




## PERSPECTIVE

# Navigating a shifting agri-environment policy landscape to conserve butterflies

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## Abstract

For decades, agri-environment schemes (AES) within the United Kingdom have served as a policy tool for conserving butterflies. However, the UK's 2016 decision to leave the European Union (EU) means the overarching framework for AES, the EU Common Agriculture Policy (CAP), is being replaced by a new independent agri-environment policy, the Environmental Land Management (ELM) scheme. Here, we examine the shift from CAP towards ELM and explore its implications for butterfly conservation across England, as a devolved administration, within the United Kingdom. We identify the key changes between the current Countryside Stewardship scheme and the incoming ELM scheme and present recommendations for policymakers to ensure policy design and delivery can benefit efforts to conserve butterflies, and indeed wildlife more generally, in England. This is an opportune moment to contribute to discussions on the emerging agri-environment scheme policy within the United Kingdom as the ELM scheme is trialed, revised, and implemented.

## KEYWORDS

agri-environment policy, agri-environment schemes, butterflies, butterfly conservation, Environmental Land Management scheme

## 1 | INTRODUCTION

There is a strong societal interest in conserving butterflies for a variety of instrumental and ethical reasons (Fox et al., 2015). However, both wider-countryside generalist species and habitat specialist butterflies have declined across the British countryside over the last 40 years (Fox et al., 2015; Joint Nature Conservation Committee [JNCC], 2021). Among the most prominent threats contributing to this decline is land-use change through

agricultural intensification (Hayhow et al., 2019) and changes in woodland structure and management (Thomas et al., 2011). Climate change has also influenced butterfly dynamics across the United Kingdom in recent decades, though evidence suggests a variable response among species (Parmesan et al., 1999; Warren et al., 2001). Various legislative and policy instruments are in place that has the potential to mitigate declines of butterflies. Of these, agri-environment schemes (AES) have been recognized as one of the most influential mechanisms for butterfly

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conservation (Brereton et al., 2011; Fox et al., 2015). Cruickshanks (2018) has identified a range of interventions from past AES that provide benefits to butterflies, including the facilitation of landscape-scale conservation as well as targeted initiatives for Lepidoptera (known as butterfly-friendly options). Despite these efforts, evidence of how AES has benefited butterflies is limited (Fox et al., 2015), with most studies examining the effect of targeted schemes on priority species, including the silver-spotted skipper (*Hesperia comma*; Davies et al., 2005) and the chalkhill blue (*Polymmatius coridon*; Brereton et al., 2007). Wider systematic reviews of AES impact on wildlife, including butterflies, also indicate limited evidence for the effectiveness of AES (Kleijn & Sutherland, 2003).

Until recently, AES in England have been implemented under the European Union's (EU) Common Agriculture Policy (CAP). The current CAP splits subsidies into two pillars: Pillar 1 provides income-support payments, and Pillar 2 funds policies aimed at delivering sustainable rural development, including AES (Department for Environment, Food and Rural Affairs [Defra], 2020a). Countryside Stewardship (CS) is the current AES in England, originally launched in 2014 and funded under CAP Pillar 2. However, following the UK's decision to leave the EU, CS has been legislated independently by the UK government. CS is composed of several key elements of particular importance for butterfly conservation: Mid Tier agreements, including Wildlife Offers; Higher Tier (HT) agreements; and capital grants, including woodland support grants (Rural Payments Agency [RPA], 2020). HT options are designed to cover the most environmentally significant sites, including commons and woodlands, usually where more complex management is needed (RPA, 2020), and are important for the conservation of specialist or threatened species (Cruickshanks, 2018). CS also includes a Facilitation Fund which supports landscape-scale conservation efforts that are crucial for the conservation of butterflies (Cruickshanks, 2018; Ellis et al., 2012; JNCC, 2019). However, despite these mechanisms, butterfly populations, and indeed wildlife more generally, have continued to decline over recent decades (Hayhow et al., 2019). This indicates that current agri-environment policies are not effective at reducing or reversing biodiversity loss at a national scale (Batáry et al., 2015; Fox et al., 2015). There is therefore a pressing need to review and revise agri-policy in England to achieve the goal of reversing biodiversity loss set out in the UK's 25-Year Environment Plan (25 YEP; Defra, 2018).

