# Nature-based benefits of enhanced grassland management

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Mark Schofield

# **c.40%** of UK's land cover is grassland (9.52Mha)

**29%** = Improved grassland

**11%** = semi-natural grassland

**<1%** of UK land (170,000 ha) high-quality grasslands that meet Priority Habitat designation

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The UK's largest category of land use

(UK National Ecosystem Assessment, 2011)


Species-rich grassland habitats are extremely high in biodiversity
• >20% of UK plant species
• 38% of UK BAP species

# Value of road verges for biodiversity

## Sanctuary

- >700 species of wildflowers grow on verges
- 45% of our total plant diversity
- 87 species threatened with extinction

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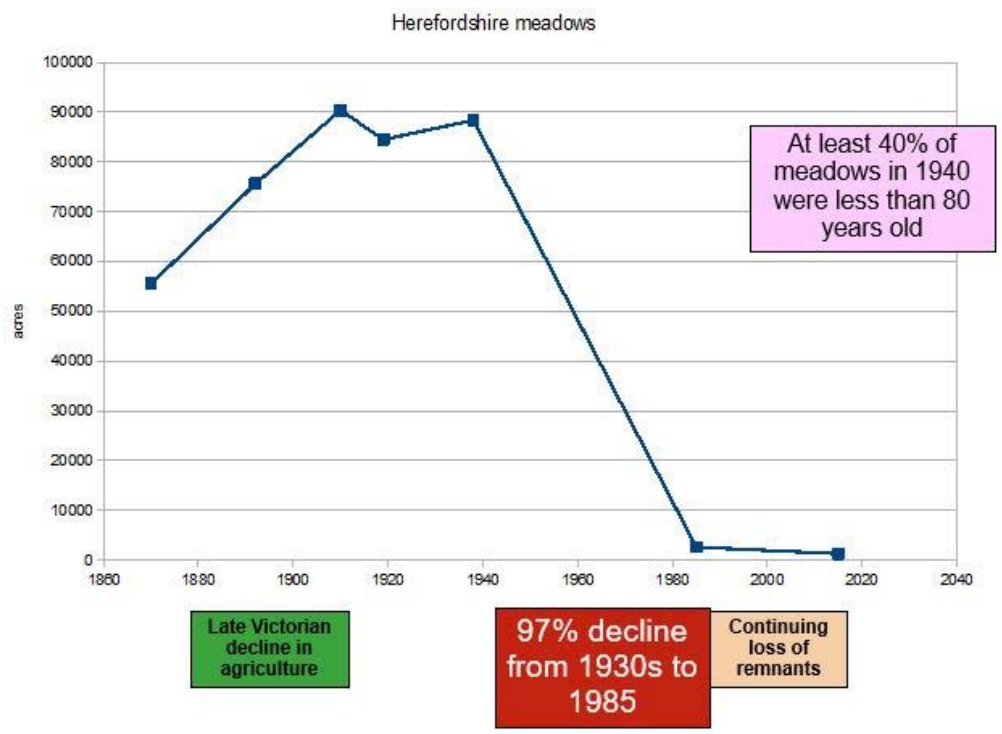
# 97% of lowland unimproved grassland lost since 1930s




- Agricultural census records for Herefordshire
- "Any county in England or Wales would show the same shape"

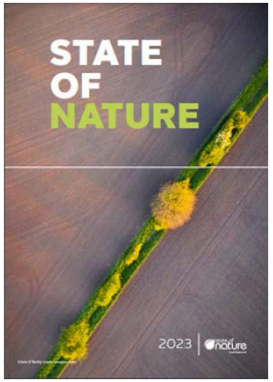
*George Peterken (presentation)*


"The changing extent and conservation interest of lowland grasslands in England and Wales: A review of grassland surveys 1930–1984", by R.A. Fuller, published in "Biological Conservation" in 1987 (Vol 40, no. 4, pp 281-300). NCC ITE

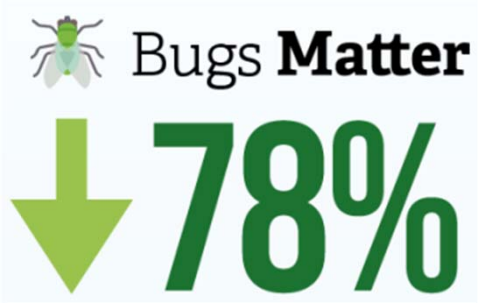

**'Grasslands amongst the most threatened habitats in Britain'** (BSBI, 2023)

- Devil's-bit Scabious
- Pasqueflower
- Sheep's Sorrel

**'More than half of our native flowering plants have decreased in range in the last 50 years'** (State of Nature Report, 2023)




**'UK's flying insect population has declined by as much as 78% in the last 20 years'** (Kent Wildlife Trust, Buglife 2023)

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# A whole ‘Cornwall’s-worth’ of land hidden in plain sight

**GB Road verges:** (Phillips et al. 2021)

- 260,000 ha (1.2%) approximately the size of **Dorset**
- c.70% is grassland = 80% area of priority semi-natural grassland in GB

**GB green space (public):** (ONS)

- 85,847 ha
- 43,550 sites
- > 2x size of **Rutland**

**Totalling** the size of **Cornwall**

# Lost opportunities: for people and wildlife

## ‘Roadside lawns’

- c.700 $km^2$ (>25%) of road verge area is frequently-mown, short grassland (lawn)
- 56% of ‘lawn’ verges were found in urban areas
- Of all ‘lawn’ verges, 65% were greater than 2 m wide



