms of basic species.



Yellow-rattle is a great component of, or addition to, any meadow. As well as being attractive, it has a semi-parasitic lifestyle and takes nutrients from the roots of its grass hosts, inhibiting the growth of rank species.

Species that do well in my meadow include the following, in no particular order: Yorkshire Fog; Creeping Soft-grass; Cock’s-foot, Crested Dog’s-tail; Red Fescue; Common Bent; Smooth-stalked Meadow-grass; Meadow Foxtail; Tufted Vetch; Common Vetch; Meadow Buttercup; Goat’s-beard; Common Knapweed; Hedge Bedstraw; Rough Hawkbit; Meadow Vetchling; Oxeye Daisy; Selfheal; Bugle; Common Sorrel; Wild Carrot; Hogweed; Yarrow; and Yellow-rattle. Some are species that benefit from residual fertility in the soil and their significance will diminish in time, I suspect.



Caterpillars of the Grass Rivulet moth feed on the seeds of Yellow-rattle and spend their brief lives inside the seed capsules. If you cut a field too soon, before the caterpillars are fully grown and have left their seed-capsule home to pupate in the soil, you will destroy the moth’s life cycle.

The consequence is depleted biodiversity and an overall erosion of complexity in the natural world.

## ON THE VERGE OF EXTINCTION

Stepping outside the boundaries of my garden for a moment, it is an interesting aside to return to the subject of roadside verges. Having driven past a gaudily planted verge in a north Hampshire town I was reminded of a visit to a Yellow Book garden, an occasion where I overheard an uncharitable critic describe the garden in question as ‘an eyesore in purple, pink and orange’. And I was also reminded of a link someone sent me concerning a roadside wildflower scheme in Rotherham.

The article appeared in the *Rotherham Advertiser*, and was entitled ‘The story behind Rotherham’s bloomin’ lovely River of Colour’, a link to which can be found in the References section. It concerned a seemingly laudable aim to grow ‘wildflowers’ beside an otherwise uninteresting eight-mile stretch of road. What could be wrong with that? Gaudy colour combinations notwithstanding, the photograph used to illustrate the article showed a predictably strange mix of former arable ‘weeds’ – just the sort of thing that intensive



A ghastly mix of colourful former arable ‘weeds’ and alien species on a north Hampshire verge. The sight may be pleasing to untutored human eyes, but from the point of view of all but a few native wildlife species the display is essentially worthless.

arable farmers want to be rid of – and a scattering of alien species and dubious natives. From what I could make out, the main components comprised a cultivated form of poppy, California Poppy, Cornflower and Corn Marigold. How would they maintain this mix of peculiar annual plants, I wondered? All was revealed when I read on to the section where an official stated, ‘Hopefully in late March 2015 we will weed-kill all of the eight miles and reseed it again in April’.

So, if the report was accurate and I understood it correctly, the reality was that native verge wildflowers along with the sown species were destined to be sprayed to death so the cycle could continue and inappropriate and sometimes alien (but colourful) species could

charm the eyes of passing motorists. To me that seemed like a victory for those producing and selling seeds and herbicides to councils, and a loss for native biodiversity. The article revealed another factor in the appeal of the planting scheme: a cost saving to the local council when it came to roadside verge cutting.

Returning to the subject of that north Hampshire town’s verges, judging by the species mix on show, the wildflower verge-planting scheme had taken a leaf out of Rotherham’s book and used the same or a similar source of seeds. However, less than a mile further down the road, on the same day I came across another verge (well, a roundabout actually) that was just as colourful. There was a difference, however: this one consisted of naturally colonising native species appropriate to the soil type.

The beauty of this natural verge was that, to promote genuine and meaningful biodiversity, the council need do nothing other than mow the vegetation once a year, in autumn when the plants had set seed. Those tasked by local councils to manage roadside verges would be well advised to read a document produced by the charity **Plantlife** entitled *Roadside Verge Best Practice*, a link to which can be found in the References section.