Following the UK's decision to leave the EU (Brexit), a new agri-environment policy, the Environmental Land Management (ELM) scheme is being developed to replace CS. This is an opportunity to correct historic shortcomings of AES. ELM consists of three elements:

the Sustainable Farming Incentive (SFI), Local Nature Recovery (LNR), and Landscape Recovery (LR) schemes (Table 1). ELM is supported by the Agriculture and Environment Acts which establish domestic UK agricultural and environmental legislation. For example, the Agriculture Act sets out provisions to fund ELM (Defra, 2020a). More generally, the Environment Act aims to develop an ambitious program to enhance and protect the environment and to deliver objectives included in the 25 YEP. It also establishes key mechanisms for delivering its nature recovery goals, such as conservation covenants, LNR Strategies (LNRS), and the requirement that there will be long-term, statutory targets related to the environment (Defra, 2020d).

With the launch of ELM currently planned for 2024, now is an opportune time to contribute to its development. A National Pilot of ELM commenced in 2021 and will run until 2024 to inform the design of each of the ELM schemes (see Defra, 2020c for pilot timelines and details on the nature of the pilots). The pilot results, along with discussions from the continuing consultation process and ongoing tests and trials of individual scheme components, will be used to shape the policy. This article targets this early stage of policy development, aiming to provide guidance on how the design and structure could be optimized to conserve butterflies. As environmental issues are almost entirely devolved responsibilities in the United Kingdom, here, we focus on AES policy in England. Furthermore, although this work looks specifically at the conservation of butterflies across England, there may be wider relevance for wildlife conservation more generally as butterflies have been identified as positive indicators for wider biodiversity (Brereton et al., 2011; albeit with some caveats; e.g., Billeter et al., 2008).

## 2 | RECOMMENDATIONS FOR CHANGE

Through a process of literature and policy review, expert consultation, and discussion among the authorship, we have identified nine fundamental changes to AES as England embarks on ELM. We recommend the following priority considerations for policy makers to ensure benefits for the conservation of butterflies. Additional recommendations can be found in the Data S1.

### 2.1 | Scheme funding

The emerging post-Brexit system of using public money to pay for public goods is one of the most

**TABLE 1** Simplified description of the three ELM schemes

	SFI	LNR	LR
Purpose	“To incentivize environmentally sustainable farming and forestry and help to deliver environmental benefits” (Defra, 2020b)	“To incentivize the management of land in a way that delivers locally targeted environmental outcomes” (Defra, 2020b)	“To deliver land use change projects at a landscape scale to deliver environmental outcomes” (Defra, 2020b)
What the scheme could pay for	Actions which “address the environmental impacts of farming and forestry practices” and can contribute to the delivery of environmental public goods, the 25-Year Environment Plan commitments, and England's net zero target (Defra, 2020b)	Actions which will target “agreed priority outcomes in the most strategic locations” and rewards for collaboration between farmers and/or land managers (Defra, 2020b)	Projects that can deliver “over and above” the SFI and Local Nature Recovery and can yield “a diverse range of environmental outcomes that make substantial contributions to our environmental commitments such as nature recovery and net zero target” (Defra, 2020b)
Specific examples of what could be incentivized under the scheme	“...cropland management; grassland management; livestock management; tree and woodland management; boundary and hedgerow management; soil management; nutrient management; integrated pest management; efficient water use; wildlife and biodiversity; and the protection of heritage assets – where these go further than regulatory requirements” (Defra, 2020c)	“...creating, managing and restoring habitats such as woodland, wetlands, freshwater, peatland, heathland, species-rich grassland, and coastal habitat, as well as connecting isolated habitats to form networks; natural flood management; species management; rights of way, navigation and recreation infrastructure; education infrastructure, events and services; and geodiversity and heritage asset management” (Defra, 2020c)	“... large-scale forest and woodland creation, restoration and improvement; ecosystem restoration; peatland restoration; and the creation and restoration of coastal habitats such as wetlands and salt marsh” (Defra, 2020c)