Phillips et al. 2021

# Lost opportunities: for people and wildlife

Sudbrooke Drive Play Area, Lincoln

## ‘Think outside the rectangle’

Rectangles within polygons:

- 2m margin = 10% pitch area
- 5m margin = 25% pitch area
- 10m margin = 55% pitch area

Extending the ‘use case’

- Health and wellbeing
- Circular walks
- Older demographic 0 → moderate exercise increase
- Times of year and day

Margins of sports pitches are a huge resource for people and wildlife

Over 100 pitches equivalent area per county*

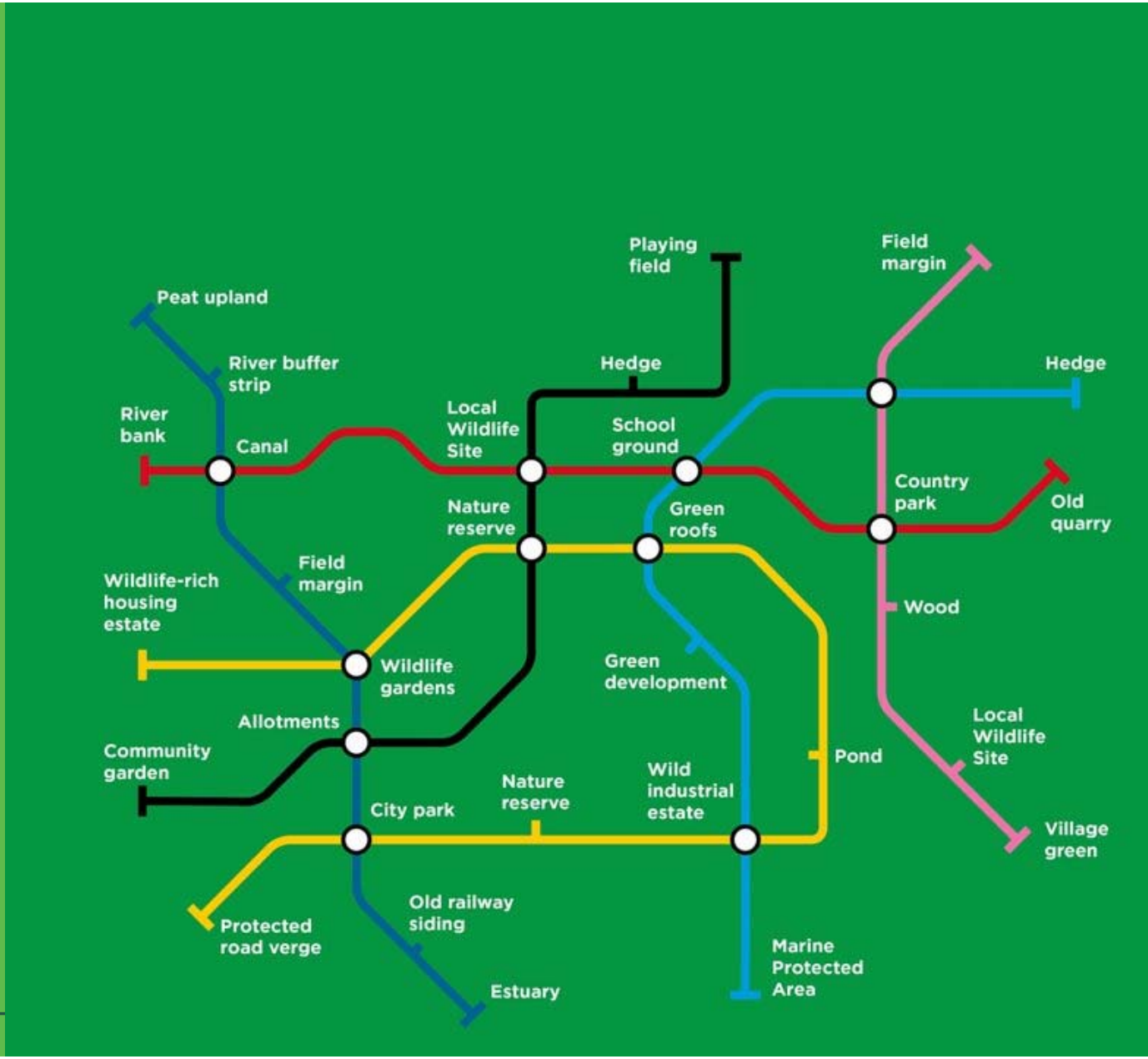
*FA estimates c.10,000 grass pitches in England on publicly accessible land owned and run by LAs (i.e. not schools)
Assuming each pitch in England could have just a 10m margin

# Connectivity

## Bridges not barriers

Linear green infrastructure and public / commercial green space ‘stepping stones’

Not just structural connectivity but ecologically functional for nature

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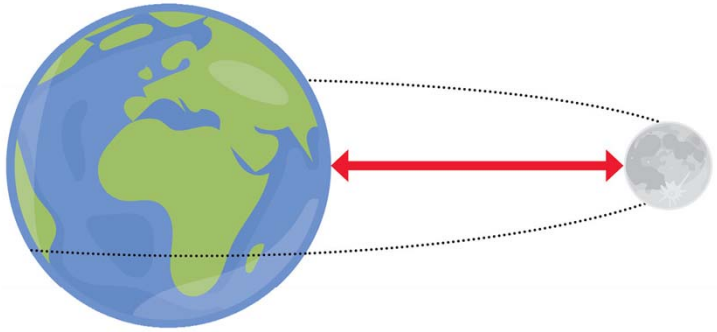
40,070 km

