

The Finance Gap for UK Nature

Assessing the finance gap for nature-related outcomes across the UK and the devolved administrations

Final report: 1 October 2021 with finance data from 31 July 2021

Citation: GFI, eftec, Rayment Consulting (2021) The Finance Gap for UK Nature

About this report

The Finance Gap for UK Nature report was commissioned by the Green Finance Institute, to identify the finance gap across the UK to achieve nature-positive outcomes in order to assess the need for private investment.

Environmental economics consultancy, **eftec**, supported by **Rayment Consulting Services**, carried out the assessment presented in more detail in the summary pages and findings that follow.



The Green Finance Institute is the UK's principal forum for public and private sector collaboration in green finance. It is uniquely placed to mobilise capital to accelerate the domestic and international transition to a sustainable, net-zero carbon and nature-positive economy.

The Green Finance Institute convenes and leads mission-led coalitions to identify and unlock barriers to deploy capital at pace and scale towards impactful, real-economy outcomes.

What is the 'finance gap for UK nature'?

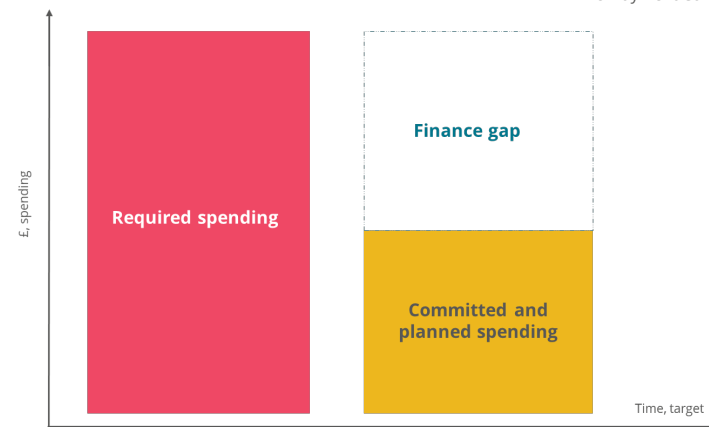
Finance gap is the difference between *required spending* and *committed/planned spending* associated with the delivery of a set of nature-related outcomes (accounting for overlaps¹).

Required and committed/planned spending are estimated using available evidence, not through a full-scale modelling of the need and actual spending. Required spending could be paid for by public, private, third sectors and/or investors. Committed & planned spending is by the public sector (in particular) and evidence is often for budgets to meet legal requirements and/or public commitments.

Spending data covers **actions** such as (i) nature-based solutions and (ii) others where the spending primarily contributes to the delivery of one of the nature-related outcomes. Spending data does not cover emerging issues that are not in the list of outcomes nor does it fully address deteriorating baseline conditions.

Nature-related outcomes are based on public policies like the 25 Year Environment Plan in England and equivalent for the rest of the UK. Spending with the intention to contribute to the delivery of each outcome is reported but whether such intention is sufficient to meet the outcome is not assessed. Given the paucity of evidence for most outcomes, **required spending and hence the finance gap reported here are likely to be underestimates.**

Source: GFI, eftec,
& Rayment Consulting (2021)



¹ This simple diagram does not show the overlaps in spending (i.e., spending that delivers multiple outcomes) but these have been taken into account in the calculations as much as possible

Location: The UK as a whole, and separately for England, Scotland, Wales, Northern Ireland and the Overseas Territories where data is available or could be reasonably extrapolated / apportioned.

Time period: the findings for 2022-2032 are reported here. The database also contains extrapolation to 20 and 30 years. Data correct as of 31 July 2021 – commitments & consultations after this date are not included. Nominal £-values are reported over these time periods.

Finance gap for nature-related outcomes in the UK



The finance gap to meet the UK's nature-related outcomes is at least between

£44 billion and £97 billion
over the next 10 years –

with a central estimate of £56 billion

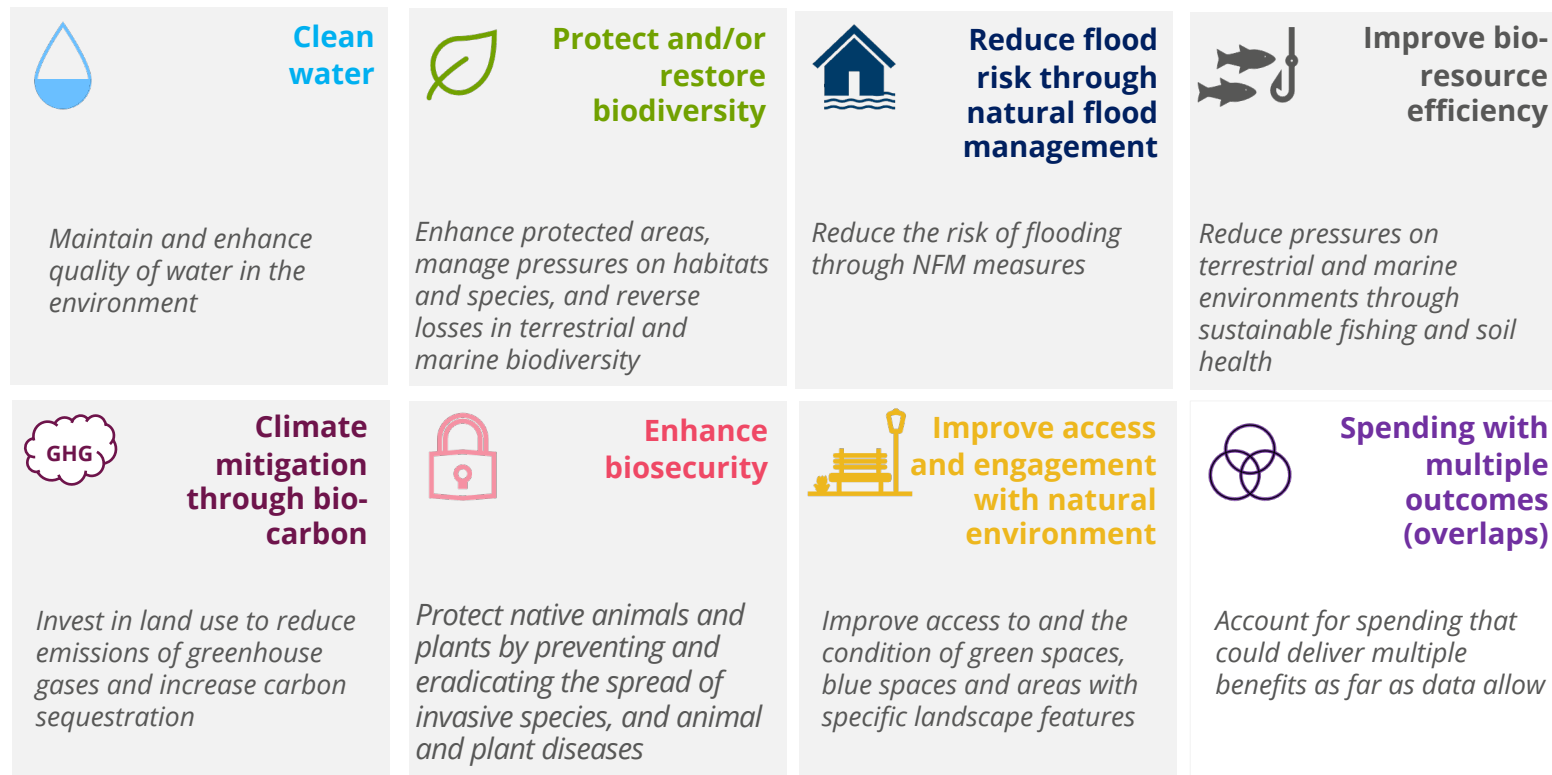
The ranges of estimates reflect the breadth of evidence found in literature and through consultations, various assumptions embedded in that evidence and assumptions we made about future required and committed or planned spending.

Lower gap estimate represents an optimistic assessment: spending currently committed continues beyond the period for which it is committed. **Central estimate** uses this optimistic assessment too.

Higher gap estimate represents a pessimistic assessment: spending currently committed stops at the end of the period for which it is committed



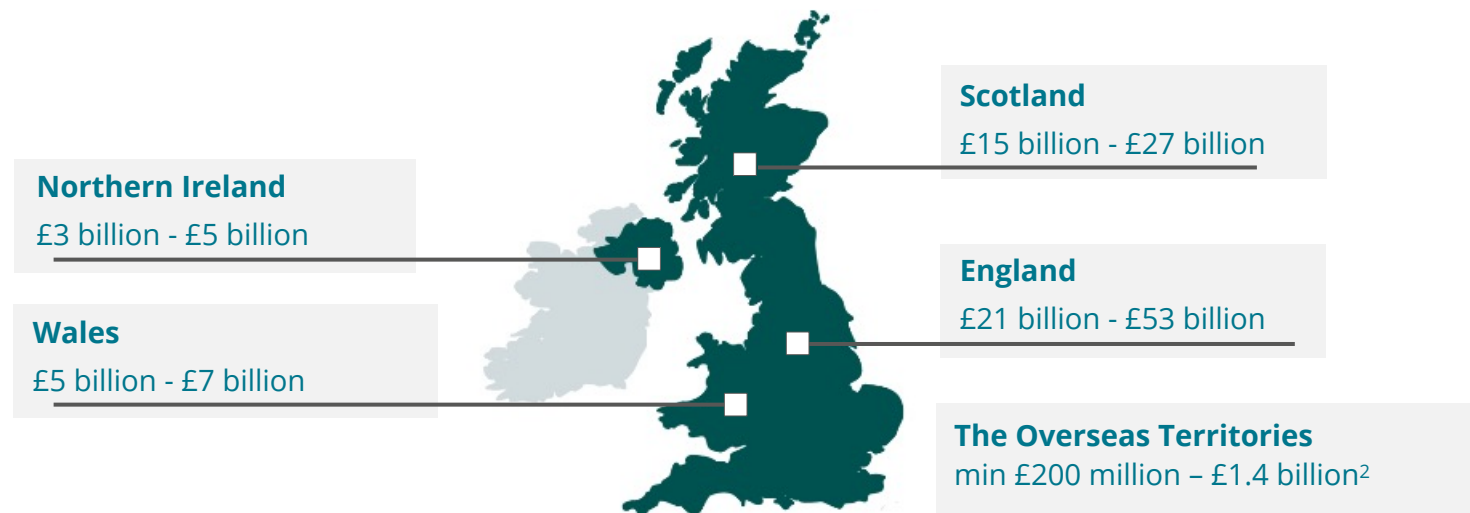
What are the nature-related outcomes?



Nature-related outcomes are based on public policies like the 25 Year Environment Plan for England and equivalent for the rest of the UK.

Finance gap by location (2022-2032)

£44 billion - £97 billion in the next 10 years is attributed to the Devolved Administrations and the Overseas Territories as follows¹:

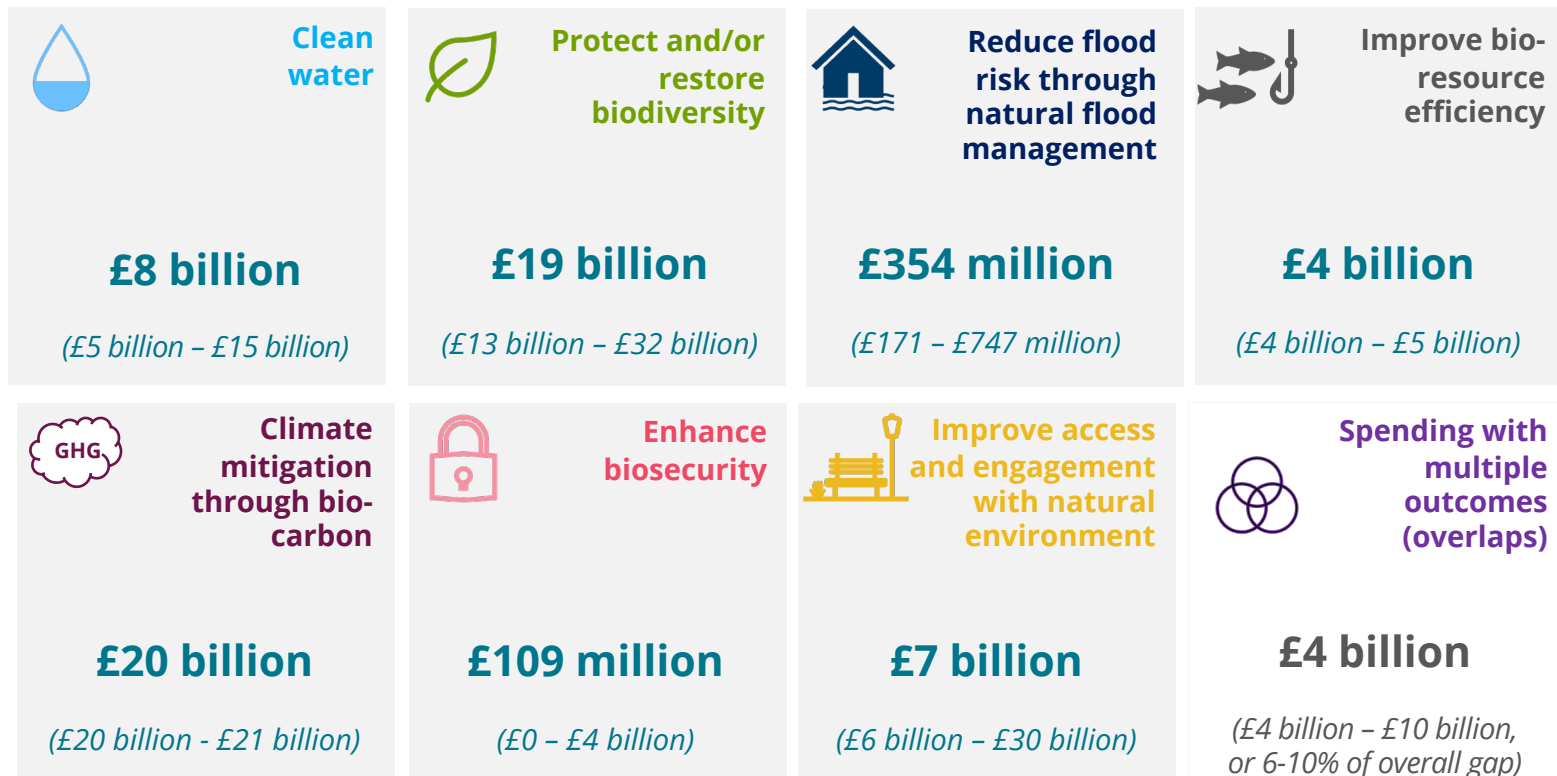


¹ The sum of the gaps for each country does not add up to the total for the UK as spending data on some outcomes (e.g. 'Reducing the risks of invasive species') are only available for the UK / Great Britain. ² Only includes spending to 'Increase the proportion of protected and well-managed seas'.

The ranges of estimates show optimistic and pessimistic expectations about the continuation of committed spending beyond the period for which it is committed.



Finance gap by outcome (2022-2032)



Nature-related outcomes are based on public policy like the 25 Year Environment Plan in England and equivalent in the rest of the UK.

The ranges of estimates show optimistic and pessimistic expectations about the continuation of committed spending beyond the period for which it is committed.

Finance gap by outcome and location (2022-2032)

	UK ¹	England	Wales	Scotland	Northern Ireland
Clean water	£8 billion	£3 billion	£1 billion	£3 billion	£710 million
Protect and/or restore biodiversity	£19 billion	£9 billion	£1 billion	£8 billion	£1 billion
Reduce flood risk through natural flood management ²	£354 million	£347 million	£7 million	-	-
Improve bio-resource efficiency	£4 billion	£3 billion	£35 million	£476 million	£437 million
Climate mitigation through bio-carbon	£20 billion	£8 billion	£2 billion	£9 billion	£669 million
Enhance biosecurity	£109 million	-	-	-	-
Improve access and engagement with natural environment	£7 billion	£4 billion	£ 1 billion	£1 billion	£1 billion
Overlap	£4 billion	£1 billion	£ 220 million	£2 billion	£272 million
Total	£56 billion	£27 billion	£5 billion	£20 billion	£4 billion

¹The sum of the gaps for each location does not add up to the total for the UK as spending data for some outcomes only available for the UK / Great Britain or includes spending in Overseas Territories. ² UK finance gap for this outcome measured as sum of gaps across DAs.