Abbreviations: ELM, Environmental Land Management scheme; LR, Landscape Recovery; LNR, Local Nature Recovery; SFI, Sustainable Farming Incentive.

influential principles shaping the changing AES landscape. This approach offers an opportunity for a larger amount of capital to be reallocated to public goods (e.g., thriving plants and wildlife) than has been available through AES funded under the CAP. However, there is concern that AES funding might be reduced now that England is not bound by the stipulations of the CAP and if taxpayers and the Treasury do not consider ELM as delivering value for money. Therefore, monitoring and measuring outcomes of ELM will be crucial to ensure enough funding is available to conserve butterflies and other wildlife.

The distribution of funding across the three ELM schemes is also still being finalized. With respect to butterfly conservation, we recommend that focusing the majority of funding within the LNR and LR schemes is likely to deliver the greatest benefits. However, fearing political pressure on policy makers to concentrate funding in the SFI, we also welcome the recently announced plan to evenly split the funding between the three schemes (Defra, 2021a).

## 2.2 | Payment structure and calculations

The ways in which farmers and land managers are paid for implementing agri-environment interventions is a key point of potential difference between CS and ELM. Payment methods are still being examined in tests and trials and will continue to be adapted until the scheme design is fully rolled out in 2024 (Davies, 2021). Two potential payment approaches for ELM schemes, Payment for Actions (PfA) and Payment by Results (PbR), are compared in Table 2. While PbR has political support and is likely to be an important part of ELM, it needs to be used strategically, focusing on areas where it will have the greatest value for money in achieving conservation goals. Although we support the PbR principle in theory, we have several reservations about its practicality. These include uncertainty surrounding the result indicators that could be used to determine success and risks that farmers and land managers may not be paid if factors outside of their control impede their ability to deliver a set result. Table 2 provides some further insights into how we believe these issues could be addressed.

TABLE 2 An overview of two agri-environment scheme payment methodologies

Payment methodology	Description	Positive attributes	Negative attributes
PfA	Farmers and land managers with CS agreements are paid for delivering prescribed management actions based on income forgone and costs incurred (see Mennig & Sauer, 2019)	<ul style="list-style-type: none"> <li>• Relatively straightforward to measure and monitor</li> <li>• There exists decade's worth of insights and experience with this system</li> <li>• Funding for management is guaranteed (so long as farmers and land managers adhere to prescriptions and other rules and regulations)</li> <li>• Its tightly defined prescriptive approach tends to work well under "normal" conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Not all years are "typical"—If there are abnormal or extreme weather conditions, farmers cannot adjust their management because they must adhere to prescriptions to receive an AES payment, even if it comes at the detriment of species</li> </ul>
PbR	Would entail a shift towards land managers being paid for outcomes, not just actions (see Keenleyside et al., 2014) PbR might be primarily applicable in LNR because of the types of outcomes it intends to deliver, which is in line with Defra's (Defra, 2020b) thinking on payment methodologies	<ul style="list-style-type: none"> <li>• It can appeal to farmers and land managers by providing them with the ability to utilize their own expertise to deliver biodiversity objectives on their land</li> <li>• The increased flexibility and reduced prescriptiveness of PbR schemes allow them to be "more easily targeted" to meet the needs of local circumstances and situations (Keenleyside et al., 2014), which is crucial for butterflies (Cruickshanks, 2018)</li> </ul>	<ul style="list-style-type: none"> <li>• PbR can be more difficult to monitor than an options-based system (see Bartkowski et al., 2021)</li> <li>• Funding for management is not guaranteed for farmers and land managers as it is under CS's system of paying for actions</li> <li>• It may be viewed as riskier to enter into, particularly if agreement-holders will be paid based on number of species produced (as this can easily be impacted by weather and other elements outside of land managers' control; see Bartkowski et al., 2021)</li> <li>• To reduce this concern, indicators of success could instead involve land managers reaching optimal conditions for a particular species (e.g., attaining a sward height of 2–10 cm for the chalkhill blue butterfly [<i>P. coridon</i>], see Brereton et al., 2007)</li> </ul>