NASA



406,700 km

ESA

Public roads
in Great Britain

428,119 km

Ordnance Survey

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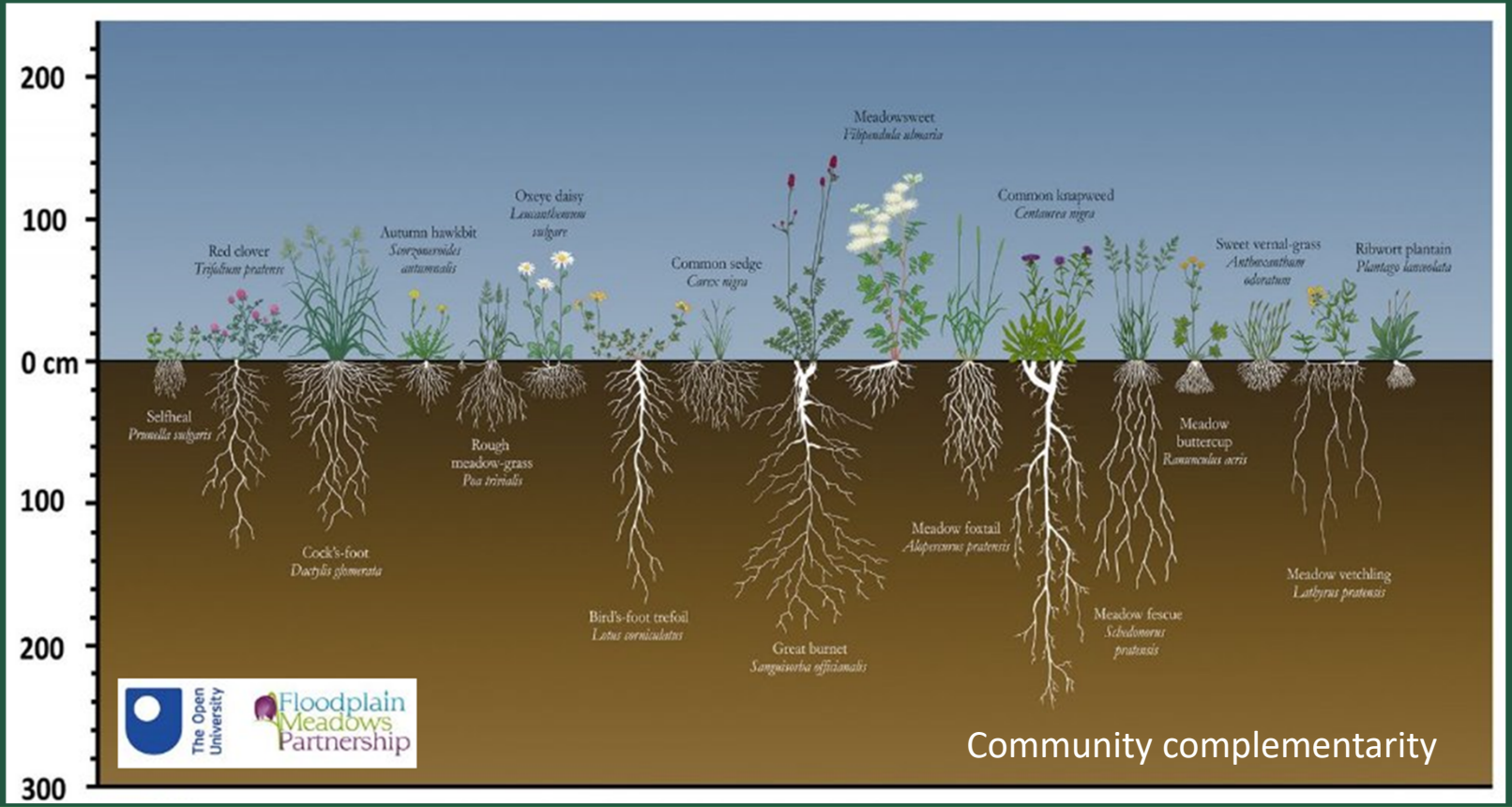
# Wilder grasslands: their benefits for carbon capture and storage

- Permanent grasslands are significant carbon stores which have been underestimated
- 90% of grassland carbon is stored below ground in its soil and roots (often more than woodland)
- Increased species-richness increases carbon sequestration