NB: Central estimate used. If figure less than 1 million rounded to nearest million. The sum of the gaps for each location does not add up to the total for the location due to rounding.

The finance gap estimate presented here

Does...

- Present all evidence we collated as of the end of July 2021 through the review of data sources, literature and stakeholder consultations
- Provide an order of magnitude estimate of the overall finance gap for nature-related spending
- Report nominal spending by nature-related outcome and location
- Report committed spending, spending requirements and gaps for 10 years from 2022 in this report – projections to 20 and 30 years are provided in the database








Does not...

- Report a full-scale assessment or modelling of all spending requirements related to nature-related outcomes beyond what is included in Rayment (2021) for biodiversity
- Imply that if the finance gap is closed the outcomes will be delivered
- Capture all potential nature-related outcomes given the limitations of available data
- Capture spending in the Overseas Territories other than for the marine biodiversity
- Include spending on grey infrastructure or produced capital, except where the primary outcome of the investment is on the condition of the natural capital assets¹
- Include spending on academic research
- Assess benefits of spending or delivering the nature-related outcomes

¹ All evidence on public and private sector spend on green and grey infrastructure to improve river water quality and/or quantity is included. Such spending is not limited to end of pipe measures. Spending on the quality and quantity of public water supply is not included.

An aerial photograph of a dense forest with a stream flowing through it. The stream is dark and rocky, winding through the green trees. The forest is lush and appears to be a temperate or subtropical forest. The stream flows from the top right towards the bottom left of the frame.

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Results for each outcome are presented in the following order:

- Definition and references from which spending evidence is taken
- Coverage in terms of activities and investments included in the estimates and gaps in the evidence
- Summary of estimates for required and committed spending, and finance gap and notes
 - Central estimates are reported here, with the range of high and low estimates shown in the graphics
 - The ranges of estimates show optimistic and pessimistic expectations about the continuation of committed spending beyond the period for which it is committed
- Where there are several outputs contributing to a given outcome, the above information is provided separately for each output as well in aggregate for the outcome

Approach

Why estimate the finance gap?

The UK faces a climate and biodiversity crisis that is set to get worse over the next 30 years if urgent action is not taken by all concerned.

There is a consensus that nature is underfunded and that the (private) nature-based markets could play an important role in closing this finance gap.

However, such markets are in early development and need strategic direction to activate private capital.

Part of this project is to provide evidence on (i) how much funding is needed (i.e. a 'baseline'), and (ii) where investors should focus.

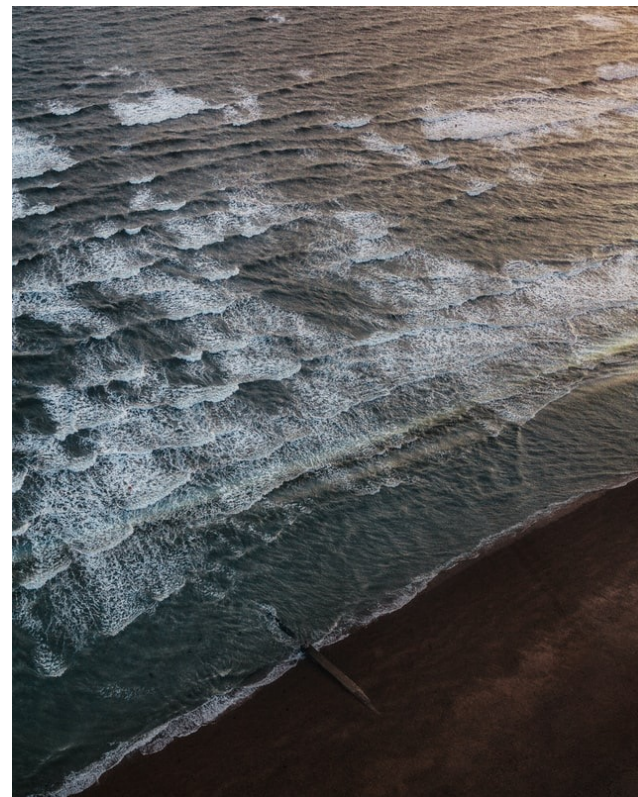


Photo by [Ars Gadz](#) on [Unsplash](#)

The scope

The purpose of this project is to assess the finance gap for spending¹ to deliver nature-related outputs across the UK, the devolved administrations and Overseas Territories over the next 10, 20 and 30 years.

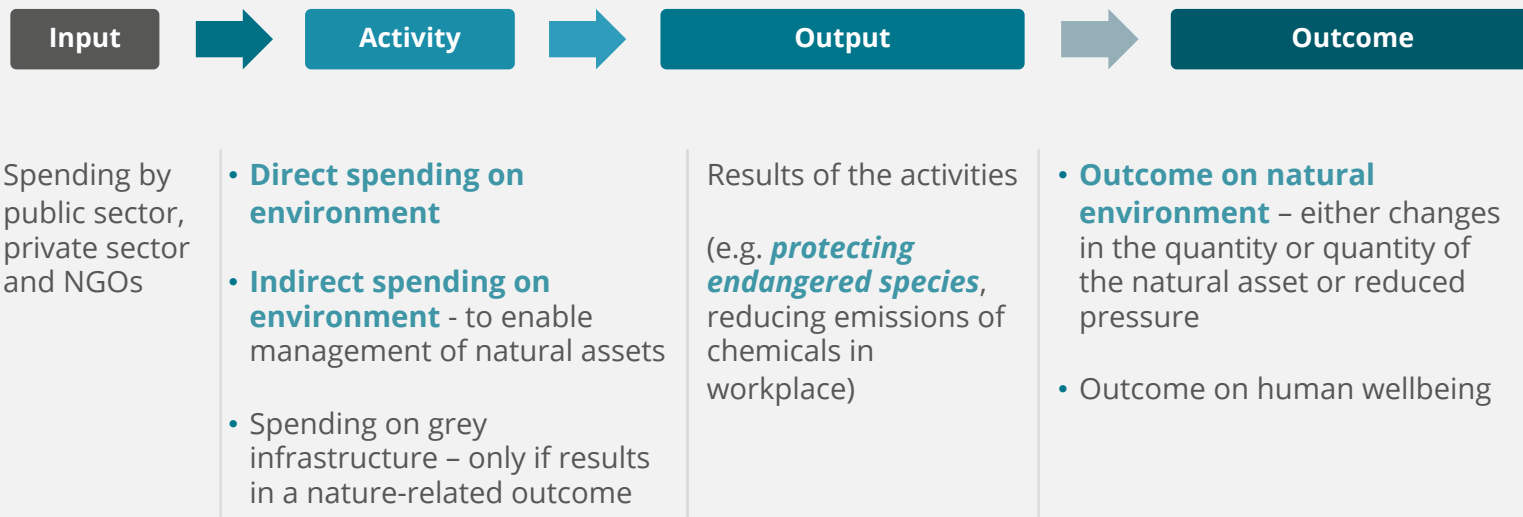
The nature-related outcomes that are within the scope of the project are agreed based on policy commitments and in consultation with the GFI. Not all, potentially nature-related outcomes, are included in the scope. For more information on outcomes, see Appendix 1.

A Theory of Change approach is used to decide what is within and out of the scope of the project. This approach is summarised in Box 1 on slide 15. The Theory of Change shows how spending related to each outcome is expected to contribute to its delivery and differentiates between input, activity, output and outcome. The example of how this theory of change is applied to the Clean Water outcome is shown on slide 16.

In total, seven nature-related outcomes and twenty associated outputs associated are included in the scope of the project. In addition, overlaps between spending where certain activities can deliver multiple outcomes are included as much as possible – see Slide 17.

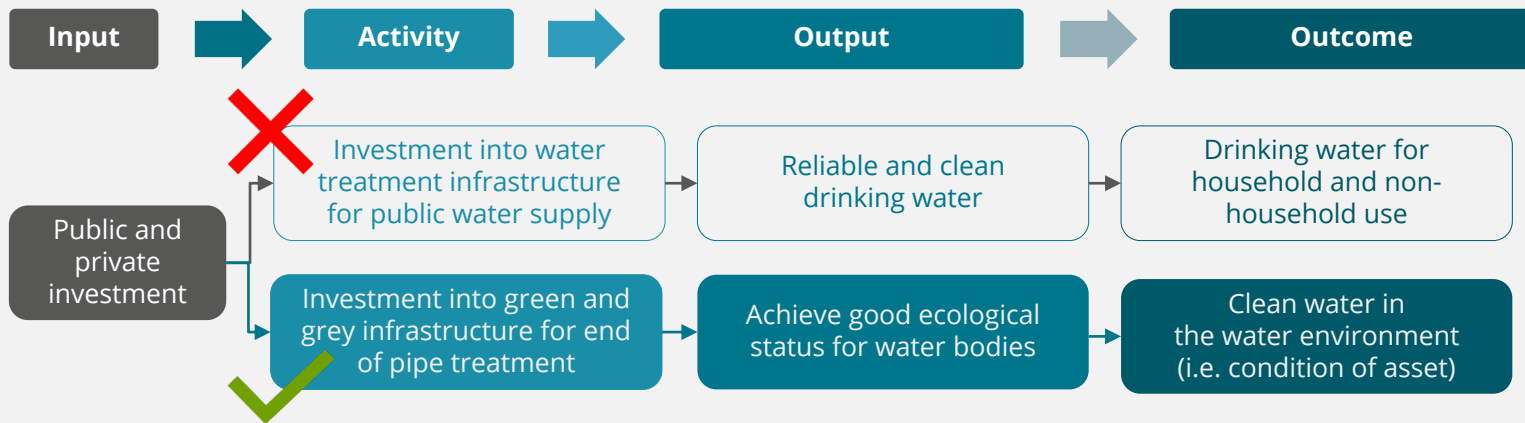
¹Spending data covers **actions** such as (i) nature-based solutions and (ii) where the spending primarily results in one of the nature-related outcomes. It does not cover emerging issues that are not covered in the list of outcomes nor does it fully address deteriorating baseline conditions

Box 1: Theory of change for nature-related spending



Box 2: Theory of change for nature-related spending – example of the Clean Water outcome

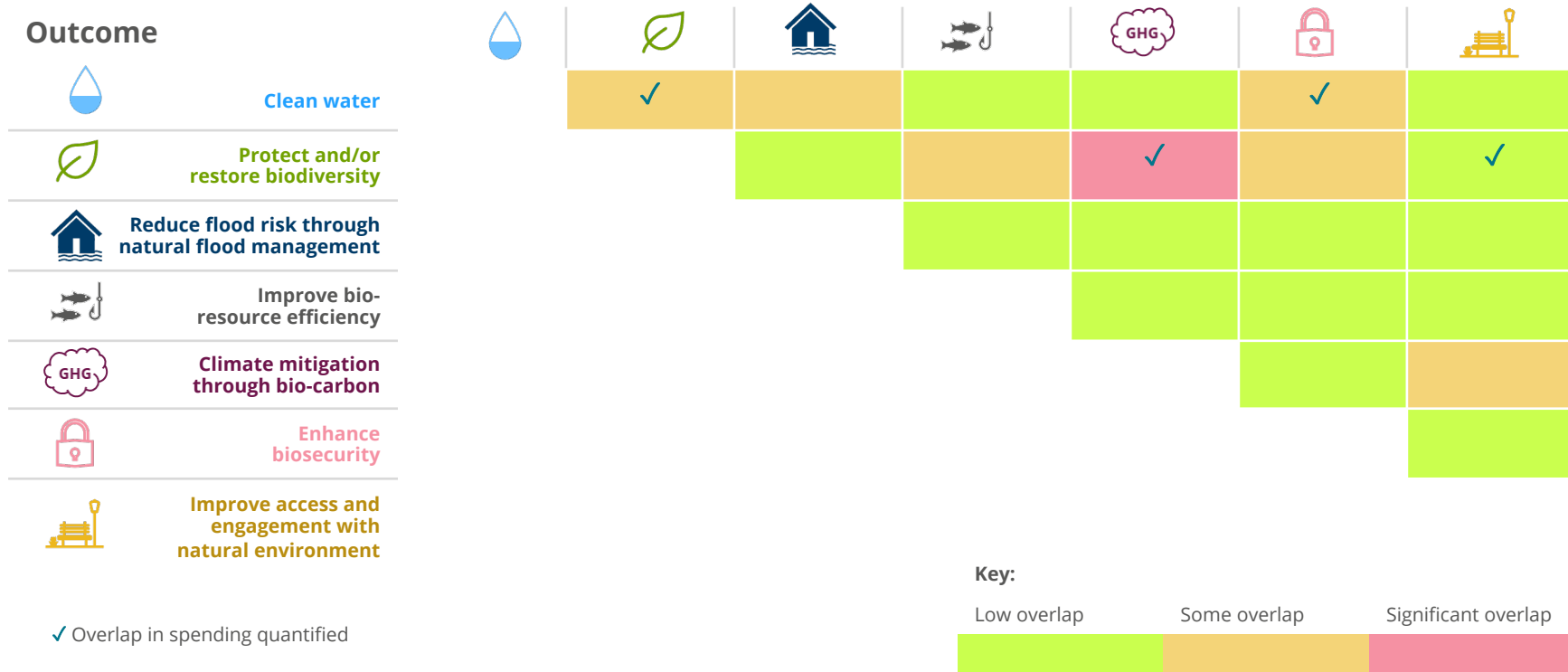
For example, for the **Clean Water** outcome, spending evidence relates to green and grey infrastructure for the quality and quantity of water in the environment. Spending on water treatment for public water supply quality is outside the scope.



Overlaps in spending



Some spending on nature may contribute to more than one outcome. The evidence we could find points to the types of 'overlaps' shown in the matrix below. For example, there is a significant overlap between protecting and/or restoring biodiversity and climate mitigation through bio-carbon, i.e. spending in one will go a long way to delivering the other.



Working with the available evidence

We collected, analysed and aggregated all the available evidence we could find to populate the theory of change in Box 1 above for each of the seven outcomes in the scope.

Approach consisted of collating available evidence on committed/planned and required spending. This is why the results do not claim to represent a comprehensive calculation of spending requirements and hence finance gaps. The following steps were taken:

- 1 Collect evidence** through desk-based research, consultations (including through the project board) and modelling of spending data **where this was possible**.
- 2 Synthesize evidence** to bring together different baselines, targets, time periods and assumptions including an **assessment of the relevance of the evidence** for the scope of the project
- 3 Aggregate spending evidence**, including **adjustments for overlaps** and **recognising gaps** in spending.

45 sources are included in the final database which is a part of the searchable database ('the finance gap tool') produced for this project.

Estimating required, committed or planned spending

Different sources of evidence report spending in different units, over different time periods and locations. In the synthesis step, we adjusted the evidence to be comparable across time and location.

	Time period	Location
Required spending	<ul style="list-style-type: none">• Optimistic spending assumption that the spending continues beyond the commitment period reported in the data¹.	<ul style="list-style-type: none">• Required spending at the UK level disaggregated to Devolved Administrations (DAs) and vice versa, where appropriate data is available².
Committed or planned spending	<ul style="list-style-type: none">• Central estimate takes an optimistic spending assumption that the current committed spending continues¹.• Lower bound estimate takes a pessimistic spending assumption that committed spending stops after the period it is committed for³.	<ul style="list-style-type: none">• Committed spending at the UK level disaggregated to DAs, where appropriate data available².• Committed spending at DA levels are <u>not</u> extrapolated to other DAs nor the UK given differences in budgets across DAs, unless spending is reported per hectare.