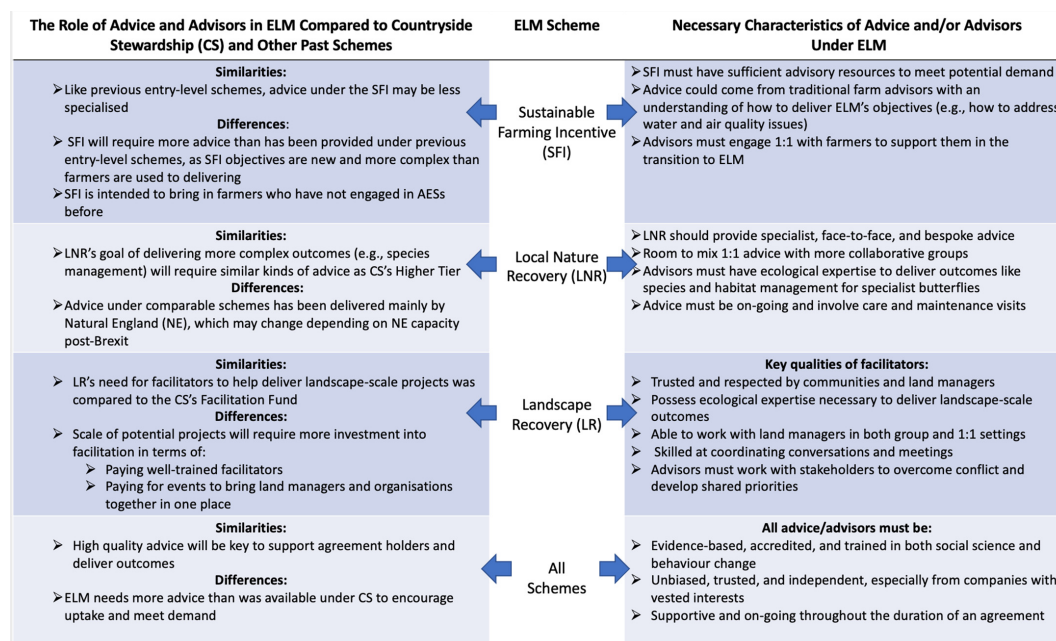
Abbreviations: AES, agri-environment schemes; CS, Countryside Stewardship; LNR, Local Nature Recovery; PbR, payment by results; PfA, payment for actions.

In addition, we argue payment rates need to be sufficient to achieve the changes that are being proposed. Short et al. (2018) found insufficient incentives limited uptake of CS agreements, so offering higher payments in ELM, possibly linked to delivering SMART<sup>1</sup> targets (see below), may see higher rates of uptake, resulting in greater environmental benefits.

## 2.3 | Monitoring and targets

The outcomes of past schemes have not been set against SMART<sup>1</sup> environmental targets, which is a key weakness

of previous AES. However, it is anticipated there will be more attention to monitoring and measuring outcomes of ELM than in past schemes. Specifically, ELM may be measured against targets set out in the 25 YEP and codified as statutory targets within the Environment Act and/or against local targets determined by LNR Strategies (LNRs; e.g., targets related to butterfly abundance and/or distribution). In either case, we recommend that targets should be SMART (e.g., Green et al., 2019). To evaluate, more effectively, the outcome of ELM, we suggest that monitoring schemes, whether conducted by farmers and land managers (and potentially local people) or by non-governmental organizations (NGOs) or



**FIGURE 1** A summary of the role of advice and advisors in ELM, including how it compares to past schemes and what must be considered moving forward

other organizations, should be adequately funded and training provided to those responsible for monitoring and reporting. Sufficient and effective resources are crucial, as monitoring and reporting progress can inform how overall scheme delivery may need to be altered to achieve targets (Hawkins et al., 2019).