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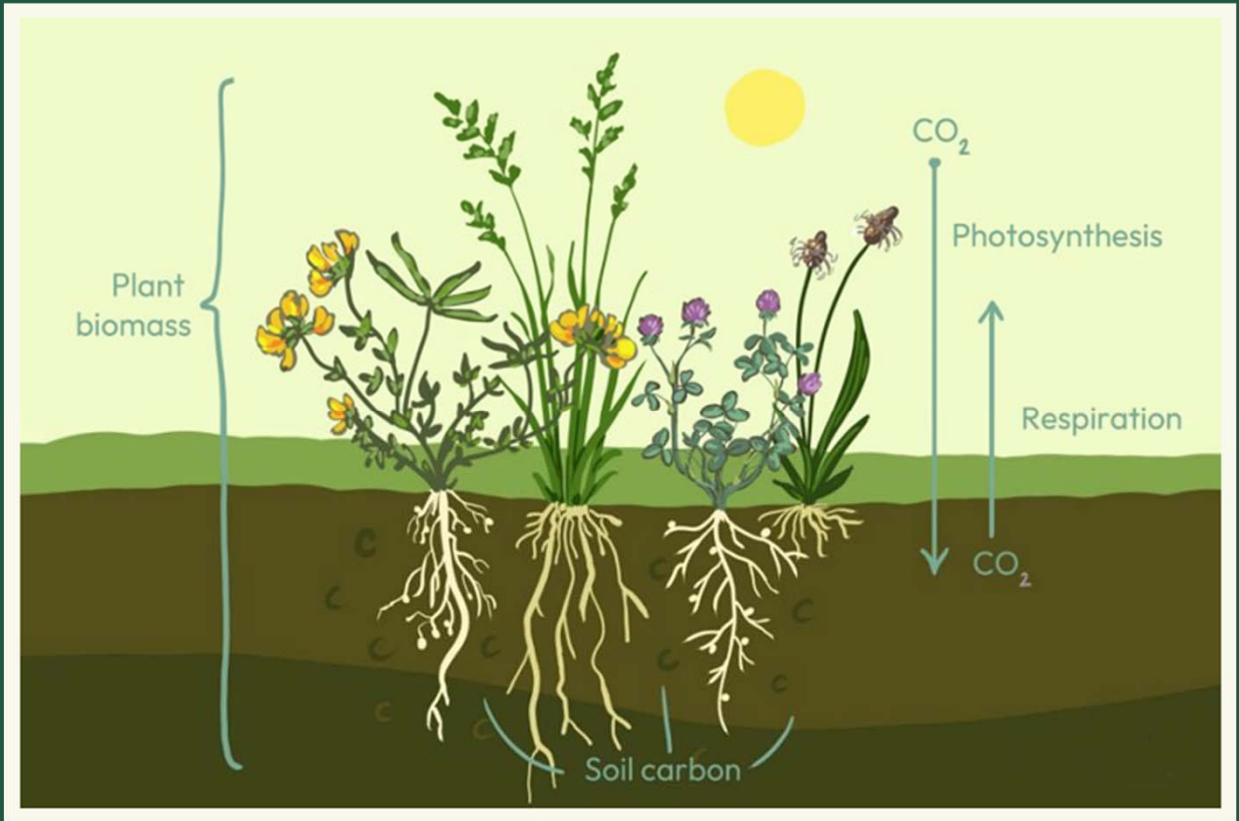
## Grassland soil C is underestimated:

- 60% of grassland soil carbon is located below 30cm but often only top 15cm measured
- Other habitats are measured to 100cm
- Semi-natural grassland C often not counted
- Many UK semi-natural grasslands can store more soil C than agricultural improved grasslands, arable land and woodland

## Increasing C storage in grassland

- Reducing mowing, disturbance and fertiliser can increase species-richness and soil carbon
- Increased species-richness in grasslands – particularly in communities of deep-rooting plant species and wild legumes – increases carbon sequestration