Because the underlying ground on the previously mentioned roundabout is chalk, downland plant species such as Marjoram and Kidney Vetch were thriving. If managed in an intelligent and informed manner, roadside verges have the potential to be good for native wildlife. In this instance, the insect fauna included the Small Blue butterfly, whose larval food is Kidney Vetch.



A roundabout in the same north Hampshire town as that with the planting scheme, boasting an abundance of native chalk flora including Marjoram, Kidney Vetch, Perforate St John's-wort, Small Scabious, Goat's-beard and much, more, plus all the native biodiversity that goes with it.

## A PLEA FOR RAGWORT

A few years ago, a neighbour knocked on my door and asked if I knew I had Ragwort growing in my garden and what I was going to do about it. My replies were 'yes' and 'nothing' in that order, to which he responded in a slightly tongue-in-cheek tone that it was a 'notifiable' weed and that he would have to report me. This was not the first time I had faced the subject, so, as the clenched-teeth polite conversation continued, I told him that as far as I was aware there was no such thing in English law as a 'notifiable' weed and perhaps he meant one of the five plant species classed as 'injurious' in the Weeds Act of 1959.

Anyway, all five so-called 'injurious' weeds are great for invertebrates and I am proud to say I have them all in my garden – in moderation. When I asked my neighbour to point out the offenders, I was able to

tell him that the plants in question were not in any case Common Ragwort but Hoary Ragwort (a forgivable mistake) and Common Fleabane (less so), neither of which have a whiff of illegality associated with them.

Search the internet on the subject of Ragwort and you will find some wildly inaccurate information, bordering on scaremongering. There are, however, two excellent websites, details of which can be found in the References section. These are 'Ragwort Facts' and a **Buglife** document entitled 'Ragwort: Noxious weed or precious wildflower?'

If you like to check things for yourself then read the Weeds Act of 1959. It is easily accessible online and states that where the Minister (then MAFF – Agriculture, Fisheries and Food) 'is satisfied that where there are injurious weeds to which this Act applies growing upon any land he may serve upon the occupier of the land a notice in writing requiring him, within



Spear Thistle.



Creeping Thistle.



Curled Dock.



Broad-leaved Dock.



Ragwort.

Rogue's Gallery: the plants named in the Weeds Act of 1959 are Spear Thistle *Cirsium vulgare*; Creeping Thistle *Cirsium arvense*; Curled Dock *Rumex crispus*; Broad-leaved Dock *Rumex obtusifolius*; and Ragwort *Senecio jacobaea*. As an aside, since the Act was created, a progression in botanical classification means the latter species is now known as Common Ragwort *Jacobaea vulgaris*. Several other species of ragwort, not specified in the Act, also grow in the UK.

the time specified in the notice, to take such action as may be necessary to prevent the weeds from spreading.' Bear in mind that 'injurious' does not mean poisonous; rather, it relates to plants that might have an economic impact on farming. And it is all about the potential for 'spreading' rather than merely having them on your land. As far as I can see you can grow as much of the five as you like and there's no legal requirement to remove

them unless the Secretary of State, or an authority specifically appointed to act on his or her behalf, asks you to do so.

The other bit of legislation that relates to Common Ragwort is the Ragwort Control Act 2003, and it is also worth a read. It is available online (see the References section), is brief and to the point, and enabled a Code of Practice to be laid down. The Code itself is introduced

by the then Minister of State for Rural Affairs and Local Environment Quality, who refers to himself as 'Minister for the Horse'; perhaps this indicates his leanings in the debate about the evils and merits of ragwort, who knows? Anyway, the document strikes me as oddly contradictory: at one turn it conjures up nightmare visions of dead and dying horses – hundreds of them – dropping like flies through Ragwort poisoning; and at the other extreme it extols the virtues and value to wildlife of Common Ragwort. To me it has the hallmarks of a document written by a committee, but one whose polarised members could not agree.

Despite the dystopian world, littered with dead horses, that the Code of Practice depicts, it states: 'The scale and extent of illness and death in animals through ragwort poisoning is difficult to determine, as an autopsy would be required in every case to confirm the exact cause of death. There is no current test available to diagnose accurately whether an animal is suffering from ragwort poisoning, and certainly no test to help determine whether any such poisoning relates to ingestion of conserved or live ragwort.' To my mind, that is another way of saying the 'evidence' is unfounded.