## 2.4 | Advice and advisors

It has been shown that the lack of access to advisors contributed to poor take-up of CS in some areas (Hawkins et al., 2019). Issues with advising have included the following: some advisors having vested interests and biases, resulting in a lack of trust; a deficiency of free advice leading to cost barriers; insufficient on-going advice to support agreement holders through the duration of their agreements; and advisors lacking necessary expertise. This suggests that increased access to high-quality advisors is necessary for improved conservation outcomes under ELM (Figure 1). The value of expert, on-going advice to implement species management interventions to benefit butterflies has been demonstrated by Butterfly Conservation (Cruickshanks, 2018). Regular and sustained care and maintenance visits from advisors with appropriate expertise are also a valuable tool to increase the likelihood of successful outcomes. Such visits provide agreement-holders with feedback, advice, and support throughout their agreement and enable the advisor to monitor how well the agreement is being implemented. In addition, we

recommend the onus for paying advisors should not be put on ELM agreement-holders but instead be funded through ELM and included as part of an ELM agreement.

## 2.5 | Regulation

Under CS, payments to farmers have been subject to regulations to enforce cross-compliance along with other standards under the CAP's framework and domestic legislation. This means that to receive payments, farmers and land managers must comply with a range of management requirements and standards. However, cross-compliance will be phased out over the coming years, with the exact details of the new regulatory regime currently under development (Defra, 2020c). We recommend that for ELM to deliver systematic change for butterflies, a stronger regulatory approach must be integrated into ELM, and particularly the SFI. We suggest raising the current regulatory baseline and integrating the principle of additionality into ELM's regulatory framework, whereby ELM agreement holders are paid to deliver environmental outcomes beyond a regulatory baseline (Wildlife and Countryside Link [WCL], 2020). Doing so can ensure ELM's funding is spent on ambitious interventions which could benefit butterflies (and wider biodiversity), not simply on best management practice. This balance between setting regulatory requirements and offering financial incentives for environmental activities through ELM, in order to deliver value for money, is being considered by Defra (2021b).<sup>2</sup>

## 2.6 | Local targeting and spatial prioritization

Locally targeted interventions are an important part of the current CS scheme, directing funding to priority habitats and species. These interventions have been crucial for butterfly conservation, especially for specialist species (Prescott, 2012). Under ELM, a new LNR scheme similarly will deliver priority outcomes in strategic locations (Defra, 2020b). The approach to spatial prioritization<sup>3</sup> for the LNR scheme will be supported by LNRS established by the Environment Act (Defra, 2020d). While there will be some similarity to the Natural Character Areas (NCAs) used to target CS, NCAs have been criticized for adopting a heavily top-

down approach (Defra, 2020b). LNRS offer an opportunity to rectify this weakness by facilitating a more participatory approach to local prioritization and targeting.

Although there is potential for LNRS to improve how prioritization and targeting have been done in the past, the balance between habitat-based approaches and species-based approaches to the LNR scheme needs to be carefully considered. Species requirements are often complex (Ellis et al., 2012) and achieving the recovery of species using a habitat-led approach can often be more complicated than simply creating more habitat. It will be important that the LNR scheme has a strong species focus in any plans that are created going forward.



**FIGURE 2** A summary of the benefits and shortcomings of the facilitation fund and farmer cluster models of collaboration and facilitation, and an overview of what can be learned from both when designing ELM

## 2.7 | Spatial coordination

Landscape-scale conservation is imperative for butterflies (Ellis et al., 2012); therefore, optimizing ELM for butterflies requires that agreements under all three schemes are properly joined-up. Achieving spatial coordination requires facilitation (individuals or organizations bringing land managers together) and collaboration (land managers working together across a landscape) (Cockburn et al., 2020). The Facilitation Fund and Farmer Clusters (n.d.) have been designed for this purpose, and these types of models are being examined in the ELM trials (Defra, 2020b). In Figure 2 we review these two mechanisms, identifying benefits and shortcomings.