- There are still gaps in UK-based research for semi-natural and species-rich grasslands



# #NoMowMay for the climate

## Publicly accessible functional green space in Great Britain [1]

| | Area (ha) | available for NMM? | Area (ha) available for NMM? |
|---|---|---|---|
| Public parks & gardens | 46,665 | 25% | c.11,500 |
| Playing fields | 25,678 | 10% | c.2,500 |
| Cemeteries | 6,896 | 10% | c.600 |
| Religious grounds | 4,130 | 10% | c.400 |
| Total | 83,369 | | c.15,000 |

+ 50% of 'lawn verges'
= 35,000ha

Gives 50,000ha total estimate

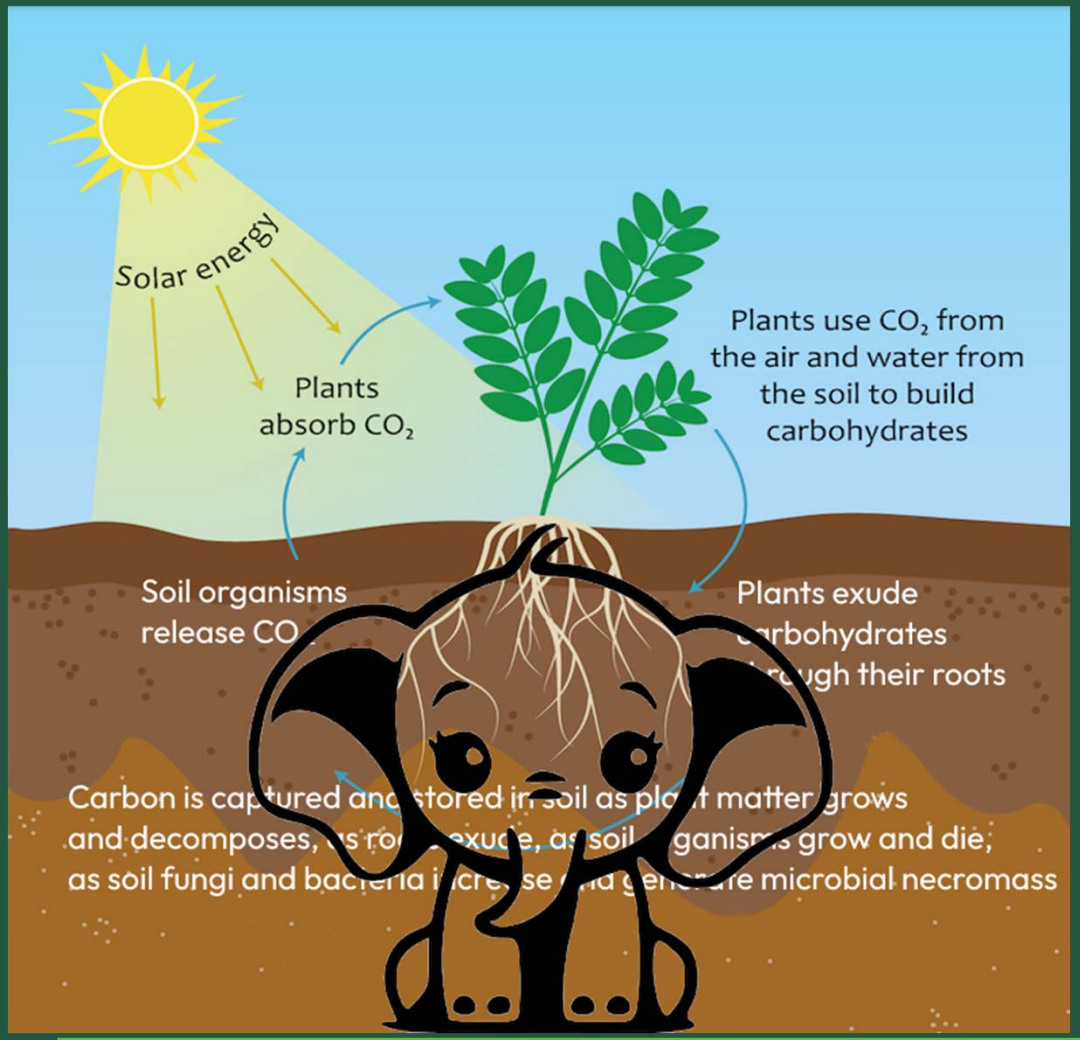
**Fuel consumption c. 6 litres diesel per ha x10/yr [2]**
**= 3M litres diesel / yr > 8,000 tonnes $CO_2e$**