I have nothing against horses, but if you accept the above statement and choose to believe the facts as presented on the websites mentioned above, then the risks to horse health are hugely exaggerated, as is the attributed number of deaths. That Common Ragwort contains toxins is not in dispute, but so do any number of other native wildflowers – in many cases, the same



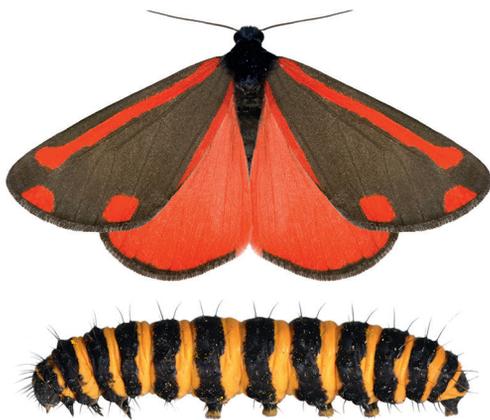
The flowers of Common Ragwort are an important source of nectar for insects, especially hover-flies.

toxins as occur in Common Ragwort. And in the context of horses and other livestock perhaps the living plant is better described as distasteful rather than poisonous. The evidence of my own eyes tells me that horses avoid it, and where I live an abundance of the plant is usually a clear indication of over-grazing. It is only a potential danger when inadvertently cut and dried as a constituent of a hay crop and only if subsequently consumed by animals as winter feed in vast quantities.

For those with concerns about the floral makeup of the English countryside, maybe Common Ragwort should not be top of the list. A better contender might be Hemlock Water-dropwort. I have heard this umbellifer described as the most poisonous plant in the UK. It is a welcome natural component of wet meadows near me, and the flowers are a valuable source of nectar for insects in summer. However, in the last decade it has begun to proliferate in eutrophic ditches (beside which horses trot) enriched by fertiliser run-off from intensively farmed fields. In the grand scheme of things, I would suggest that intensive farming and eutrophication are subjects really worth worrying about.

Stepping back from the issue of toxicity and livestock, Common Ragwort is a hugely important native wildflower and an integral component in meadows. It is a wonderful source of nectar for insects, and according to Buglife there are 30 invertebrates that are confined to it; this number includes of course the Cinnabar moth, whose caterpillars feed on nothing else.

In some specific circumstances there may be a case for controlling Common Ragwort in the context of its 'injurious' status – the potential for spreading leading to an economic impact on adjacent farmland



The Cinnabar moth's aposematic colours (red and black in adults, orange and black banding in caterpillars) warn potential predators of their distasteful nature. Quite literally they are what they eat, and accumulate toxins present in their larval foodplant.

– and perhaps even regarding livestock. Fine, so long as the perceived ‘need’ for control is based on real evidence and the Secretary of State, or an appointed representative, has reviewed the evidence and had his or her say on the matter. But whatever the rights and wrongs of Common Ragwort, it is undeniably the only species of *Senecio* (now *Jacobaea*), or yellow composite, that is specified in the Weeds Act of 1959. Nevertheless, I have a feeling that my neighbour may not be alone when it comes to mistaken identity. I have come across formal complaints about a perceived

lack of ‘Ragwort control’ beside motorways and dual carriageways. For a start, unless the adverse consequences of ‘injurious’ spreading can be demonstrated, I cannot see there is a legal requirement to ‘control’ it unless a minister deems it necessary. But more significantly, the species in question is more likely to be Oxford Ragwort than Common Ragwort. I am not aware of any legal requirement for the former species to be ‘controlled’, despite the strange claim in the Code of Practice that other species of ragwort ‘may need to be controlled’.

## ● ALIEN INVADERS

The Botanical Society of Britain and Ireland has produced a new atlas covering the 3,500 or so vascular plant species that grow wild in Britain and Ireland, including the Isle of Man and the Channel Islands. The ratio of native plants (ones that clung on during the last Ice Age or colonised under their own steam subsequently) to those considered to have been introduced by humans by accident or design is now 49:51. Alien plant species now outnumber natives in Britain and Ireland.