¹ For example, if commitment to spend £1million/year for the first 5 years, assume that over 10 years, £10 million will be spent.

² For example, spending requirements reported for marine protection at UK level disaggregated to each DA based on the area of MPA within each DA.

³ For example, if commitment to spend £1million/year for the first 5 years, assume that £5million is spent in the first five years and £0 in the second 5 years.

Rating the relevance of available evidence

The relevance of the found evidence for the purpose and the scope of the project is rated in a 3 point scale for the references for required and committed spending estimates

- **Matching scope:** sources that provide sufficient information on how the spending is estimated and cover the nature-related outcomes that are within the scope of this project (and any potential overlaps) are rated as having higher relevance.
- **Coverage of nature-related outcomes:** sources that are closer in their definition of nature-related outcomes to the definitions used in this project are rated higher.
- **Coverage of location and time:** sources that provide a breakdown of location and time periods similar to the ones used in this project, or provide sufficient information for us to do the necessary attributions and projections are rated as having higher relevance.

Relevance rated as a three-point scale for each reference

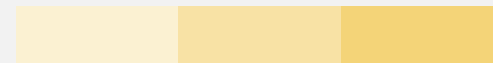
Required Spending

Low Medium High



Committed Spending

Low Medium High



The 'relevance rating' is not a rating of the quality of the underlying evidence but an attempt to help interpret the differences in the spending estimates for a given outcome.

Outputs of the project

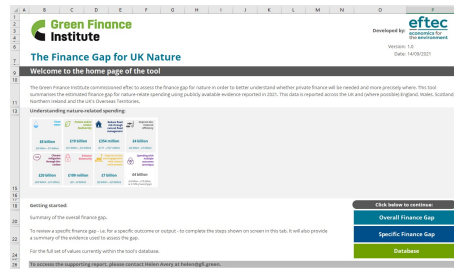
Outputs of this project are:

1 This report



Summary of the project approach, results and notes. Includes a detailed summary of the spending gap for each outcome (and its underlying investment categories/outputs) and explains how the found evidence was aggregated.

2 The finance gap tool



Searchable database of evidence that will help users find the relevant information on:

- The overall finance gap – filters the evidence on the overall finance gap by country and for multiple time periods.
- Specific finance gap – filters the evidence on the finance gap by country, individual outcome and output and time period.

3 Appendices

In Separate Documents

Appendix 1: theory of change to define scope for each nature-related outcome – expanding the above summary

Appendix 2: summary of the modelling approach used for terrestrial biodiversity spending (by Rayment C.S)

Database overview

Seven nature related outcomes assessed:



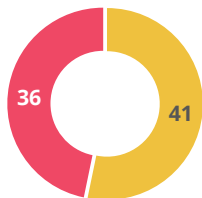
**18 (out of 20)
related outputs¹**

Number of evidence reviewed²:

45 documents

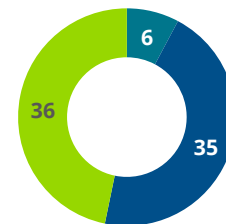
Number of entries:

78 entries

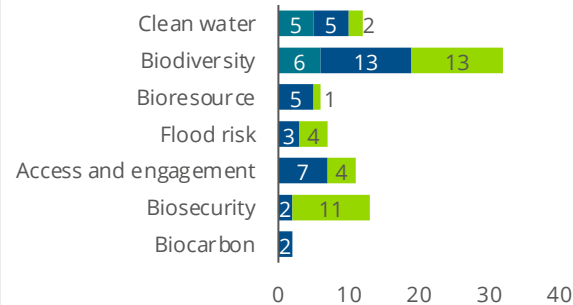


■ Required spending entries
■ Committed spending entries

Relevance ratings of entries










■ High ■ Medium ■ Low



¹ Refers to the outputs from spending on the seven outcomes listed.

² Refers to the number of documents included in the final database. Over 50 documents were assessed through the review.

Results - *finance gap by outcome*

	Clean Water	<u>25</u>
	Protect and/or restore biodiversity	<u>30</u>
	Reduce flood risk through natural flood management	<u>74</u>
	Improve bio-resource efficiency	<u>78</u>
	Climate mitigation through biocarbon	<u>89</u>
	Enhance biosecurity	<u>94</u>
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Clean Water

GFI
eftec

Rayment
Consulting
Services



Clean Water – definition & evidence

To prevent further deterioration of, maintain or enhance the quality of water in the environment.

Commitments in the UK follow statutory requirements set by the Water Framework Directive and related national legislations to: meet/exceed objectives on specially protected water bodies; achieve excellent or good bathing water body status; achieve good ecological status for all surface water and ground water bodies; and reduce abstraction of water from rivers and groundwater.

These commitments are in place against a changing environmental baseline, given the pressures from climate change, and increasing population and consumption levels, resulting in increased demand for water supply and increasing waste water. Box 2 on the next slide provides a high-level summary of the commitments in the UK and highlights that some of the required and committed spending on the clean water outcome is currently under review and subject to change in the near future.

Note that spending by private water companies in the UK is regulated based on the approval of their business plans.

References & relevance rating

	Required spending	Committed spending
H		
M	EA (2015)	Ofwat (2019, 2021)
L		WICS (2021), Utility Regulator (2021)



Box 2: UK Clean Water context

Commitments

Achieve good ecological status for all surface water & ground water bodies –

Commitments set out in national legislation to implement the Water Framework Directive, for **all water bodies to achieve good ecological status** by 2027.

Meet/exceed objectives on specially protected water bodies –

Commitments on protected water bodies are set out in national legislations in each of the devolved administrations. These water bodies include drinking water sites, shellfish sites, nutrient sensitive areas and areas designated for the protection of habitats/species (including Natura 2000 sites).

Achieve excellent or good bathing water body status –

Commitments to monitor bathing water sites set out in national legislation to implement the Bathing Water Directive. Long term targets in each nation to increase the number of bathing water sites at excellent status.

Reduce abstraction – In England, commitment to reduce abstraction set out in the 25 Year Environment plan and expanded in the Environment Agency's National Framework for Water Resources (EA, 2020b). The equivalent ambition has not been identified for Scotland, Wales and Northern Ireland.

Monitoring

These commitments are monitored through the River Basin Management Planning (RBMP) process across the UK, which is set to be finalised in 2021.

This will also be impacted by the newly created Drainage and Wastewater Management Planning (DWMP), which is set to release (draft) plans in 2022

Water resources are monitored through the Water Resource Management Planning (WRMP) process across the UK, which is set to release (draft) plans in 2022.

Clean Water – Coverage of spending evidence



Activities/investments in the estimates

- Spending to meet minimum requirements for water released into the environment, including the number and severity of pollution incidents
- Investments to prevent to prevent deterioration of the water environment
- Actions to slow the spread of aquatic invasive species
- Rural land management measures, including reducing use of phosphate and nitrogen
- Use of sustainable urban drainage systems
- Reducing amount of water abstracted, particularly from sensitive habitats
- Investments to achieve objectives for protected areas and bathing water sites

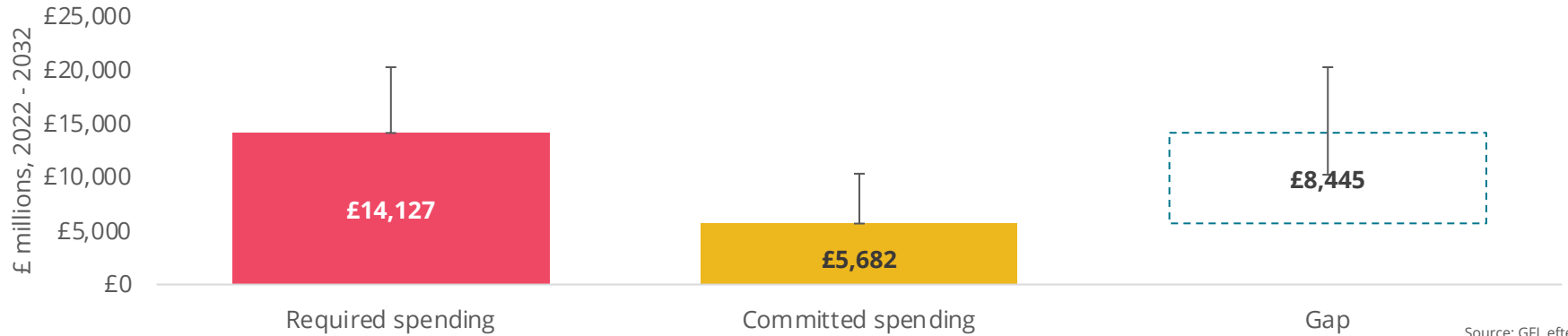
Gaps in current evidence

- Unclear how much committed spending in Scotland and Northern Ireland targets their respective environment plans, as these do not report on a national environment programme (unlike England and Wales).
- Estimated costs of reducing abstraction do not account additional spend required to achieve environmental ambition set out in the EA's National Framework. This can only be estimated following the 2022 Water Resource Management Planning (WRMP) process
- No data on proportion of committed agri-environment spend that will contribute to clean water targets
- Some projections made on changes in population and pressures on the environment, but data likely out of date compared to latest projections.

Note: Fertilisers entering the waterways relate to the applications within that year



Clean Water – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Estimated from EA impact assessment of River Basin Management Plans in England (EA, 2015), where each component of estimated costs was extrapolated to the other devolved administrations. Central estimate for the EA’s proposed option for achieving water body status, where investments can only be implemented if the benefit-cost ratio is greater than 1
- Upper bound: Same as central estimate, but implementation is not limited to options with benefit cost ratio greater than 1

Committed spending

- Add up ranges reported for each of the nations:
- England: Estimate from remaining spend allocated to Water Industry Natural Environment Programme (WINEP) in PR19 final determination (Ofwat, 2019) and additional spend committed for the green recovery (Ofwat, 2021)
 - Wales: Estimate from remaining spend allocated to WINEP in PR19 final determination (Ofwat, 2019)
 - Scotland: Estimate from final determination for Scottish Water (WICS, 2020), where central estimate assumes proportion of WINEP spend in England and Wales is only in scope
 - Northern Ireland: Similar to Scotland, estimated using final determination for NI Water (Utility Regulator, 2021)



Protect and/or restore biodiversity





Protect and/or restore biodiversity – definition & categories

To extend coverage of protected areas, managing pressures on habitats and species, increasing species' abundance and reversing losses covering both terrestrial and marine biodiversity.

Investments into achieving this outcome are organised into the following categories which are covered separately below:

- Increase and restore protected freshwater and terrestrial sites to favourable condition
- Create/restore priority habitats outside protected sites
- Protect endangered species
- Increase species abundance
- Woodland creation and management
- Peatland restoration
- Increase the proportion of protected and well-managed seas
- Ensure populations of key marine species are sustainable
- Ensure seafloor habitats are healthy and sustainable
- Achieve Biodiversity Net Gain

Committed spending to protect and/or restore biodiversity



Total committed spending of approximately £700 million/year¹ in the UK

Public sector funding	Agri-environment schemes – from historic commitments ² combined with commitments in England for the transition from CAP to <i>ELM</i> and Scotland's investment into the <i>Agriculture Transformation Fund</i>	£300m/year
	Forestry/ woodland schemes – from historic commitments ² combined with commitments in England on a <i>Woodland Carbon Fund</i> ; Wales on the <i>Glastir Woodland Creation</i> and <i>Restoration Funding</i> and <i>Wales National Forest Programme</i> ; and commitments in Scotland and Northern Ireland	£58m/year
	Peatland schemes – from national government commitments on spending	£36m/year
	Statutory nature agencies – from historic commitments ²	£46m/year
	Environment agencies – from historic commitments ²	£11m/year
	Natural capital funds – from historic commitments ² on <i>Heritage Lottery Fund</i> , <i>EU LIFE</i> and <i>Green Recovery</i> , combined with more recent funds announced in England on the <i>Nature Recovery Network Fund</i> and <i>Natural Environment Impact fund</i> ; and in Wales on the <i>Nature Network Fund</i>	£82m/year
	Local authorities – from historic commitments ²	£24m/year
	Marine protection – from national government commitments like the Overseas Territories' <i>Blue Belt Programme</i>	£107m/year
Other public spending – from historic commitments ² and includes Darwin Plus programme spending on wildlife conservation spending in the Overseas Territories	£32m/year	
NGO funding	From historic commitments, including grant funding ²	£337m/year ¹
Private sector funding	From historic commitments, including estimated water sector spend and spend from other sources (e.g. housing development, minerals sector, private estates etc.) ²	£95m/year ¹

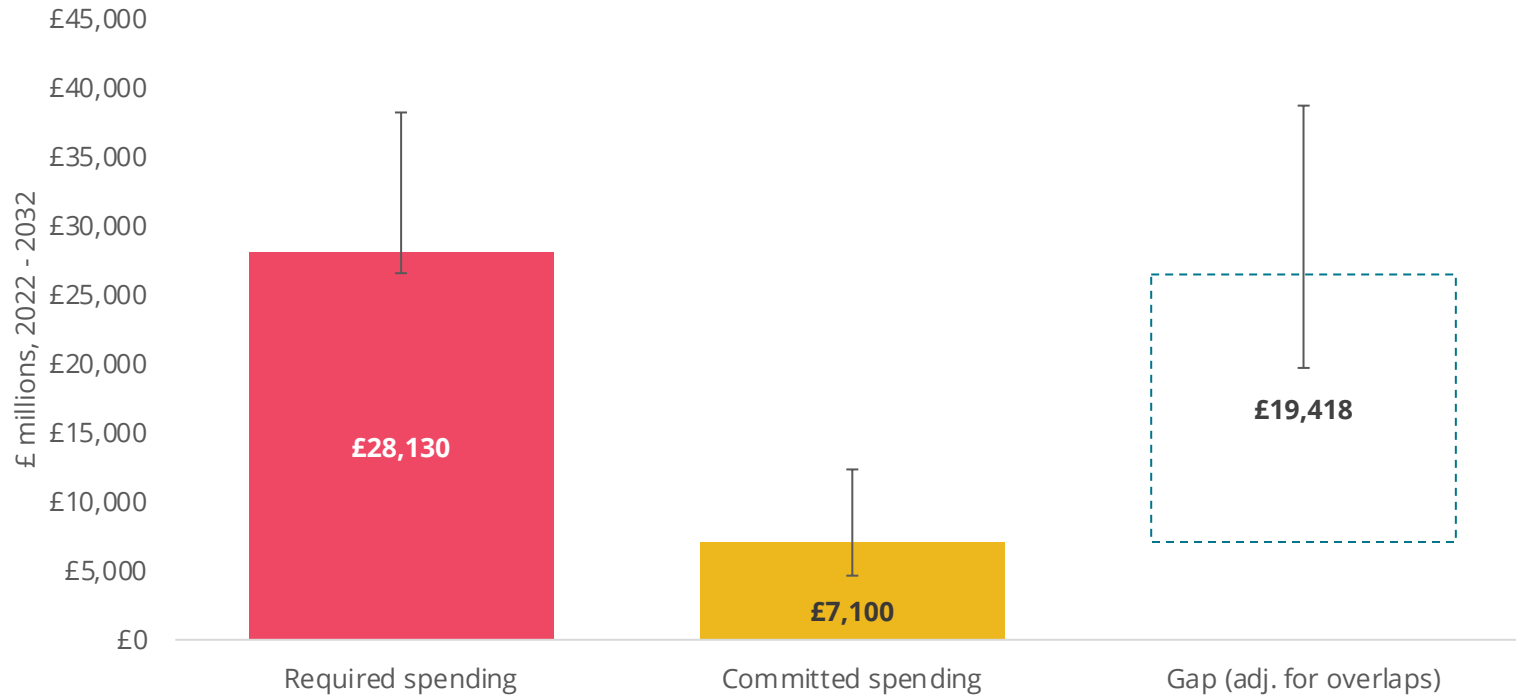
¹ NGO funding and private sector funding only included in upper limit of estimated funding. See Database for full range of results.