**> C footprint of 680 UK residents [3]**

**> 4,250 average cars on UK roads / year [4]**


1. ONS Urban Natural Capital Accounts, 2023
2. Fuel consumption based on Wesström, Uppsala Universitet, 2015
3. Open Access Government, 2023
4. National Travel Survey, DfT, 2023
5. Ward et al. 2016, Legacy effects of grassland management on soil carbon to depth

# Soil carbon: The elephant underground




Research by University of Lancaster in 2016 looked at affects of grassland management on grassland's ability to store carbon.

Reducing the intensity of management and increasing plant species diversity in areas of low soil carbon could boost grassland soil carbon capture and storage by as much as 10% (> 20 tonnes C / ha)

50,000ha of road verge and public green space could generate an uplift of **2-8 $MtCO_2e$ (1000x more than carbon saved mowing 2x instead of 10x per year).**

Mowing frequency ↓ (with cut-and-collect)

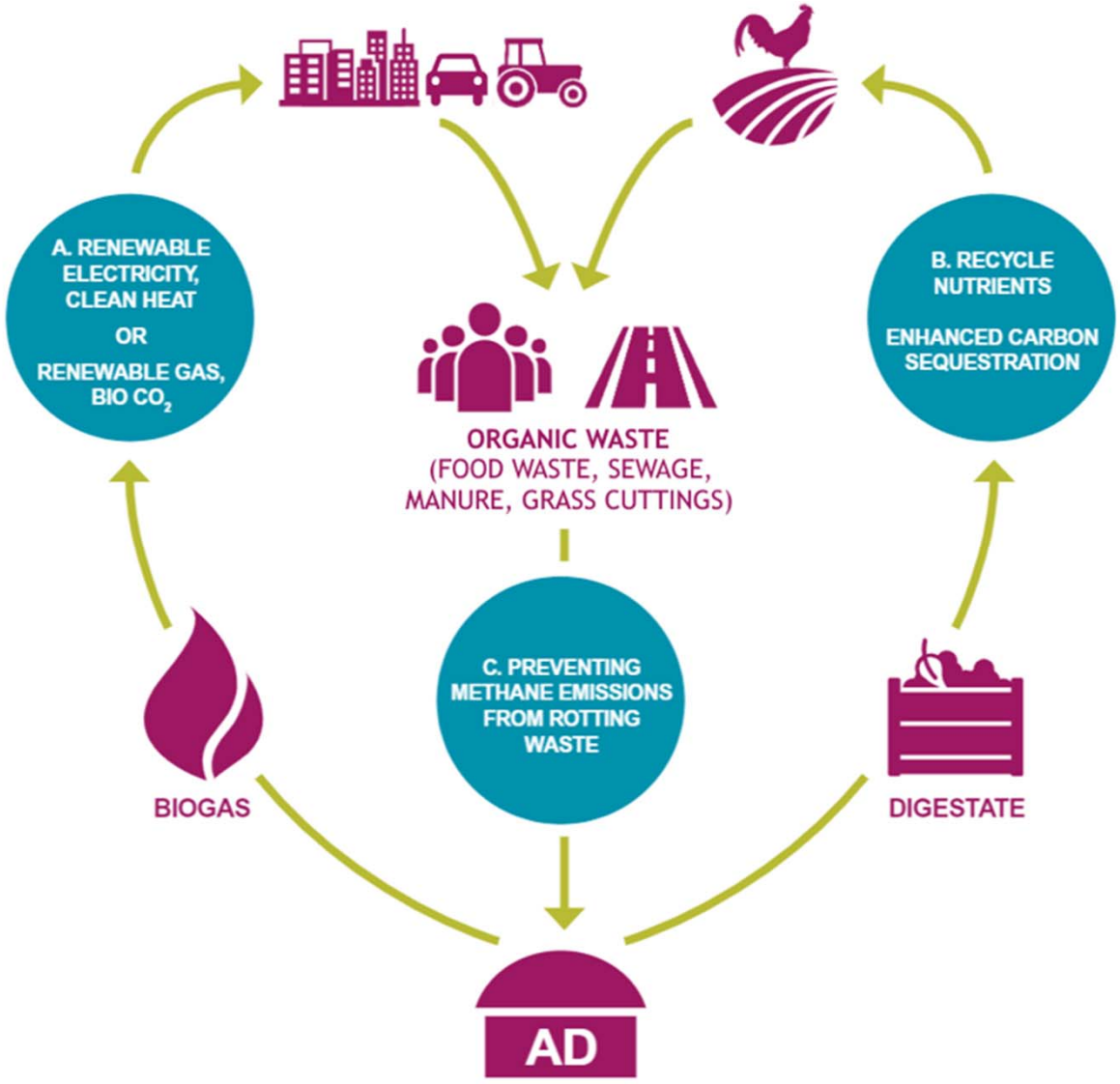
Plant diversity ↑

Soil C capture up to 1000x $co_2e$ emissions saved from reduced mowing

# Bio-circular approach

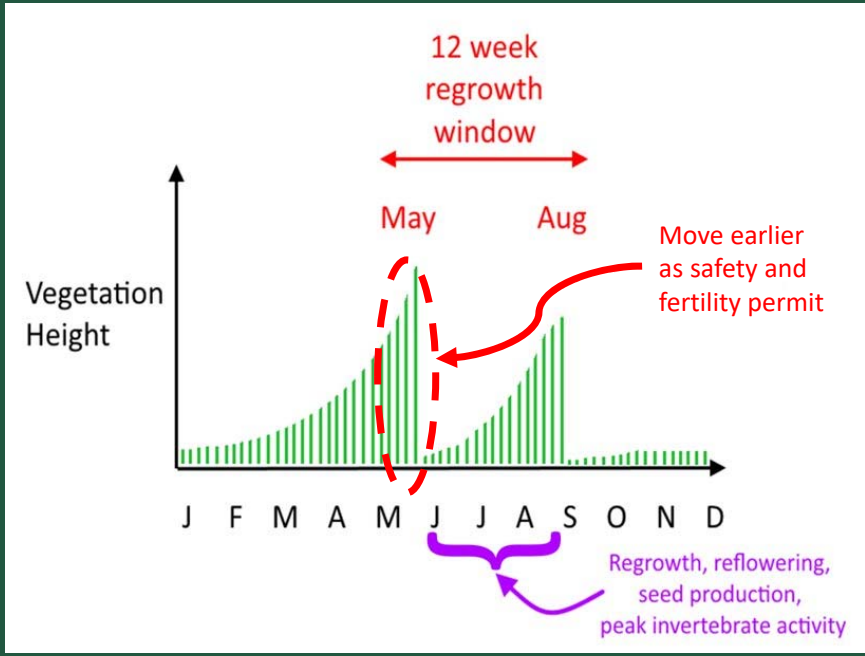
## Can we recycle grass cuttings?

Can we valorise the green waste we generate when we manage vegetation on public assets?