Although many non-native plant species appear to have little impact on native UK biodiversity, some provide genuine cause for conservation concern. Looking at the bigger picture, of course all of them have a legitimate place in the environment, but only in the parts of the world where they originate. Problems arise when they are introduced by man to other locations: in the absence of the biological checks and balances of their native ranges, vigorous species can smother native plants and in the process wreck formerly thriving ecosystems. In the UK, examples include Japanese Knotweed, a botanical thug that, if left unchecked, rampages along hedgerows and woodland margins. Himalayan Balsam is an unwelcome discovery along any riverbank, while New Zealand Pigmyweed is every UK freshwater enthusiast’s worst nightmare, smothering and blanketing entire ponds in a season.

In case anyone thinks this alien invasion is a one way process, the UK has done its fair share of exporting unwelcome visitors, and has contributed to the spread of invasive species worldwide. In North America, Purple Loosestrife, introduced accidentally and intentionally, is a major invasive problem in wetlands and the subject of eradication programmes. And my copy editor, Annie

Gottlieb, informs me that Oxeye Daisy (a welcome resident in my garden) is considered an invasive weed in the US state of Minnesota. In Australia, Sea Spurge (seeds of which are thought to have arrived with ships’ ballast) is classed as an invasive weed. While Pennyroyal, a mint that is revered for its rarity in the UK, was inadvertently introduced to New Zealand by settlers and is now classed as an agricultural pest.



Purple Loosestrife.

## MEADOW MANAGEMENT

Historically, meadows did not exist for their aesthetic appeal nor for the biodiversity they supported. Instead, they were an agricultural land use that produced a crop. Referred to as hay, this crop is cut vegetation that includes a significant grass component, and is dried and stored as animal feed for the winter months. The practice continues to this day, although the botanical composition varies greatly, from hay derived from species-rich unimproved meadows to the utilitarian, agro-industrial crop derived from agriculturally improved grassland. Hay differs from straw, which is the stalk by-product of an arable crop such as wheat; among the uses of straw are animal bedding, and thatching. Hay also differs from silage, where grass and other plant material is cut 'green' and preserved by the acidification that results from fermentation.

Meadows that are promoted today with native biodiversity in mind still need some form of management if the intention is to preserve the habitat and prevent an otherwise natural progression towards scrub development and eventual woodland succession. Like many others, I see the value of scrub for wildlife, but since in my part of the world unimproved meadows appear to be more threatened than scrub, I make the distinction between the two in the context of my garden. The aim with my tiny patch of grassland is to maintain it as a meadow, fixed in time ecologically in terms of the vegetative succession that would otherwise follow. I encourage the development of scrub elsewhere in the garden.

Conventional wisdom has it that seasonal cutting is the way to approach meadow management for biodiversity, with the removal of cut material an essential stage in the process. The aim, particularly when it comes to restoration or creation of meadows on fertiliser-laden farmed land, is to impoverish the soil and hence hinder the growth of vigorous species, giving more delicate plants a fighting chance. The depletion of soil levels of potassium is seen as especially crucial in reducing the growth of vigorous species and encouraging diversity among less-competitive plants. One way in which that is achieved is by the removal of cut grass. That's the method I employ in my garden, not so much because I feel the need to reduce fertility per se, but more because it tallies with the original way of managing the land that helped create and maintain local grassland biodiversity in the first place.

I can also see the merits of leaving areas of rank grassland to flourish. Stepping back in time, it is hard to imagine that men with scythes achieved the same manicured results when cutting as we see with the mechanised process today. Furthermore, historically, I can also picture neglected areas of 'waste', marked on Tithe Maps as such but now incorporated into farmed land, being periodically colonised with rank grassland. On larger meadow-restoration plots near me, I have seen the advantages of benign neglect, where landowners cut part of their grassland every other year in a rotation pattern or not at all.