² Historic commitments compiled in Appendix 2.

Sources: Rayment (2021); Defra (2020b); Scottish Government (2021c); WCC (2021); HM Government (2020); Welsh Government (2020a); Welsh Government (2020b); Scottish Government (2021a); DAERA (2020); UK Government (2021b); NRW (2020); Scottish Government (2021b); UK Government, (2020); Welsh Government (2021b); WCL (2020); Welsh Government (2021a); Scottish Government (2021c); UK Government (2021a)



Protect and/or restore biodiversity - finance gap for the UK



For a breakdown of spending and gap estimates for within this outcome, see the following slides on each output.



Increase and restore
protected freshwater
and terrestrial sites to
favourable condition



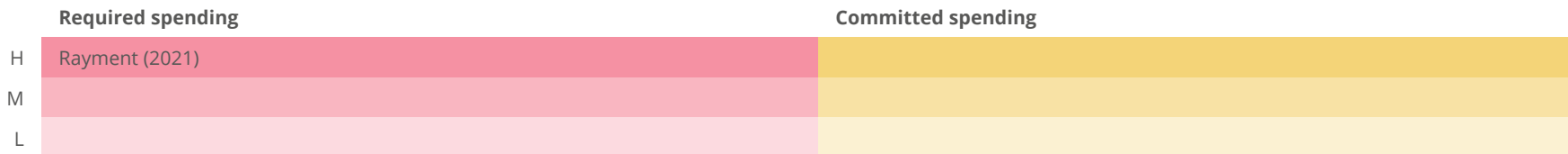
Increase and restore protected freshwater and terrestrial sites to favourable condition – definition & evidence

Extend coverage of protected areas, restore protected sites to favourable condition and address pressures on species in the wider terrestrial environment.

Commitments by country:

UK	Committed to extending coverage of protected areas to 30% of land and sea by 2030 (30 by 30 target)
England	Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term by 2042
Wales	Natural Resources Wales' strategic steer for biodiversity to 2022 to <i>"work towards achieving favourable conservation status for habitats and species"</i> , <i>"getting the features of protected sites in favourable condition"</i> and <i>"addressing pressures on conservation status of habitats and species in the wider terrestrial and marine environment."</i>
Scotland ¹	No specified commitments identified, though the 2020 Challenge for Scotland's Biodiversity refers to intention to "meet the targets for favourable condition of Natura sites and the Sites of Special Scientific Interest (SSSIs)"
Northern Ireland ²	By 2020, the Department aims to manage its designated sites in line with the 12 principles of the ecosystem approach and take account of the operational guidance provided by the UN Convention on Biological Diversity.

References & relevance rating



¹ Extrapolation to Scotland has been on the basis of the size of the features. Given the differences in the features across the DAs, the costs are likely to differ but this size based extrapolation has been the only possible assumption

² Northern Ireland Peatland strategy not included as still under consultation at the moment of writing.

Increase and restore protected freshwater and terrestrial sites to favourable condition - coverage of spending evidence



Activities/investments in the estimates

- Spending to achieve favourable conservation status – includes spending on capital restoration and habitat maintenance
- Model covers spending data for biological SSSIs

Gaps in current evidence

- Model does not cover geological SSSIs
- Despite the commitment to establish the “30 by 30 network” (an initiative that aims to protect 30% of the world's oceans by 2030), there is currently no commitment relating to land management across the 30% area
- No estimation for spending to address losses due to pressures on environment from population growth, emissions etc.
- No estimation for spending to address biodiversity loss due to climate change



Increase and restore protected freshwater and terrestrial sites to favourable condition – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) uses land use modelling based on costs of activities from the costs of restoring European protected sites to favourable conservation status in England and Wales - set out in country level Prioritised Action Frameworks (PAFs).

Committed spending

- Committed spend is included in the required spending total but it is not possible to identify the amount that is committed.
- The current spending cuts across a number of outputs and outcomes and it's not possible to estimate the proportion for this output.



Create/restore
priority habitats
outside protected
sites



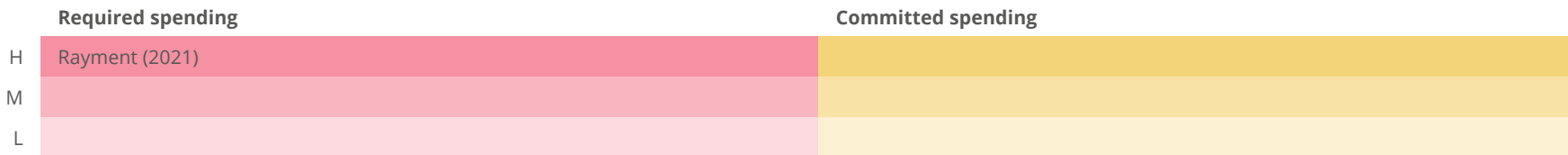
Create/restore priority habitats outside protected sites – definition & evidence

Create and restore wildlife-rich habitats outside protected sites, with a focus on priority habits. Habitats include woodland, grassland, wetland, heathland, montane, inland rock and coastal habitats.

Commitments by country:

UK	No specific commitment identified
England	25 Year Environment Plan sets a commitment to create or restore 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits by 2042
Wales	No specific commitment identified, but Nature Recovery Action Plan has an objective to increase the resilience of our natural environment by restoring degraded habitats and habitat creation
Scotland	No specific commitment identified
Northern Ireland	No specific commitment identified

References & relevance rating



Create/restore priority habitats outside protected sites - coverage of spending evidence



Activities/investments in the estimates

- Capital investment for habitat creation
- Capital investment for habitat restoration
- Annual cost of maintenance of priority habitats

Gaps in current evidence

- No commitments in place for nations except England, so similar targets as England assumed for Scotland, Wales and Northern Ireland, in proportion to existing priority habitat area
- No estimation for spending to address losses due to pressures on environment from population growth, emissions etc.
- No estimation for spending to address biodiversity loss due to climate change

Create/restore priority habitats outside protected sites – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) uses unit cost for creation, restoration and maintenance. Land use modelling to extrapolate costs across the nations.

Committed spending

- Committed spend is included in the required spending total but it is not possible to identify the amount that is committed.
- The current spending cuts across a number of outputs and outcomes and it's not possible to estimate the proportion for this output.



Protect endangered species

Protect endangered species – definition & evidence

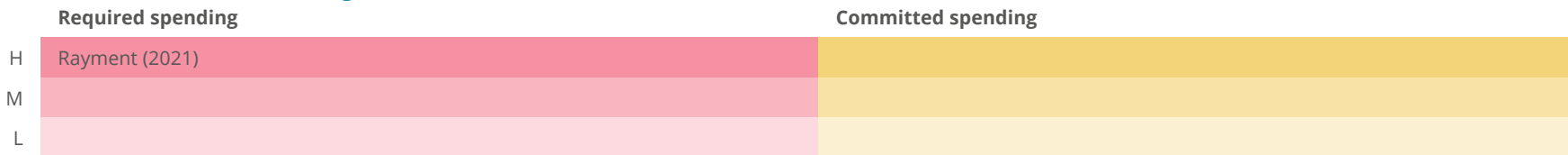


Protect endangered species through targeted site management of species' habitats. This includes around 1,500 red listed species in England.

Commitments by country:

UK	No specific commitment identified
England	25 Year Environment Plan sets a commitment to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human induced extinction or loss of known threatened species in England and the Overseas Territories ¹ .
Wales	No specific commitment identified
Scotland	No specific commitment identified
Northern Ireland	No specific commitment identified

References & relevance rating



¹ Policy paper on targets indicates Government plans to introduce targets on extinction risk – to consider how a target could focus action to reduce species extinction risk, in particular whether this could track the change in the number of species within each IUCN Red List category.

Protect endangered species - coverage of spending evidence



Activities/investments in the estimates

- Habitat actions to protect endangered species
- Species recovery actions, including species protection measures, research, education, advice and targeted site management

Gaps in current evidence

- No commitments in place for any of the nations, as a result begin with spending requirements for red listed species in England and extrapolate to the other countries
- No required/committed spending data available on the Overseas Territories
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc.
- No estimation of spending to address biodiversity loss due to climate change

Protect endangered species – finance gap for the UK



Source: GFI, eftec,
& Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) uses an estimate for (one-off and ongoing) actions to protect red list species in England. Extrapolate to other DAs using overall land area of each country.

Committed spending

- Committed spend is included in the required spending total but it is not possible to identify the amount that is committed.
- The current spending cuts across a number of outputs and outcomes and it's not possible to estimate the proportion for this output.



Increase species abundance

Increase species abundance – definition & evidence



Agri-environment measures to increase species abundance in addition to investments into priority habitats.

Commitments by country:

UK	No specific commitment identified
England	25 Year Environment Plan sets a commitment to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human induced extinction or loss of known threatened species in England and the Overseas Territories ¹ .
Wales	No specific commitment identified
Scotland	No specific commitment identified
Northern Ireland	No specific commitment identified

References & relevance rating

	Required spending	Committed spending
H	Rayment (2021)	
M		
L		

¹ Policy paper on targets indicates Government plans to introduce targets on species abundance, across different habitats (including farmland birds, woodland butterflies and priority species under Section 41 of the NERC Act).

Increase species abundance - overview of spending evidence



Activities/investments in the estimates

- Arable biodiversity measures
- Improved grassland biodiversity measures
- Rough grazing biodiversity measures

Gaps in current evidence

- As there is no commitments in place for any of the nations, total spending is estimated through measures to increase species abundance through agri-environment schemes in each country
- No required/committed spending data available on the Overseas Territories
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc.
- No estimation of spending to address biodiversity loss due to climate change

Increase species abundance – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) uses an estimate for each of the activities identified and applies a land use model to estimate the costs for all of the nations.

Committed spending

- Committed spend is included in the required spending total but it is not possible to identify the amount that is committed.
- The current spending cuts across a number of outputs and outcomes and it's not possible to estimate the proportion for this output.



Woodland creation and management

Woodland creation and management – definition & evidence



Support planting of trees to increase and restore forest cover as well as manage existing woodlands to maintain their overall productive potential.

Commitments set by each of the devolved administrations for woodland creation: England (12% woodland cover by 2060); Wales (at least 2,000 hectares per annum 2020-30); Scotland (annual target of 12,000 hectares in 2020/21 rising to 18,000 hectares in 2024/25); and Northern Ireland (announcement to plant 18 million trees by 2030). Note that Woodland Carbon Code is a standard, through which both public and private funding are channelled.

References & relevance rating

	Required spending	Committed spending
H	Rayment (2021)	
M	CCC (2020b)	Scottish Government (2021a), Woodland Carbon Code (2021)
L		DAERA (2020), Welsh Government (2020a), Welsh Government (2020b), HM Government (2020)

¹ For cumulative areas of woodland assumed to be created – see Appendix 2.

Woodland creation and management - coverage of spending evidence



Activities/investments in the estimates

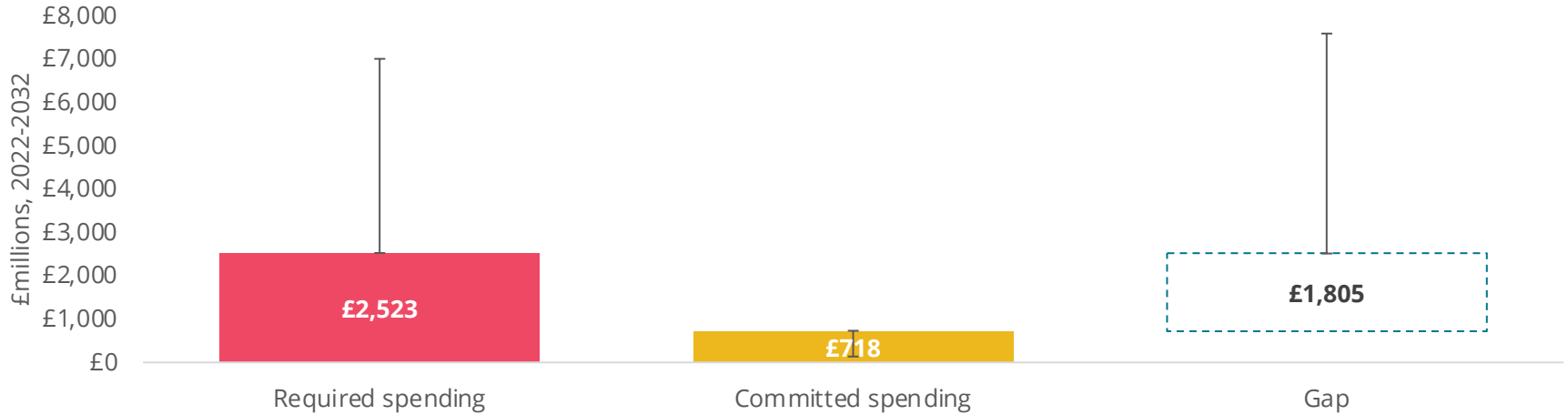
- Woodland creation/planting of trees
- Maintenance of newly created woodlands
- Increased tree nursing capacity

Gaps in current evidence

- No data on proportion of planting that will be met by planting native and/or non-native woodlands – assumed that targets met by native species. If non-native conifers are planted, cost would be similar and may contribute towards climate targets, but there could be a concern on the benefits to local biodiversity from this woodland creation
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc.
- Partial proxy for loss of woodland due to climate change included in the high estimates using the CCC estimates



Woodland creation and management – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) uses estimates of creation and maintenance of woodland to meet the commitments
- Upper bound: Rayment (2021) estimates with the required commitments adjusted for the UK Climate Change Committee's approximation for required area to compensate for losses in *timber* from climate change.

Committed spending

Add up ranges reported for each of the nations:

- England: central from commitment for Woodland Carbon Fund (WCC, 2021) and range estimated from historic commitments in HM Government (2020)
- Wales: combines committed spending from Glastir Woodland Creation and Restoration Funding (Welsh Government, 2020a) and Woodland National Forest Programme (Welsh Government, 2020b)
- Scotland: range estimated from committed funding (Scottish Government, 2021a)
- Northern Ireland: range estimated from Small Woodland Grant Scheme (DAERA, 2020)

Woodland creation & management - case study



There is currently over **£490 million** funding gap in woodland creation in the Northern Forest.

Partnership behind the Northern Forest

- The Northern Forest aims to plant 50 million trees (24,000 hectares) across the North of England. To date, it has planted over 3 million trees.
- Development estimated to cost about **£500 million** over the next 25 years.
- The government has provided an initial **£5.7 million¹** to kick start the project.



¹ It is unclear if more has been allocated by the government subsequently.



Peatland restoration



Bring all peatland into good (near natural) condition by restoring the degraded peatlands and managing the restored peat by 2040.

Commitments set by most of the devolved administrations¹ for peatland restoration²: England (all peatland to good condition by 2040); Wales (restore 600-800 hectares per year 2020-35); Scotland (restore 250,000 hectares by 2030). No commitments set by Northern Ireland.

References & relevance rating

	Required spending	Committed spending
H	Rayment (2021)	
M	ONS (2019a)	Scottish government (2021a)
L		UK Government (2021b), NRW (2020)

¹ IUCN UK National Committee set a target of 2 million hectares of peatland in good condition, under restoration or being sustainably managed in the UK by 2040

² For cumulative areas of peatland assumed to be restored – see Appendix 2.