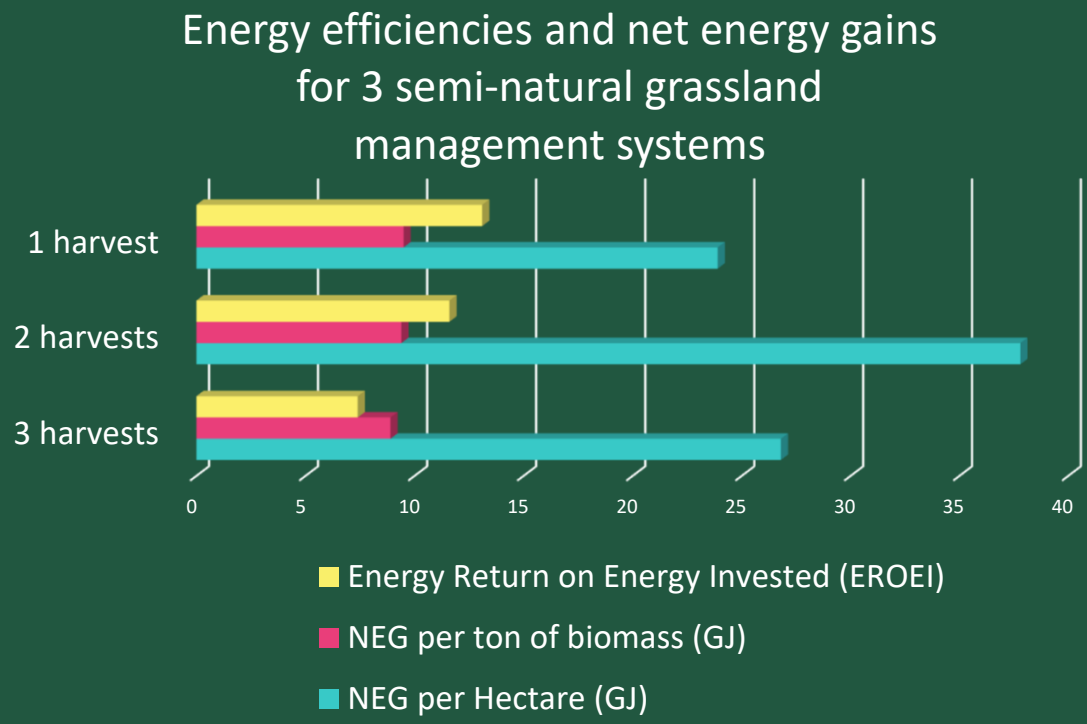


# The ‘two-cut sweet-spot’

## A happy coincidence of biodiversity benefit and energy efficiency




2 cuts/yr with collection best for biodiversity
- Jakobsson et al. 2018




2 harvests/yr best net energy gain / area
- Arodudu et al. 2013

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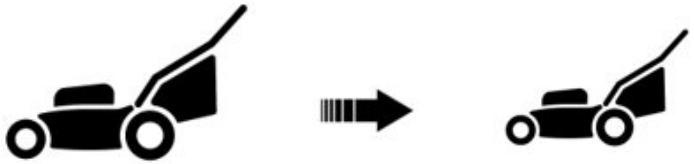
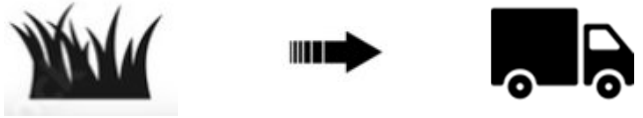
# Carbon-negative vegetation management

## The carbon case for Great Britain's road verges*

Reduction of more than 45% mowing costs, 50% emissions

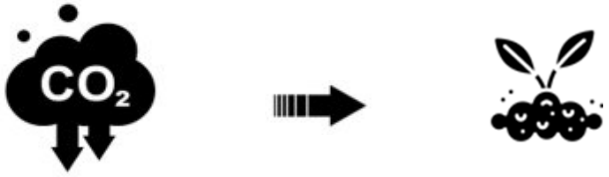


Replace diesel with biomethane cutting HGV emissions 2%



Bioenergy from roadside grass: 800M kWhrs
Power for 260,000 homes equivalent
Equivalent to 130 onshore wind turbines

Road verge grassland soil contains 160M tonnes CO2e
Could be increase by up to 10% if verges managed for grassland biodiversity.



Equal to 1/8th total annual domestic transport emissions

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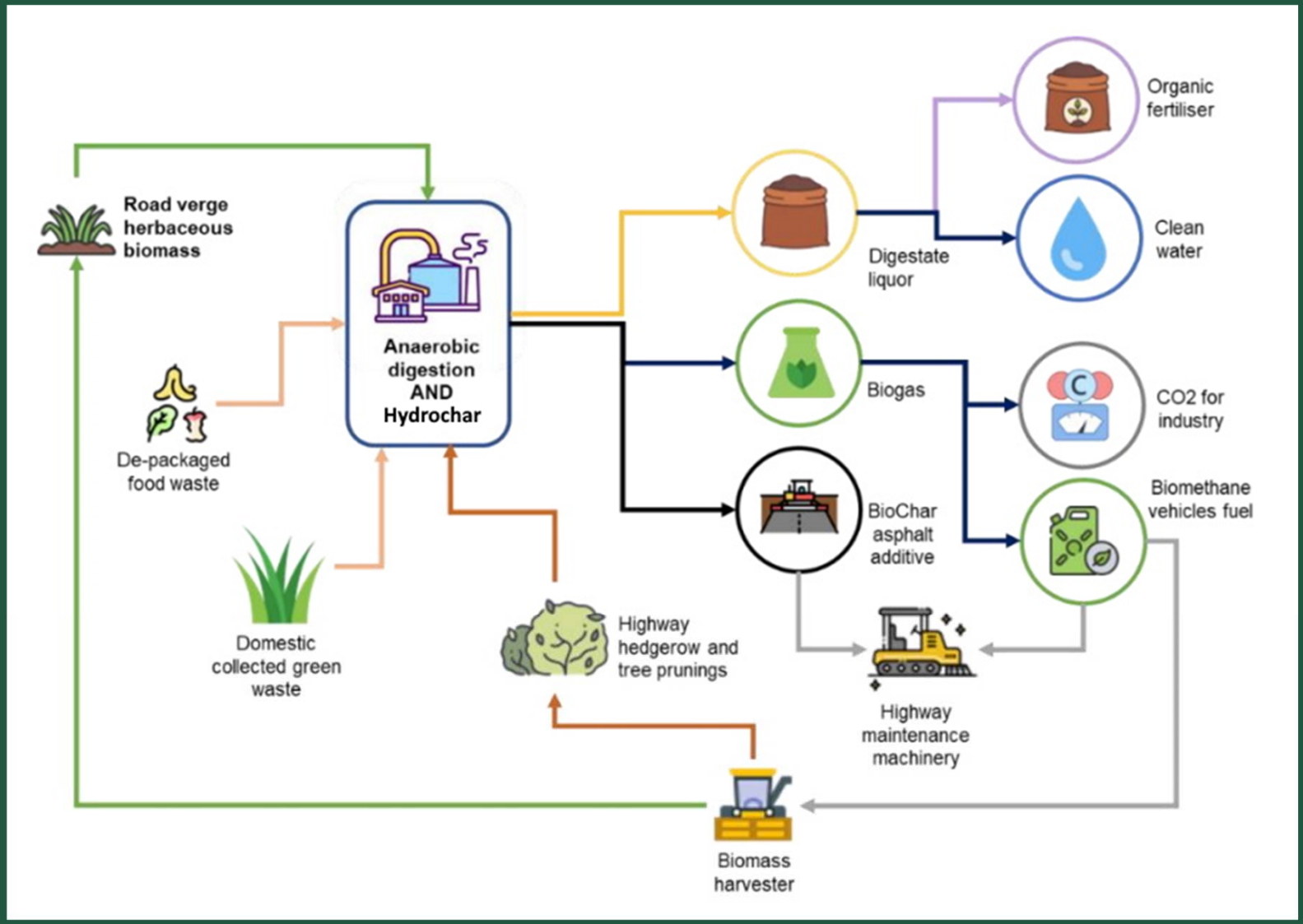
*Assuming 2 cuts / year from 50% of all verges