The end results are meadows that would probably fail to meet Natural England's 'favourable status' standards in terms of botanical make-up and visual appearance. However, the resulting knee-deep matted sward has its own beneficiaries, notably small mammals such as Harvest Mice and armies of Short-tailed Voles, plus a suite of predators. Nowadays, I see Weasels and Stoats in my garden once in a blue moon, the last sighting being of the former, four years ago; these overgrown fields are the only places near me where I stand a reliable chance of seeing them today. In my youth, my recollection is of regular encounters of both, almost every time I went out for a bike ride, as they dashed across the road, or more regularly as roadkill victims or grisly trophies on gamekeepers' gibbets. Today, these specialist small-mammal predators appear to have vanished from large swathes of north Hampshire's countryside, one conclusion being there is nothing for them to eat and they have been starved out of existence.

## TIMING IS ALL

Based on experience with my patch of meadow, and by observing what I perceive to be management successes and failures on other sites, I would say that timing is all when it comes to cutting. In my garden I adopt a flexible approach because each season is different. I generally wait until everything has set seed (typically late August or early September), and I am happy to leave patches of late flowerers (Musk-mallow and Betony, for example) uncut until much later in the season.

Many people will have come across bad examples of how to manage grassland without necessarily realising it. Taking roadside verges as examples of linear meadows I have lost count of the number of times I have seen council verge-cutters or contractors decapitating

## ● MEADOW MANAGEMENT: A CASE STUDY



Photographed in early June, this area of open countryside, not far from where I live, provides a graphic example of the restorative power of nature. It also sheds light on the ways that alternative methods of land management can either help or hinder the speed of biodiversity recovery. Until 2011, the land in this image was part of a larger field that had been heavily grazed by horses for many years. It changed

hands and, tasked by its new multiple owners, a contractor grew arable crops for two years, using agrochemicals as part of his strategy. Thereafter, three of the field's owners adopted different approaches to management of the parcels of land that they owned. Bearing in mind that the observations, interpretation and speculation on my part are subjective, it is nevertheless interesting to consider the following:

### Plot A

**Management regime** Regular cutting; the plot had just been cut.

**Floral makeup in early June** Viewed from the margin, perhaps 11 species of flowering plant (including grasses and rushes) in low numbers. Much of the ground was blanketed by cut vegetation.

**Meadow butterflies as indicators** I would rate the chances of meadow butterflies breeding in the plot as slim, or at least the completion of their life cycles as unlikely. In early June, life-cycle stages of many of the 'brown' butterfly species would be using tall, standing grasses, either as caterpillars or, depending on the species, adult butterflies about to emerge from their chrysalises. Cut the grass and remove it and you stand a good chance of killing them. Cut the grass and leave it where it fell, as happened here, and the smothering blanket will most likely destroy them.

**General wildlife** Little obvious wildlife on show. Had ground-nesting birds, such as Skylarks, been attempting to nest, the likelihood is that cutting the grass at this strategically important time would have resulted in nest failure.

## Plot B

**Management regime** Grassland recovery has been allowed to take place naturally. Winding paths and meadow 'clearings' are cut but otherwise the vegetation is left untouched.

**Floral makeup in early June** On my visit, I noticed 41 species of flowering plants (including grasses and rushes).

**Meadow butterflies as indicators** Based on observations in previous years, 8 species of butterfly whose caterpillars feed on meadow plants breed in Plot B. Three species were on the wing in early June, which is what I would have expected for the time of year.

**General wildlife** The dense vegetation supports a thriving population of small mammals, especially Short-tailed Voles and Wood Mice. These in turn attract the attentions of predators that include Kestrel, Buzzard, Red Kite, Barn Owl and Tawny Owl. Slow-worms and Grass Snakes are present too, and a recently created pond in the field has breeding populations of Common Toads and Palmate Newts. Skylarks breed in Plot B. Outside the nesting season flocks of Linnets and Goldfinches are attracted by the seeds of meadow plants, while passage and wintering Stonechats include invertebrates such as spiders in their diet.



**Above** A Barn Owl photographed in the parish of Pamber on vole-rich grassland that is being restored on previously farmed land (Plot B in the image on p. 68).