Activities/investments in the estimates

- Capital investment in restoration of degraded blanket bog and lowland raised bog. Some activities are unique to each peatland - e.g. some sites may be affected by gullyng
- Annual maintenance of restored peatlands
- Monitoring and technical assistance – including monitoring, hydrological and ecological surveys and historic environment assessments
- Research – into the scope and financial viability of the Peatland Code, and economic and practical barriers to achieving sustainable management of peatland.
- Engagement and coordination – including ‘peat partnerships’

Gaps in current evidence

- Northern Ireland Peatland strategy not included as still under consultation at the moment of preparing this report
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc.
- No estimation of spending to address loss of peatland due to climate change

Peatland restoration – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021)
- Upper bound: central estimate of ONS estimates for costs of restoration in UK peatland accounts

Committed spending

Add up ranges reported for each of the nations:

- England: range estimated from UK Government (2021b)
- Wales: range estimated from NRW (2020)
- Scotland: range estimated from Scottish Government (2021b)
- Northern Ireland: no committed spending identified – peatland strategy currently under consideration



Increase the
proportion of
protected and well-
managed seas

Increase the proportion of protected and well-managed seas - definition & evidence



Manage pressures on the marine environment and limit damage by maintaining the network of marine protected areas (MPAs) across the UK, thereby tackling pressures such as over-exploitation, pollution and climate change.

Commitment in the UK to protect at least 30% of the world's oceans by 2030. UK MPA areas (including for the OTs) already exceed this commitment, so spending to manage the MPAs.

References & relevance rating

	Required spending	Committed spending
H		
M	eftec & ABPmer (2018) McCrea-Strub et al. (2011), RPA (2020)	UK Government (2021a)
L	Marine Conservation Society (2020) Wildlife and Countryside Link (2020)	Wildlife and Countryside Link (2020), Scottish Government (2021c), Welsh Government (2021a)

Increase the proportion of protected and well-managed seas - coverage of spending evidence



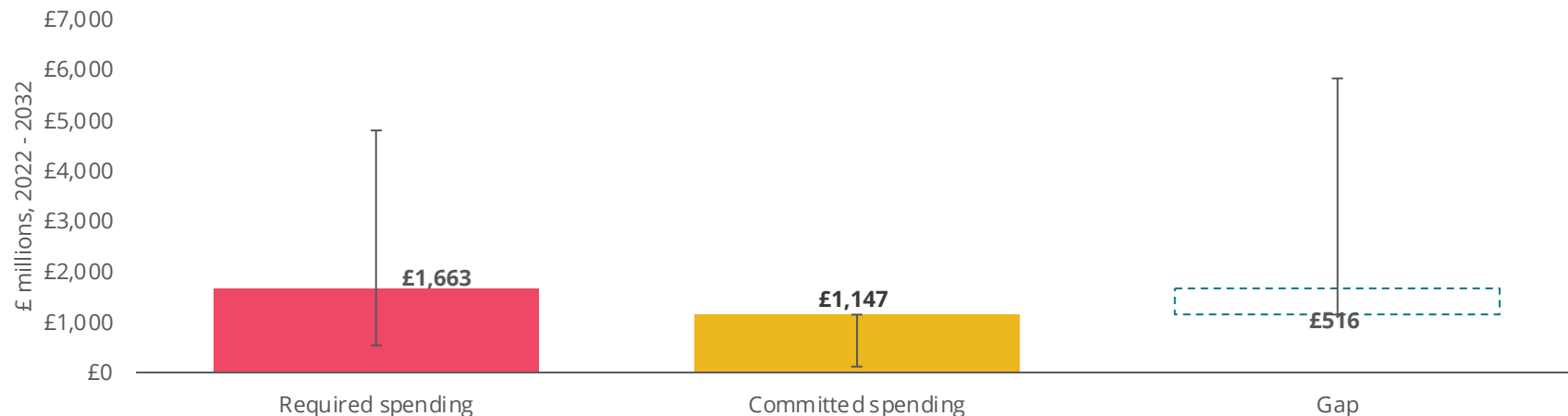
Activities/investments in the estimates

- Compliance and enforcement work for offshore sites
- Management of monitoring systems
- On-going community & stakeholder engagement tasks
- Routine management committee work
- Development, training and resourcing of management team

Gaps in current evidence

- No estimation for the spending required to improve the minimum necessary conditions to maintain MPA status and prevent the deterioration of the marine environment, as opposed to solely managing the MPAs
- There is a commitment to designate Highly Protected Marine Areas (HPMA) from 2022. These would have lower or higher financial costs than MPAs depending on the effort of enforcement activity needed but could have higher opportunity costs if more economic activity is banned. Since there is no evidence on either of these costs, these are not included in the estimates reported here.
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc. on the marine environment
- No estimation of spending to address loss to marine environment (and MPAs) due to climate change

Increase the proportion of protected and well-managed seas – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: average of the central estimates from eftec and ABPmer (2018), McCrea-Strub et al. (2011), Marine Conservation Society (2020) and RPA (2020)
- Lower bound: estimated cost from RPA (2020), which is the lowest value reported in the 'Central estimates' (above)
- Upper bound: estimated cost from McCrea-Strub et al. (2011), which is the highest value reported in the 'Central estimates' (above)

Committed spending

- Add up ranges reported for each of the nations:
- England: range estimated from WCL (2020)
 - Wales: range estimated from Welsh Government (2021a)
 - Scotland: range estimated from Scottish Government (2021c)
 - Northern Ireland: range estimated from WCL (2020)
 - Overseas Territories: range estimated from UK Government (2021a)



Ensure populations
of key marine species
are sustainable



Ensure populations of key marine species are sustainable - definition & evidence

Management of marine species – including cetaceans, seals, birds and fish.

Targets reported for indicators on defined species in part one of the UK Marine Strategy (Defra, 2019a). Indicators including abundance and distribution, breeding success, bycatch and pup production.

Gaps in current evidence

- No spending data (committed/required) available. However, likely to be partially accounted for in other investments, in particular marine protection activities and sustainable fishing. Although the emphasis (especially) on the latter is likely to be on fish, rather than mammals and seabird that are also at risk.
- No commitments identified for individual DAs and no specific targets identified for the Overseas Territories.
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc. on the marine environment.
- No estimation of spending to address loss to marine environment (and MPAs) due to climate change.



Ensure seafloor
habitats are healthy
and sustainable

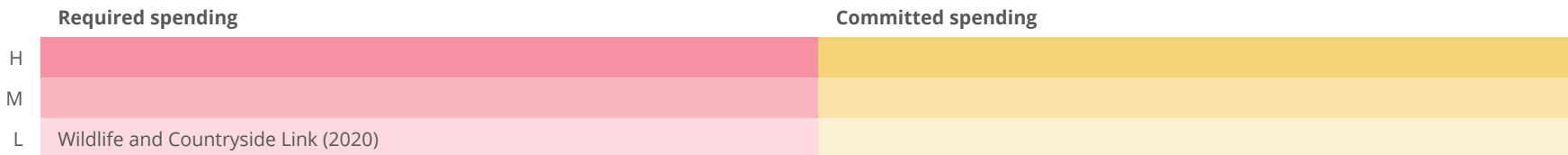
Ensure seafloor habitats are healthy and sustainable - definition & evidence



Restore deteriorated benthic (seafloor) habitats in the marine and coastal environments in order to increase carbon sequestration and enhance biodiversity.

Targets reported for indicators on defined species in part one of the UK Marine strategy (Defra, 2019), which include indicators on benthic communities, rocky shore macroalgal, infaunal quality, saltmarsh, intertidal rock community and intertidal seagrass

References & relevance rating



Ensure seafloor habitats are healthy and sustainable - coverage of spending evidence



Activities/investments in the estimates

- Investments into a “Blue Restoration Programme” to coordinate and scale up the restoration of marine and coastal carbon-rich habitats – specifically seagrass habitat

Gaps in current evidence

- Spending on seagrass habitat only, no data identified for other seafloor habitats and/or to achieve other indicators in Defra (2019)
- No committed spending identified – unclear if this is partially included in other spending (e.g. on marine protection)
- No data on spending required for Overseas Territories
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc. on the marine environment
- No estimation of spending to address losses to marine environment (and resulting additional spending for MPAs) due to climate change



Ensure seafloor habitats are healthy and sustainable – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Estimate of required spend for seagrass spend from WCL (2020)
- Very little is known about how to restore seafloor habitats and hence it is very difficult to cost them. All work is exploratory at this stage and hence the gap shown here is likely to be an underestimate.

Committed spending

- No evidence on committed spending specifically for seafloor habitats can be found



Achieve Biodiversity Net Gain

Achieve Biodiversity Net Gain - definition & evidence



Spending to achieve net gains in biodiversity for land use and infrastructure investments in England.

Mandate in England that all new developments will be required to demonstrate a 10% increase in biodiversity in or near the development sites. The primary scope of this legal mandates is for land use planning system developments, which excludes infrastructure investment.

As part of the forthcoming Environment Bill, Nationally Significant Infrastructure Projects (NSIPs)¹ are also expected will be required to demonstrate Biodiversity Net Gain. To date, this primarily refers to investments in England, although some NSIP investments have not been devolved - see Box 3 on the next slide for the scope of responsibilities for NSIPs in the devolved administrations.

References & relevance rating

	Required spending	Committed spending
H		
M	Defra (2019b), IPA (2020), Water UK (2016)	Defra (2019b)
L		

¹ NSIPs refer to infrastructure investments into Energy, Transport, Waste and Water.



Box 3: Scope of responsibilities on investments in each devolved administration

Although mandate only for England, depending on sector, investments in the other DAs could also be affected as not all investments are devolved:

Sector	Devolved administration		
	Scotland	Northern Ireland	Wales
Road	Devolved responsibility	Devolved responsibility	Devolved responsibility
Rail	The Scottish government is responsible for internal services. The UK government is responsible for cross-border daytime services	Devolved responsibility	Not devolved
Airports	Devolved responsibility. The regulation of air services is a reserved matter	Devolved responsibility	Devolved responsibility,
Ports	Devolved responsibility, with some minor exceptions	Devolved responsibility	Devolved responsibility, with some minor exceptions
Energy	Not devolved	Not devolved	Not devolved
Communications	Not devolved	Not devolved	Not devolved
Water	Devolved responsibility	Devolved responsibility	Devolved responsibility
Flood Defence	Devolved responsibility	Devolved responsibility	Devolved responsibility
Waste	Devolved responsibility	Devolved responsibility	Devolved responsibility
Housing	Devolved responsibility	Devolved responsibility	Devolved responsibility

Source: Infrastructure and Projects Authority (2020)



Activities/investments in the estimates

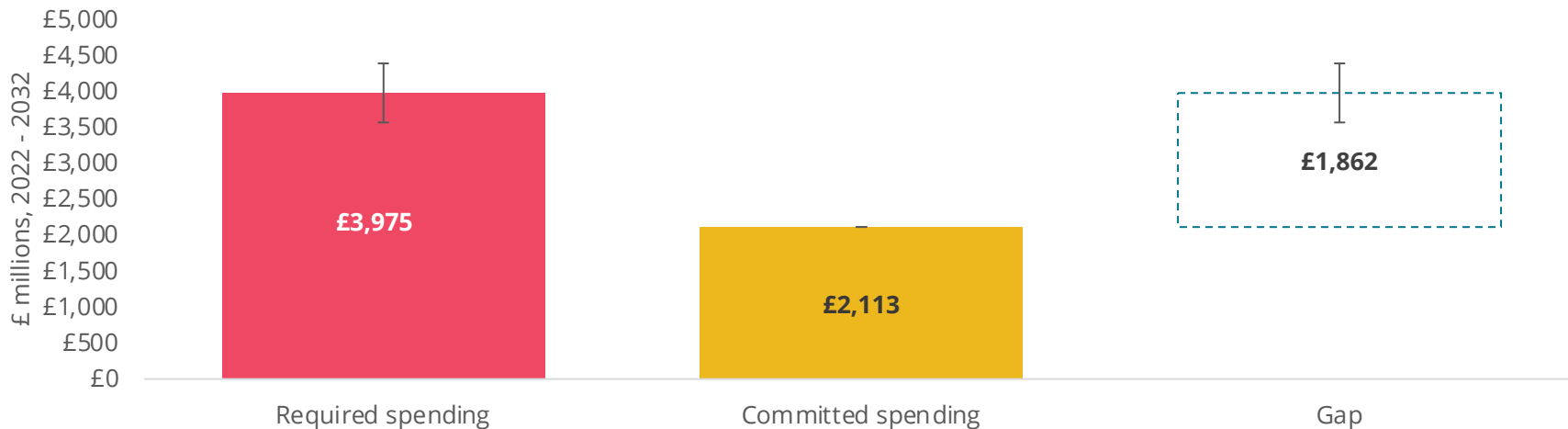
- Purchase of land, habitat creation and management to achieve biodiversity net gain targets. Relates to all infrastructure spending – including Nationally Significant Infrastructure Project and other infrastructure

Gaps in current evidence

- No targets/mandates set for Scotland, Wales and Northern Ireland. Voluntary actions are beyond the scope of the project.
- Does not account for infrastructure providers that go beyond 10% infrastructure – as a result, required spending is likely a lower estimate
- Investments assumed to be additional to achieve terrestrial biodiversity targets – although the 10% 'gain' from investments *may* be a source of funding for targets
- No commitments from government to fund the spending, although some of this may be part-funded by public sector spending
- Insufficient data to estimate increases in required spending on BNG over time¹

¹ For example spending may increase in response to increase in populations and other pressures (e.g. climate change).

Achieve Biodiversity Net Gain – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: sum of the estimated BNG market size excluding Nationally Significant Infrastructure Projects (NSIPs) (Defra, 2019b), the estimated additional costs for NSIPs in energy, waste and transport (IPA, 2020) and the estimate for water (Water UK, 2016)
- Range driven by figures in NSIP from IPA (2020)

Committed spending

- Central estimated: reported mandatory investment for England (Defra 2019).



Reduce flood risk through natural flood management





Reduce risk of flooding by investing into natural flood management (NFM) measures, which are a part of the broader programme of investment into Flood and Coastal Erosion Risk Management (FCERM).

Spending on NFM invests directly in the environment to restore / maintain / enhance the ability of nature to regulate water flow (e.g. water retention capacity of soils). Required and committed spending figures tend to be expressed for the whole FCERM programme and we had to make assumptions for extrapolating from the UK to (and across) devolved administrations both for the overall amounts and the share of NFM on the basis of assets at risk and area. Required spending for NFM, as a result, is likely to be an underestimate.