# GreenPrint (LiveLabs2)

£3.7M DfT funded

Mowers that....
'feed' themselves

and roads that....
'grow' themselves

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ADEPT LIVELABS2 Decarbonising Local Roads

west sussex county council

South Gloucestershire Council


## Well-managed grasslands provide ecosystem services

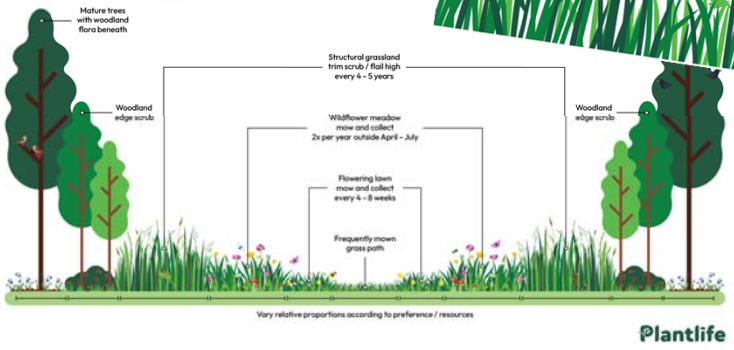
## Nature-based solutions for:

- Carbon-capture
- Nature recovery
- Health and well-being
- Drainage
- Urban cooling
- Drought resilience
- Pollination
- Driving down costs

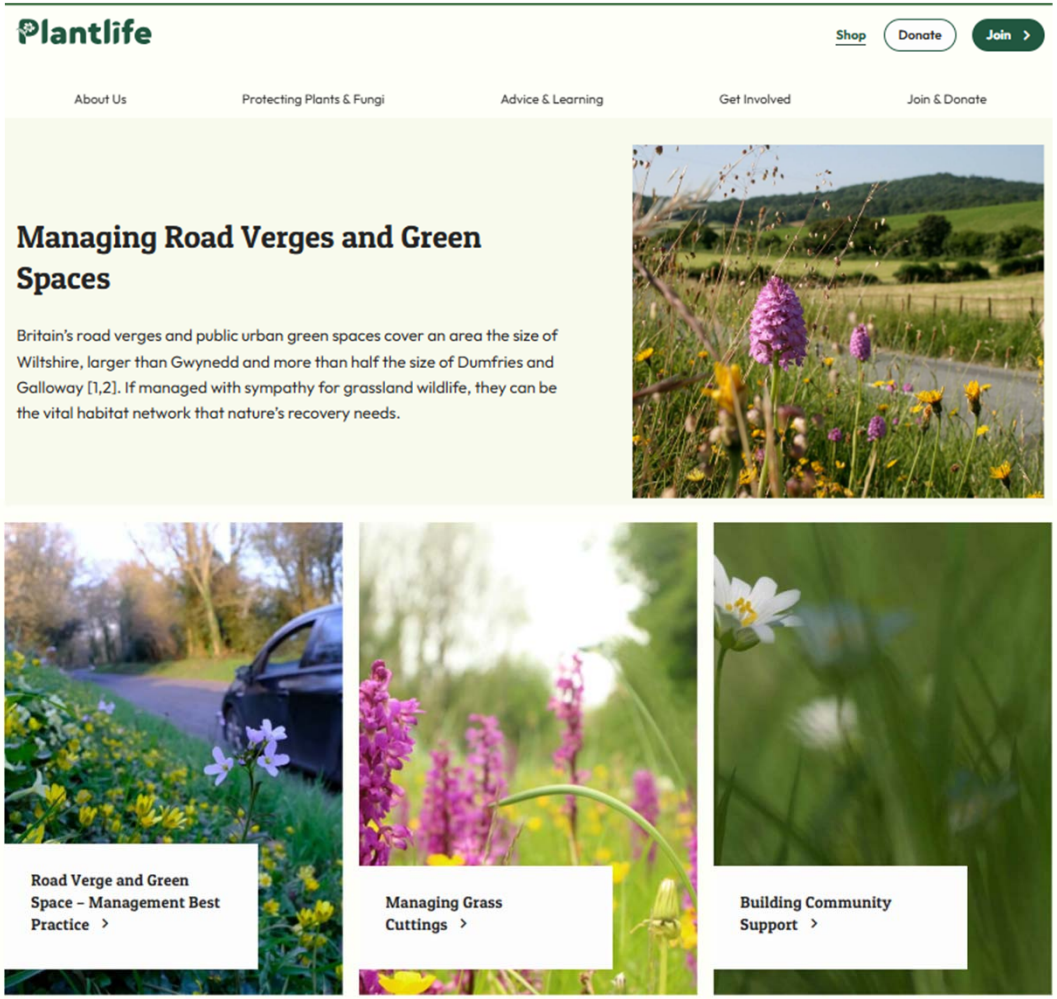
# How Plantlife can help…


PBC

CPD-accredited training for asset managers and operational staff



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