## 2.8 | Securing long-term benefits

A particular challenge for any AES is that beneficial land use change (one of the primary objectives of the LR scheme) can take longer than the typical 5-year or 10-year AES agreement. However, farmers and land managers can understandably be averse to making long-term changes without long-term funding guarantees. To mitigate this discrepancy in ecological and policy time-scales, we suggest LR should explore offering longer grants to incentivize permanent land use change. Additionally, conservation covenants (legal tools which allow landowners to commit to conservation for the long-term; Defra, 2020d), are a potential solution to secure enduring benefits for butterflies and other wildlife.

## 2.9 | Public engagement and access

Improved public engagement under ELM is important for numerous reasons, but particularly to engage with taxpayers and gain broad support for ELM and its funding. This is particularly crucial now that AES funding across England will no longer be ringfenced by the CAP framework. Public access to the countryside is a key facet of increased public engagement (see WCL, 2020). In the original Countryside Stewardship scheme (active from 1991 to 2014) local people could express what forms of access (e.g., footpaths, bridleways), among other public benefits, they wanted from the scheme. We recommend that ELM could increase options for public consultation and access to the countryside. Rights of Way are currently listed as an example of what the LNR scheme could pay for (Defra, 2020c), but it is crucial that this is promoted to increase potential uptake. Furthermore, in the recent past, AES options for public engagement/access have been narrowly focused on educational purposes (e.g., JNCC, 2019,

pp.131–132), and we argue the scope of payments should be expanded as with earlier schemes.

## 3 | CONCLUSIONS

AES have the potential to act as critical policy mechanisms for the conservation of butterflies. However, despite decades of conservation efforts implemented through AES across England, butterfly populations have continued to decline, which has primarily been driven by agricultural activity (Hayhow et al., 2019). Brexit offers an opportunity to improve agricultural and environmental policy to offer greater benefits for butterflies than have been achieved under past schemes.

AES policy negotiations are at a watershed moment as ELM's National Pilot and tests and trials commence, and the full rollout of the three ELM schemes approaches. Here we have brought together a wide range of conservation expertise and distilled diverse insights into recommendations that we believe could enable ELM to significantly improve butterfly conservation across the English countryside over the coming years. These recommendations are intended to guide and inform policy discussions at this early stage in the process and as such, we have not delved into the budgetary realities that will determine their feasibility and effectiveness; this will be an area for future study once the scheme is finalized and implemented. While our intention for this Perspective is to recommend policy, we acknowledge the need for additional research in several key areas. These are outlined in the Data S1.

## AUTHOR CONTRIBUTIONS

Linnea B. Stewart, Chloe Strevens, George Cusworth, Michael B. Bonsall, and Christopher Corrigan planned the research. Linnea B. Stewart collected and analyzed the interview data. Christopher Corrigan, Lynn V. Dicks, Jilly Hall, Jenny Plackett, and Martin Spray took part in interviews and conceived the ideas presented in this article. All authors assisted in critically reviewing the article and gave final approval.

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## CONFLICT OF INTEREST

The author declares that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

## DATA AVAILABILITY STATEMENT

Given the sensitive nature of the human participant data used in this study, it will not be made publicly accessible.

## ETHICS STATEMENT

This research was approved by the University of Oxford Central University Research Ethics Committee (Reference number: SOGE1A2020–91).

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## ENDNOTES

- <sup>1</sup> Specific, measurable, achievable, relevant, and time-bound.
- <sup>2</sup> The Defra is the government department responsible for developing and implementing ELM in England.
- <sup>3</sup> Defined as “planning, targeting, and prioritizing at a local level” (Defra, 2020b).

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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