Box 4: Examples of NFM investments

- In stream structures (e.g. woody debris)
- Blocking of moorland drainage channels
- Woodland planting
- Land and soil management practices (e.g. cover crops, hedgerows, suitable crops)
- River morphology and floodplain restoration (e.g. removal of embankments and re-meandering)
- Inland storage ponds and wetlands
- Protecting riverbanks (e.g. stock fencing)
- Sustainable urban drainage systems (e.g. swales, wetlands in urban areas, green roofs)
- Saltmarsh restoration
- Coastal managed realignment and change management

References & relevance rating

	Required spending	Committed spending
H		
M	NIC (2018)	Dfi (2020), Welsh Government (2020c)
L	EA (2020a)	Kaminski (2016), Scottish Government (2021b)

Reduce flood risk through NFM - coverage of spending evidence



Activities/investments in the estimates

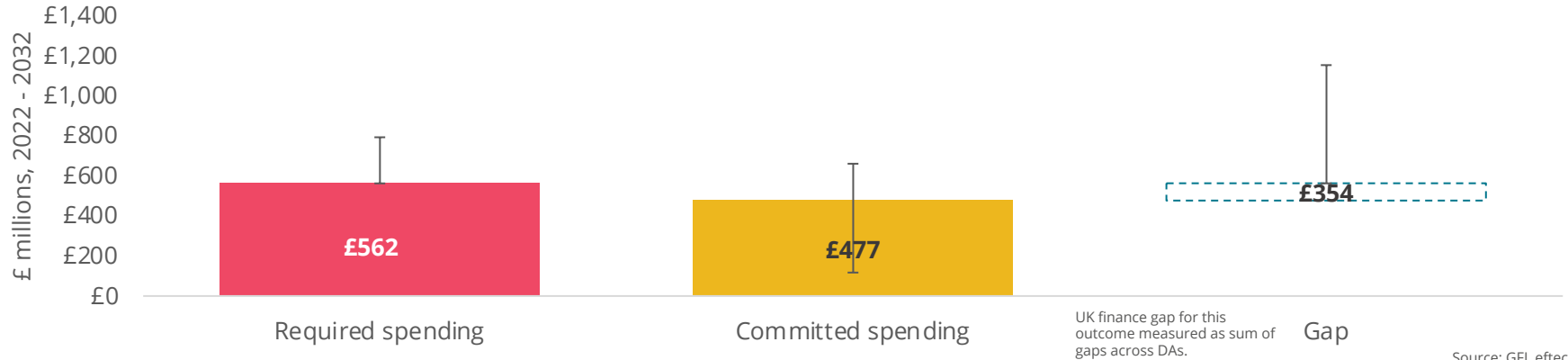
- Examples of the range of NFM activities are reported in Box 4. NFM spending was reported for a number of the committed spending figures.
- No separate required NFM spending estimate was identified. It is assumed that 7% of the FCERM budget is for NFM (see database).
- Required spending does account for increase spending to address climate change risks

Gaps in current evidence

- No required spending data reported for NFM and no required spending data for FCERM (overall) for Wales, Scotland and Northern Ireland
- Committed spending for NFM primarily tied to trials and development programmes. No data reported for committed spending to NFM (specifically) for Scotland
- Committed spending does not account for climate change and/or other pressures (e.g. population growth)
- Although a measure of climate change risks included in spending, there is no evidence on how NFM spending will change over time. As a result, a constant proportion of FCERM spend assumed to be allocated to NFM over time



Reduce flood risk through NFM – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: estimated NFM spend from NIC (2018) for overall FCERM spending. Assume that 7% of FCERM spend will continue to be allocated to NFM, based on the Environment Agency's Long-term Investment Scenarios (LTIS).
- Upper bound: estimated from EA (2020) for NFM. Unlike NIC figures, these are likely to be an overall estimate for the entire 30 year period, rather than relevant to the specific time period

Committed spending

Add up ranges reported for each of the nations:

- England: Central estimate and lower bound from Defra commitment to NFM (Kaminski, 2016); upper bound from estimates from Gov (2020) commitment to test NFM techniques
- Wales: Reported commitment to NFM according to Welsh Government (2020)
- Scotland: Estimated NFM from overall Scottish budget on FCERM from Scottish Government (2021b)
- Northern Ireland: Reported spending committed specifically on NFM (DfI, 2021)

Improve bio-resource efficiency



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Improve bio-resource efficiency – definition & categories



To improve the services provided by natural assets in the UK by reducing the pressures on terrestrial and marine environments, through sustainable management of: (i) commercial fish and shellfish; and (ii) soil health.

Investments into achieving this outcome are organised into the following categories, which are covered separately below:

- Increase sustainability of fish stocks (commercial fish and shellfish)
- Sustainable soil management

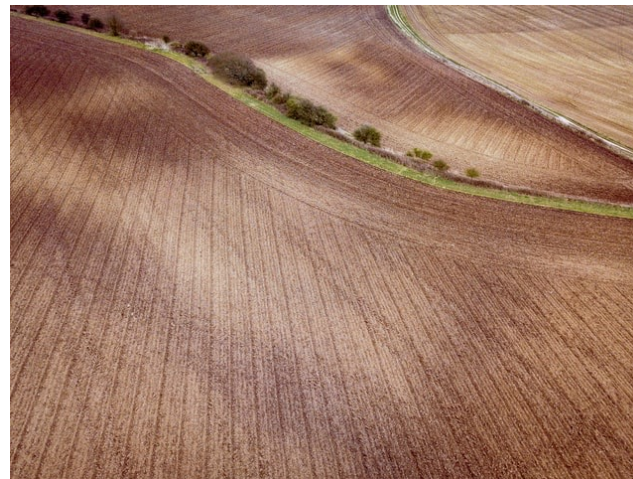
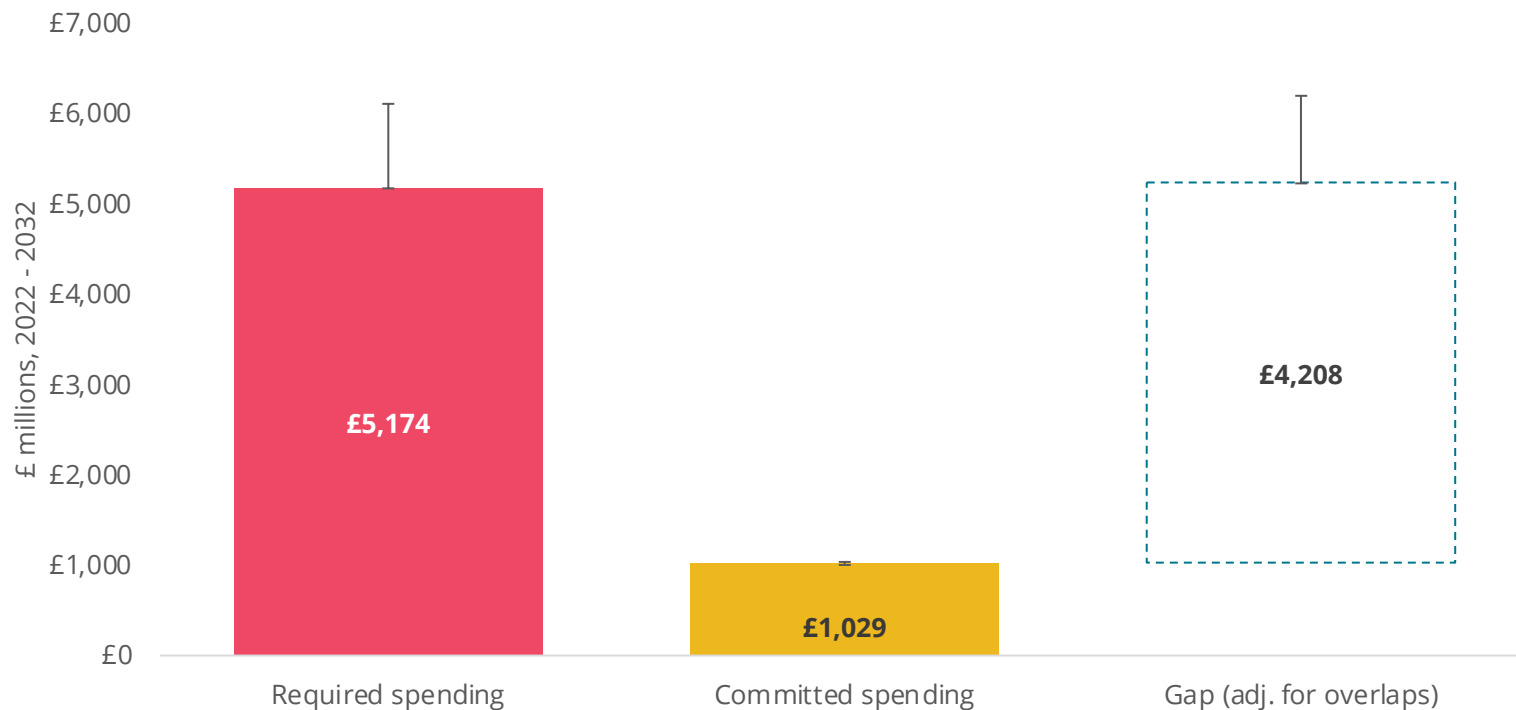


Photo by [Ivan Bandura](#) on [Unsplash](#)



Improve bio-resource efficiency - finance gap for the UK



For a breakdown of spending and gap estimates for within this outcome, see the following slides on each output.



Increase sustainability of fish stocks

Increase sustainability of fish stocks – definition & evidence



Improve the sustainability of fishing practices and aquaculture in order to reduce their impact on the marine environment, and implement and enforce robust management measures to protect fish and shellfish stocks.

Targets reported for indicators for defined fish and shellfish species in part one of the UK Marine strategy (Defra, 2019a). Investments are to reduce pressures on fish and shellfish by controlling quantity, timing etc. of catch, to allow for sufficient time for populations to grow.

References & relevance rating

	Required spending	Committed spending
H		
M	Wildlife and Countryside Link (2020), Marine Conservation Society (2020), WWF (2020)	Institute for Government (2021)
L		Gov (2019)

Increase sustainability of fish stocks - coverage of spending evidence



Activities/investments in the estimates

- Deliver sustainable fisheries. Support the fishing industry and coastal communities in the transition and diversifying their economies
- Remote Electronic Monitoring with cameras to supplement observer data collection
- Implementation and enforcement of management measures
- Encourage uptake of innovation and related jobs in coastal communities

Gaps in current evidence

- Figures are only for marine fishing, which is the primary focus of the sustainable fishing targets in the UK. They do not account for fishing in other water environments (e.g. salmon river enhancement), some of which is accounted for in the required and committed spending on Clean Water ([link](#)).
- No data reported for the UK Overseas Territories, even though there may be some overlap with the investments into marine protection.
- No data reported for the devolved administrations. All spending data at a UK level.
- No estimation of spending to address losses due to climate change

Increase sustainability of fish stocks – finance gap for the UK



Source: GFI, eftec,
& Rayment Consulting (2021)

Required spending

- Central estimate: average of the estimated MPA costs reported by WCL (2020) and MCS (2020), which is based on the same data sources
- Upper bound: take the estimate reported by WWF (2020), which does not explain the reasoning behind the far higher estimate

Committed spending

- Central estimate: central estimate of historic MPA spending reported by Institute for Government (2021)
- Upper bound: central estimate of Gov (2019) figure for spending, which may include spending that extends beyond the scope of the project
- Lower bound: using historic MPA spending reported by Institute for Government (2021)



Sustainable soil management

Sustainable soil management – definition & evidence



Improve the sustainability of agriculture in order to improve the quality of degraded agricultural soil and prevent further deterioration.

No targets in place for sustainable soils beyond an ambition to improve soil health in England and Scotland (at least).

Available evidence is on spending to reduce pressures on arable land, grassland and deep peat soils under cultivation.

References & relevance rating

	Required spending	Committed spending
H		
M	Rayment (2021)	Rayment (2021)
L		



Sustainable soil management - coverage of spending evidence

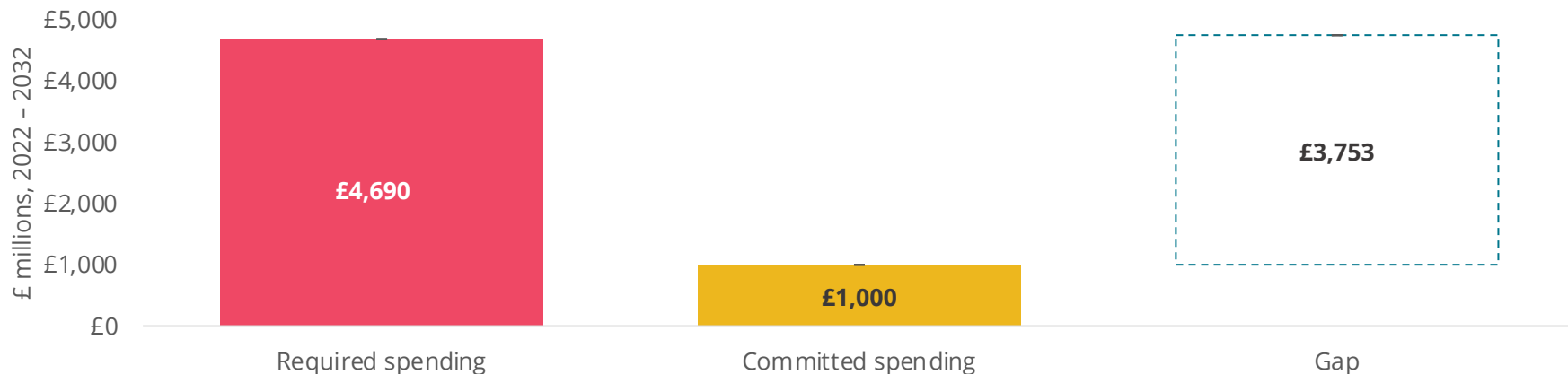
Activities/investments in the estimates

- Investments into conversion of arable land to grassland
- Investments into winter cover crops
- Investment in seasonal livestock removal

Gaps in current evidence

- No targets in place for any part of the UK
- Approximation of committed spending allocated to soil management based on expert opinion about the proportion of agri-environment scheme spend allocated to soil management
- No estimation of spending to address losses due to pressures on environment from population growth, emissions etc. – e.g. increase in cultivation to meet demand
- No estimation of spending to address losses in soil quality due to climate change

Sustainable soil management – finance gap for the UK



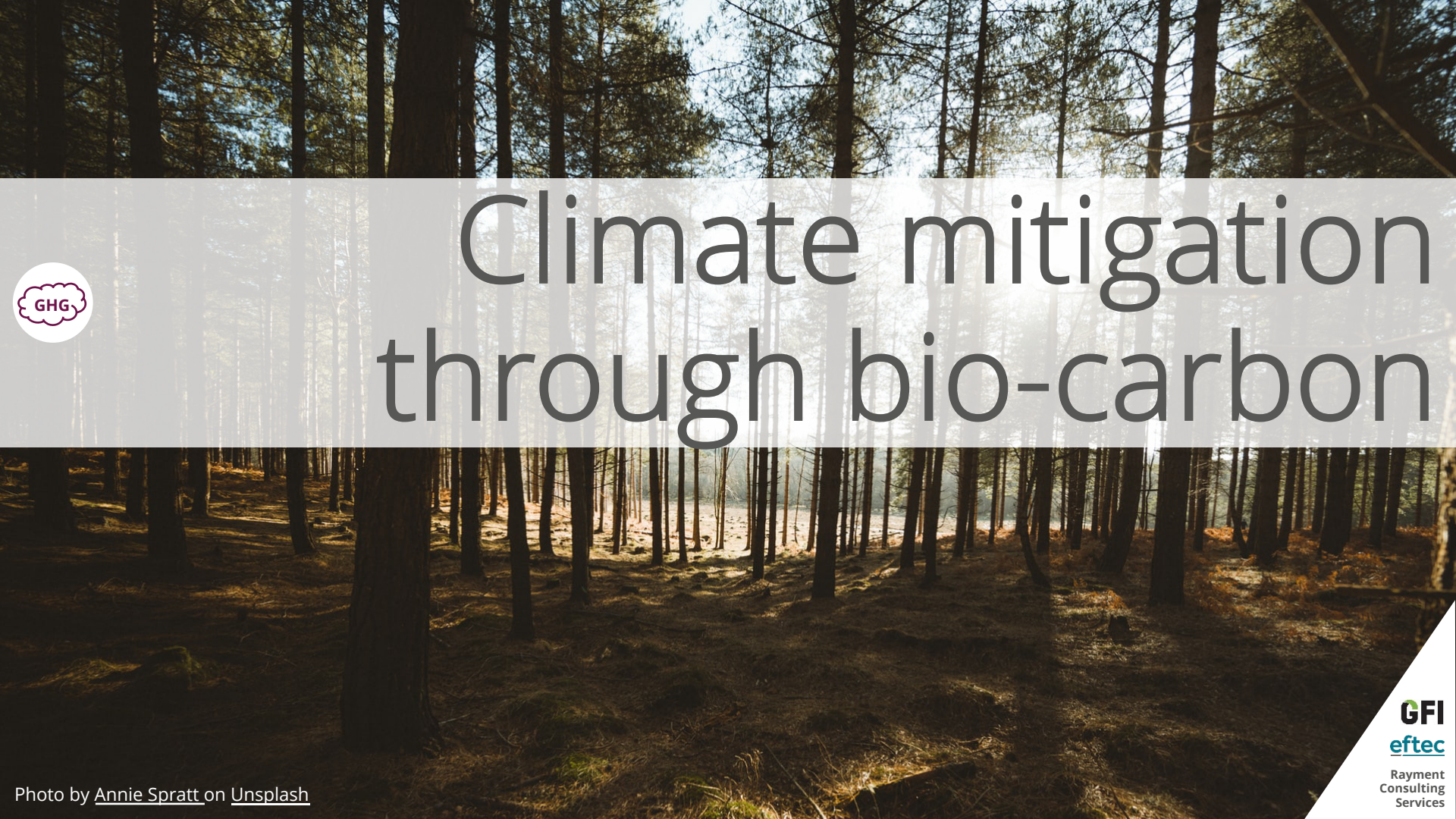
Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: Rayment (2021) model uses estimated costs of actions required to tackle degraded soil for arable land, grassland and deep peat and apply to land use for each country

Committed spending

- Central estimate: use estimates of current agri-environment schemes in each country (Rayment, 2021) and use approximation from soil specialist that around a third for soil management
- Gap does not match the difference between required and committed spend due to extrapolation and aggregation from DAs to the UK



Climate mitigation through bio-carbon



Climate mitigation through bio-carbon – definition & evidence

Invest in land use to reduce greenhouse gas emissions and increase carbon sequestration as part of the UK's Net Zero commitment by 2050

However, **commitments across the devolved administrations to achieve reductions in emissions and/or net zero targets.** Spending on land use changes invests directly in the natural environment, resulting in a change in service from the natural asset – whether this is to increase sequestration (e.g. from increased woodland planting) or reduce emissions (e.g. from changes in agricultural practices and/or peatland restoration).