**Left** The contents of a couple of passes with a sweep net on Plot B reveals an abundance of life, mostly insects.

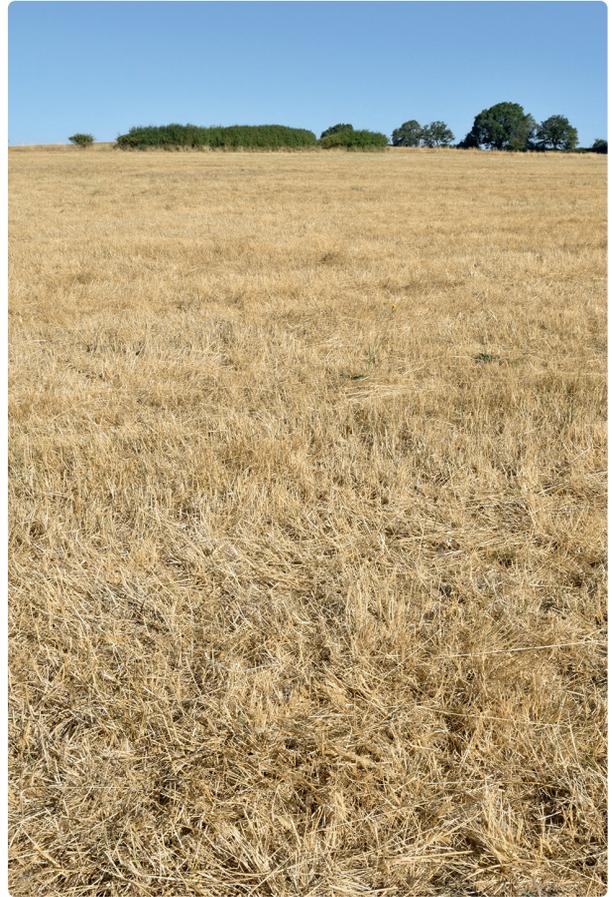
## Plot C

**Management regime** Regularly grazed by sheep. A newly planted hedge defines the boundary between this plot and Plot B.

**Floral makeup in early June** The close-cropped sward appeared to support a community of grazing-tolerant species, with 16 species in evidence by scrutiny from the margin.

**Meadow butterflies as indicators** Given their reliance on tall, dense grassland, it is most unlikely that any meadow butterfly species are able to breed in Plot C, except perhaps in the hedge-fringed margins.

**General wildlife** Little obvious wildlife on show. If present, small mammals are likely to be restricted to the margins, and the field offers no opportunities for ground-nesting birds.



Photographed in mid-August, these images show my uncut garden meadow (left) and nearby grassland that had been cut for hay six weeks earlier. My meadow retained its three-dimensional structure and was alive with butterflies, grasshoppers and other insects plus late-flowering nectar sources such as thistle species and Common Fleabane. The commercially cut grassland was devoid of any obvious signs of life.

orchid spikes in their prime in May, and witnessed the manicuring they employ in summer. It comes as no surprise then that the reason why Grass Vetchling thrives in my garden but has been driven to extinction on the local roadside verges is down to timing. The species is an annual that relies on hot dry weather to blacken its pods to the point where they explode and release their seeds. Cut the plant before it has had a chance to release its seeds, which happens on verges where it used to thrive, and it soon disappears from the scene.

Visibility and safety are clearly reasonable reasons for cutting certain stretches of roadside, but I suspect that the timing of verge-cutting might on occasion have more to do with occupying a workforce during an otherwise slack period. Dig a little deeper and in some instances verge-cutting is done in response to complaints

from taxpayers and their elected representatives about the ‘untidy’ (i.e., flowering nicely and biodiversity-rich) appearance of their roadside verges. This is further indication of the disconnect between society and nature, and a measure of the level of environmental ignorance among some in the community.

### **AN ANTIDOTE TO BOTANICAL BUZZ CUTS AND AGRICULTURAL MANICURE, THE UNKINDEST CUTS OF ALL FOR WILDLIFE**

Personal experience has influenced the method and approach I use to manage my tiny meadow. Informative was a visit a few years ago to a hay meadow whose status is that of a nature reserve. When I first visited the site

(continued...)