References & relevance rating

	Required spending	Committed spending
H		
M	CCC (2020a)	Compiled for this project – see database
L		

Climate mitigation through bio-carbon - committed spending



Current public funding on biodiversity spending that will contribute to this outcome is at least £116-£251 million per year in the UK.

Data from number of sources are compiled for this project. Some overlap in committed spending with the outcome **Protect and/or restore biodiversity (peat and forest)**.

Forestry/ woodland schemes – from historic public sector commitments ¹ combined with commitments in England on a <i>Woodland Carbon Fund</i> ; Wales on the <i>Glastir Woodland Creation and Restoration Funding</i> and <i>Wales National Forest Programme</i> ; and commitments in Scotland and Northern Ireland (<i>WCC, 2021; HM Government, 2020; Welsh Government, 2020a; Welsh Government, 2020b; Scottish Government, 2021a; DAERA, 2020</i>)	£58m/year (£26m–88m/year)
Peatland schemes – from national government commitments on spending (<i>UK Government, 2021b; NRW, 2020; Scottish Government, 2021b</i>)	£36m/year (£23m–36m/year)
Nature-related climate schemes – from government commitments on spending on the <i>Nature for Climate Fund</i> (<i>Defra, 2020</i>)	£128m/year (£64m–128m/year)

¹ Historic public sector commitments compiled in Appendix 2.

Climate mitigation through bio-carbon - coverage of spending evidence



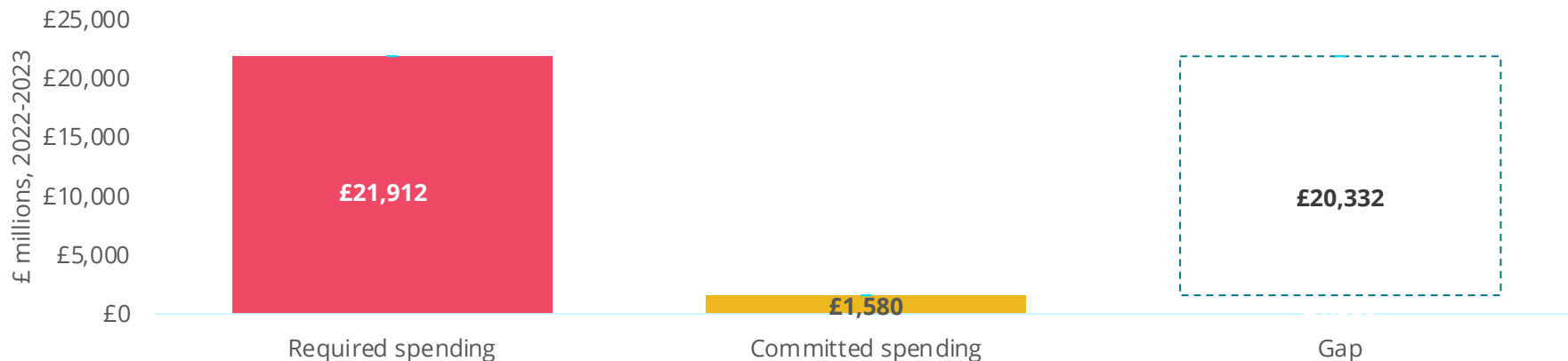
Activities/investments in the estimates

- Forestry - new coniferous planting, new broadleaved planting, broadleaved management
- Bioenergy - miscanthus, short rotation coppice, short rotation forestry
- Agroforestry - silvoarable agroforestry, silvopastoral agroforestry, hedgerow expansion)
- Peatlands - upland peat restoration, lowland peat restoration, woodland to bog
- Agricultural practices and technology - crops & soils and livestock

Gaps in current evidence

- Does not include additional spending to address climate change and/or other pressures (e.g. population change)

Climate mitigation through bio-carbon – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: estimated spending reported by the UK Climate Change Committee (CCC, 2020a) for each devolved administration for required spending on land use changes to achieve targets

Committed spending

- Range of estimates compiled from a number of sources for woodland creation, peatland restoration and nature-related climate schemes (eftec, 2021).



Enhance biosecurity



Enhance biosecurity – definition & categories



To protect native animals, and plants in the UK by preventing, managing and/or eradicating the spread of invasive species, animal disease and plant disease. Long-term risks may increase due to the impacts of climate change – resulting in more rapid spread of invasive species and/or disease(s).

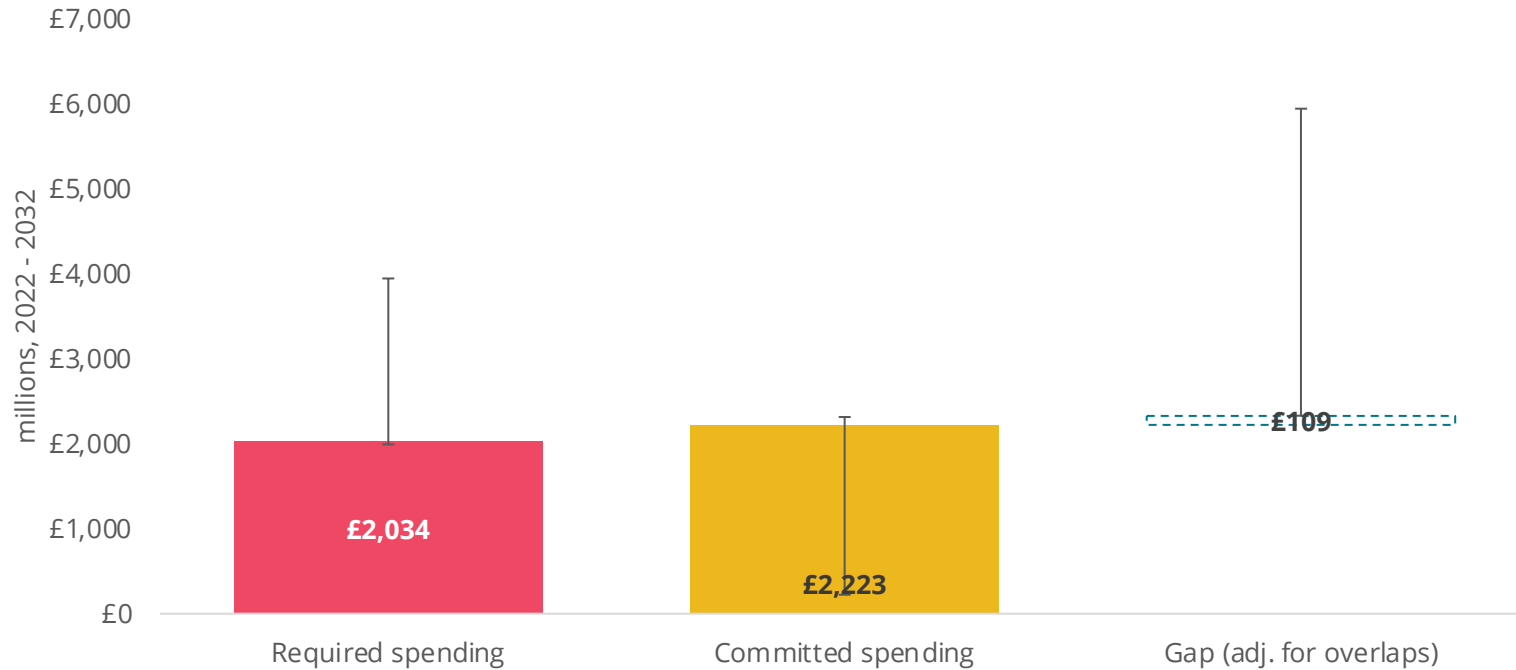
Investments into achieving this outcome are organised into the following categories which are covered separately below:

- Reduce risks of invasive species
- Reduce risks of animal disease
- Reduce risks of plant disease

The reason for this species-led categorisation is that risk assessments, and hence type of action required / committed, are species-led, even if some actions like monitoring and testing are common to all types of biosecurity risks.



Enhance biosecurity - finance gap for the UK



For a breakdown of spending and gap estimates for within this outcome, see the following slides on each output.



Reduce risks of invasive species

Reduce risks of invasive species – definition & evidence



Reduce the risk of entry and spread of invasive species in the UK. At least 49 such species are identified as priority for the UK.

Commitments across the UK to tackle the spread of invasive plant and animal species. List of species identified for Great Britain and Northern Ireland. An island-wide strategy of tackling these species is prepared, given the physical routes the species can spread.

Invasive species have an impact on native species (i.e. their habitat affected and/or invasive species are predators) and result in losses to the economy from destruction of crops; costs to homeowners, local authorities, water companies etc.

References & relevance rating

	Required spending	Committed spending
H		
M	House of Commons (2019), Defra (2018a)	House of Commons (2019)
L	Wildlife and Countryside Link (2020), Williams et al. (2010), Oreska and Aldridge (2011)	Defra (2018a), Williams et al. (2010), Defra (2015)

Reduce risks of invasive species - coverage of spending evidence



Activities/investments in the estimates

- Eradication of invasive species (although selective)
- Management of natural assets – including river management for water species (e.g. for signal crayfish); and land (e.g. Japanese knotweed require spending by councils and across the road network)
- Rapid response activities – for current species, new species, contingencies and specialist capacity that may be required to tackle some species
- Monitoring of trade – to prevent invasive species (including new species) entering the UK
- Secretariat to coordinate action across the different DAs (especially across Great Britain)
- Research – to identify new invasive species risks and methods to eradicate invasive species

Gaps in current evidence

- No spending data (committed/required) available on Northern Ireland – only data for Great Britain as a whole.
- The spending excludes the costs of dealing with the consequences of disease outbreaks, such as the 2001 break of the foot and mouth disease, which had significant costs for the UK agriculture and the rural communities.
- Any spending on measures dealing with TB is not included – even though there is a planned badger cull in Northern Ireland (consultation about this is still open when at the time of preparing this report)
- No comprehensive spending data on all species that need to be eradicated in the UK
- No estimation of spending to address losses in soil quality due to climate change

Reduce risks of invasive species – finance gap for the UK



Source: GFI, efttec, & Rayment Consulting (2021)

Required spending

- Central estimate: government estimates for all spending and water company spend (House of Commons, 2019) plus spending on enhanced rapid response (WCL, 2020)
- Upper bound: add to central estimate, total spending (public and private) on freshwater Invasive Non-Native Species (INNS) (Oreska and Aldridge, 2011), examples in Williams et al (2010) and eradicating all 14 high/medium species (Defra, 2018a) [adjusting for overlaps]
- Lower bound: government estimates for all spending and water company spend (House of Commons, 2019)

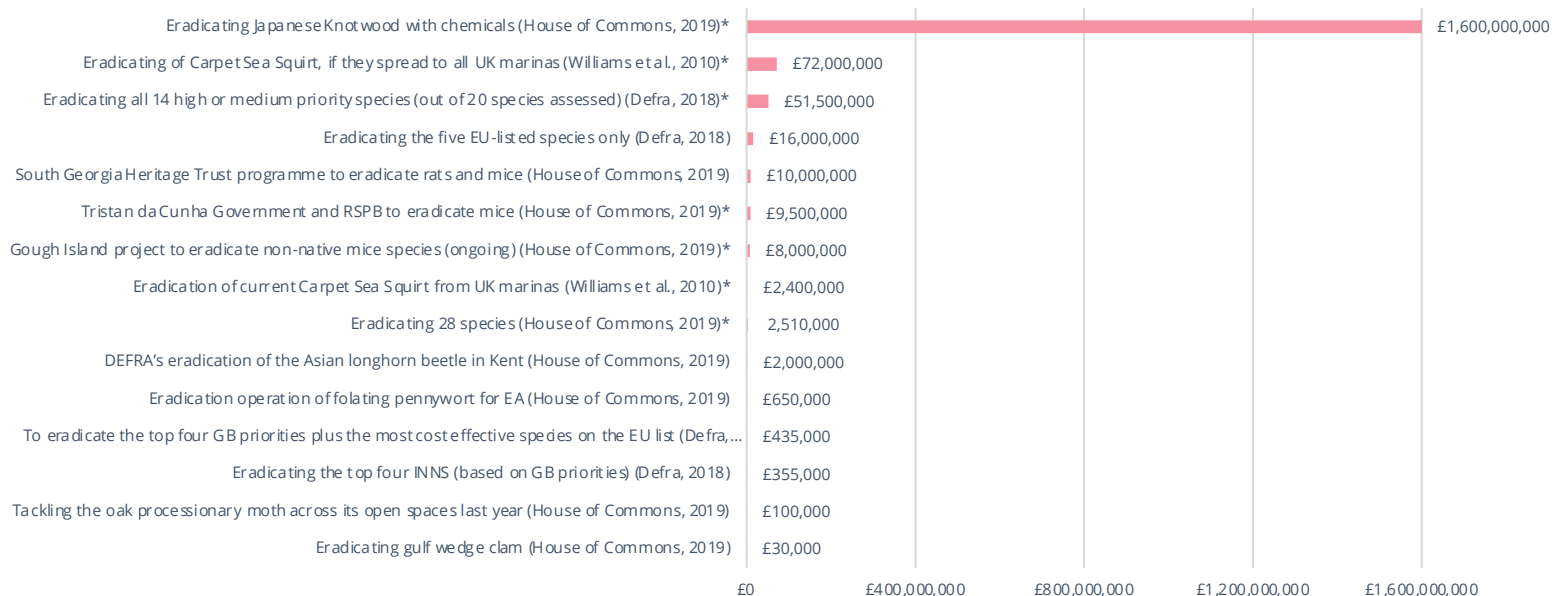
Committed spending

- Central estimate: current spend by government and water companies (that have reported spend) (House of Commons, 2019)
- Upper bound: current spend plus spending from government/local authorities likely to be committed to tackle three species (Williams et al., 2010)
- Lower bound: lower bound estimate of current spend assuming it discontinues following one year (House of Commons, 2019)

Reduce risks of invasive species - case study



Examples of costs of eradicating specific species (expected/completed) across the UK and its Overseas Territories:



* Expected/projected spending to eradicate species



Reduce risks of animal disease

Reduce risks of animal disease – definition & evidence



Reduce the spread and risks of animal disease and related costs.

No formal commitments in the UK to tackle animal disease. At least 53 animal diseases, 15 aquatic animal diseases and 6 bee diseases identified in Great Britain (Defra, 2018a).

Investments are to reduce pressures on the environment, as animal diseases have an impact on the mortality and/or morbidity for animals. The impacts on humans are through the knowledge that animal welfare is improved (i.e. a non-use value) or through impacts from livestock and/or animals that people use for economic and recreational activities (e.g. horses), which can have a significant financial impact on the agricultural and other sectors.

References & relevance rating

	Required spending	Committed spending
H		
M		
L	Gunn et al. (2007)	Defra (2018a)

Reduce risks of animal disease - coverage of spending evidence



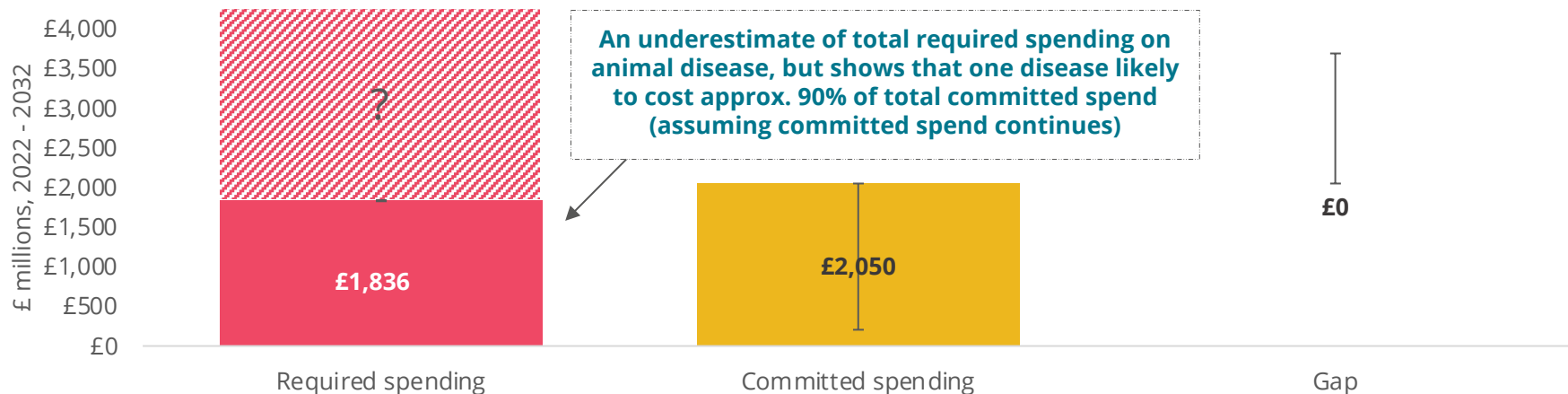
Activities/investments in the estimates

- Treatment of blue tongue virus (BTV) effects (largely palliative care) and other private treatments
- Public surveillance
- Disease control (incl. mail shots, ads etc.)
- Policy functions (including salaries and overheads)
- Inspectorate functions (including response functions)
Technical support functions (e.g. epidemiology, risk assessments, test exercise)
- Research to prevent the spread and/or to tackle the impacts of the disease

Gaps in current evidence

- Spending only on blue tongue, does not include spending for other animal diseases. BTV selected given available data on costs and scale of impacts for livestock farming
- No committed spending data on Northern Ireland – only data for Great Britain as a whole
- No comprehensive spending data on all plant diseases that need to be eradicated in the UK
- Partial estimate of the potential additional impacts from climate change – using data reported by the UK Climate Change Committee on increased incidence of BTV (Jones et al., 2019)
- No estimation of spending to risks due to other pressures on the environment from population growth, emissions etc.

Reduce risks of animal disease – finance gap for the UK



Source: GFI, efttec, & Rayment Consulting (2021)

Required spending

- Range of values from estimates of blue tongue disease only from Gunn et al. (2007) for the UK.

Committed spending

- Range of values from estimates of total spend based on current GB spend on all animal disease (Defra, 2018a)



Reduce risks of plant disease

Reduce risks of plant disease – definition & evidence

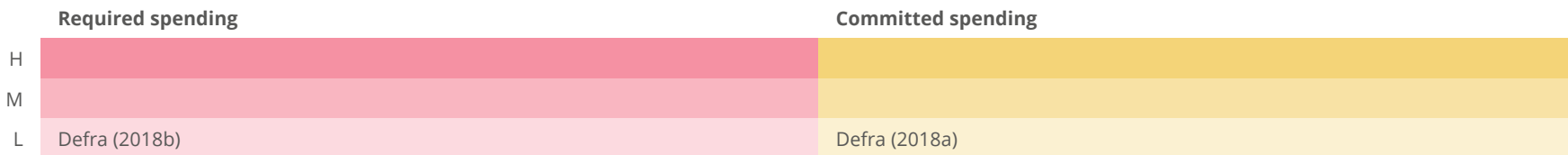


Reduce the spread and risks of plant disease and related cost.

No formal commitments in the UK to tackle plant disease. At least 409 plant diseases identified in Great Britain (Defra, 2018a).

Investments are to reduce pressures on the environment, as plant diseases have an impact on the viability of trees, marine vegetation and crops. The impacts on humans are through the knowledge that damage to plant species is avoided (i.e. a non-use value) or through the financial impact on the agriculture (in particular).

References & relevance rating



Reduce risks of plant disease - coverage of spending evidence



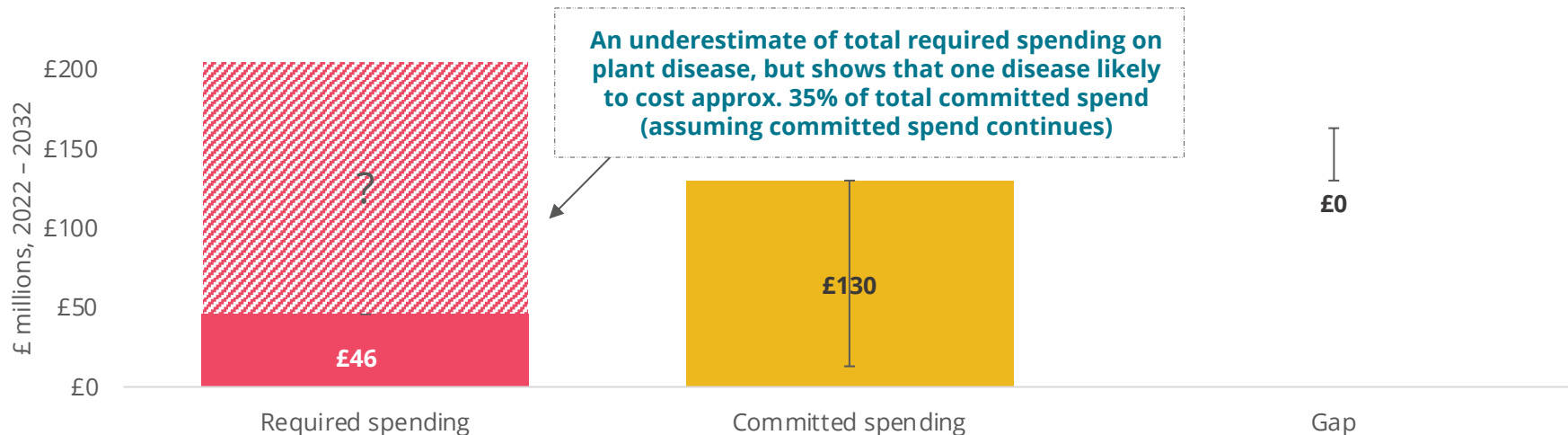
Activities/investments in the estimates

- Undefined in studies
- Spending only on Phytophthora ramorum

Gaps in current evidence

- Estimates do not include any other plant disease.
- No committed spending data on Northern Ireland – only data for Great Britain as a whole.
- No comprehensive spending data on all plant diseases that need to be eradicated in the UK
- Costs do not account for likelihood of increased spread and/or introduction of plant diseases due to climate change.
- No estimation of spending to address risks due to other pressures on the environment from population growth, emissions etc.

Reduce risks of plant disease – finance gap for the UK



Source: GFI, efttec, & Rayment Consulting (2021)

Required spending

- Central estimate: estimate of managing spread of *Phytophthora ramorum* (Defra, 2018b) for the UK

Committed spending

- Range of values from estimates of total spend based on current GB spend on all plant disease (Defra, 2018a)

Improve access and engagement with natural environment



Improve access and engagement with natural environment – definition & categories

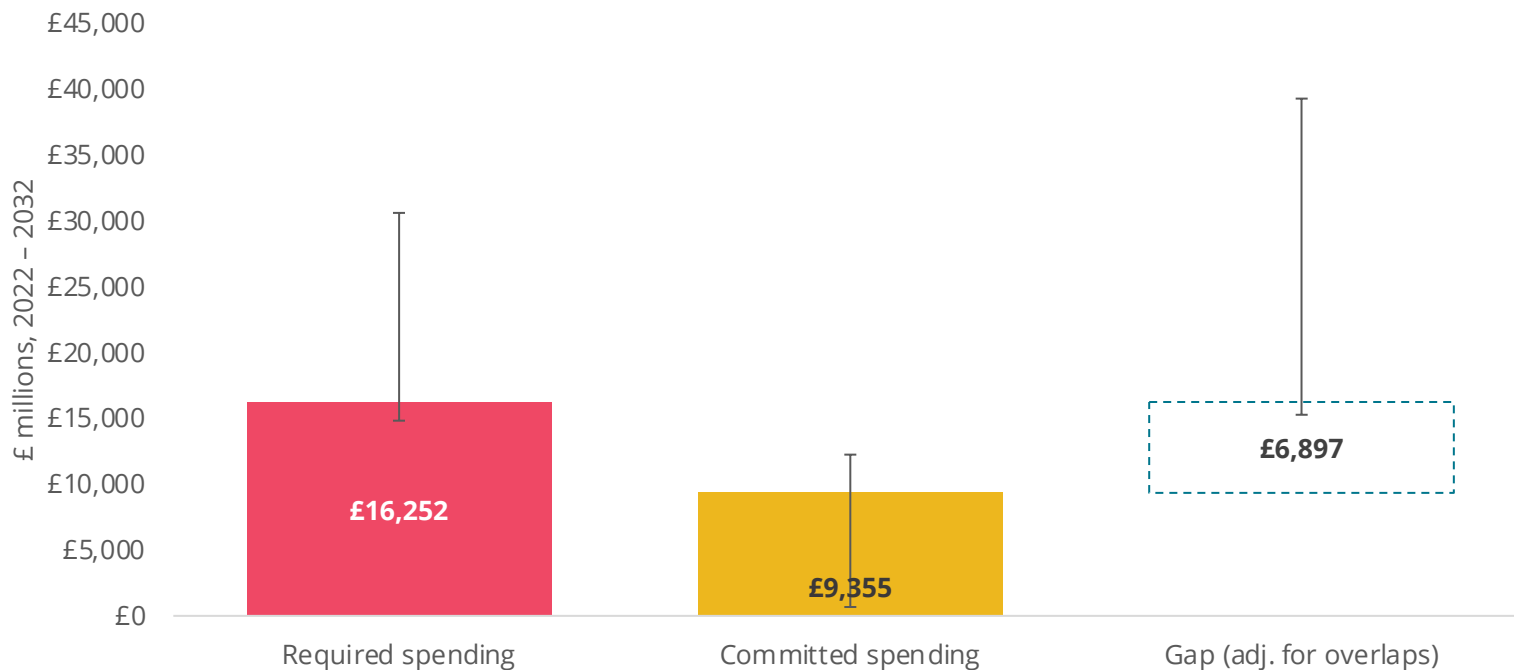


Improve access to and condition of green spaces, blue spaces and areas with specific landscape features.

Investments into achieving this outcome can be organised into the following categories which are covered separately below:

- Provide accessible green and blue space
- Safeguard and enhance landscape features

Improve access and engagement with natural environment - finance gap for the UK



For a breakdown of spending and gap estimates for within this outcome, see the following slides on each output.



Provide
accessible green
and blue space

Provide accessible green and blue space – definition & evidence



Improve access and management of green and blue spaces, where maintaining and/or improving the quality of the natural asset is the primary outcome¹.

No formal commitments in the UK² to provide access to green and blue space. General recommendation in the Natural England's Accessible Natural Greenspace Standard (ANGSt) that everyone should (wherever they live) have minimum levels of accessible natural greenspace (starting with at least 2 ha within 5 minutes walk from home).

References & relevance rating

	Required spending	Committed spending
H		
M	eftec et al. (2019), Vivid Economics (2020)	eftec et al. (2019), LGBF (2020), Welsh Government (2021a)
L	Wildlife and Countryside Link (2020), The Charter for Parks (n.d.), Friends of the Earth (2020)	

¹ Growing recognition of the co-benefits of spending into green/blue space on public health.

² Note, public access to greenspace in the countryside is more restricted in Northern Ireland than the rest of the UK. Policies like the Biodiversity Net Gain, green social prescribing and the Nature Recovery Networks can help support delivery of green infrastructure. The national Green Infrastructure Standards Framework is also due to be launched in 2022.

Provide accessible green and blue space - coverage of spending evidence



Activities/investments in the estimates

- Upgrading key existing parks and greenspaces
- Greening urban neighbourhoods (e.g. new parks, green streets)
- Creating regional parks and forests in the urban fringe
- Investment in "blue spaces" (e.g. rivers, streams, canals and other waterways)
- Delivering, managing and promoting the England Coast Path while improving coastal access for deprived coastal communities
- Green Community Hubs, to support nature-based activities and services that support peoples' mental health and wellbeing

Gaps in current evidence

- Limited information on spending on all forms of land cover included within greenspace and blue space – in particular no explicit reference to woodland creation in required/committed spending and limited information on spending on blue spending
- No data on changes in spending for national parks in England, Wales and Scotland (no national parks in Northern Ireland)
- No estimate of the cost of access to rivers and potential river enhancements planned by CaBA partners and others which deliver multiple benefits
- Partial estimate of the potential additional risks from climate change – using data reported by the UK Climate Change Committee on increase in maintenance costs for greenspace (Hudson, 2003)
- No estimation of spending to address risks due to other pressures on the environment from population growth, emissions etc.

Provide accessible green and blue space – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: average of estimated spending (central value) from eftec et al. (2019) and Vivid (2020) on parks and greenspaces
- Upper bound: average of estimated spending (central value) from the Charter for Parks (n.d.) and Friends of the Earth (2020) on parks and greenspaces
- Lower bound: lowest estimate reported, which is normally Vivid (2020) for most of the DAs

Committed spending

Add up ranges reported for each of the nations:

- England: range estimated from eftec et al. (2019)
- Wales: range estimated from Welsh Government (2021a)
- Scotland: range estimated from LGBF (2020)
- Northern Ireland: range estimate from figures for England from eftec et al. (2019)

A key message from local authority managers and literature on assessing benefits is that there is insufficient public spending allocated to maintaining public parks and green spaces.



Safeguard and enhance landscape features

Safeguard and enhance landscape features – definition & evidence



Improve condition of landscape features, including Areas of Outstanding Natural Beauty (AONB), field margins (on farmlands) and maintenance of historic sites.

No formal commitments in the UK to safeguard and/or enhance these landscape features. AONBs have land use planning powers related to specific landscapes and landscape features – meaning that investments and management are not tied to management of the biodiversity on these areas.

References & relevance rating

	Required spending	Committed spending
H		
M	Rayment (2021)	Glover (2019)
L	Glover (2019)	

Safeguard and enhance landscape features - coverage of spending evidence



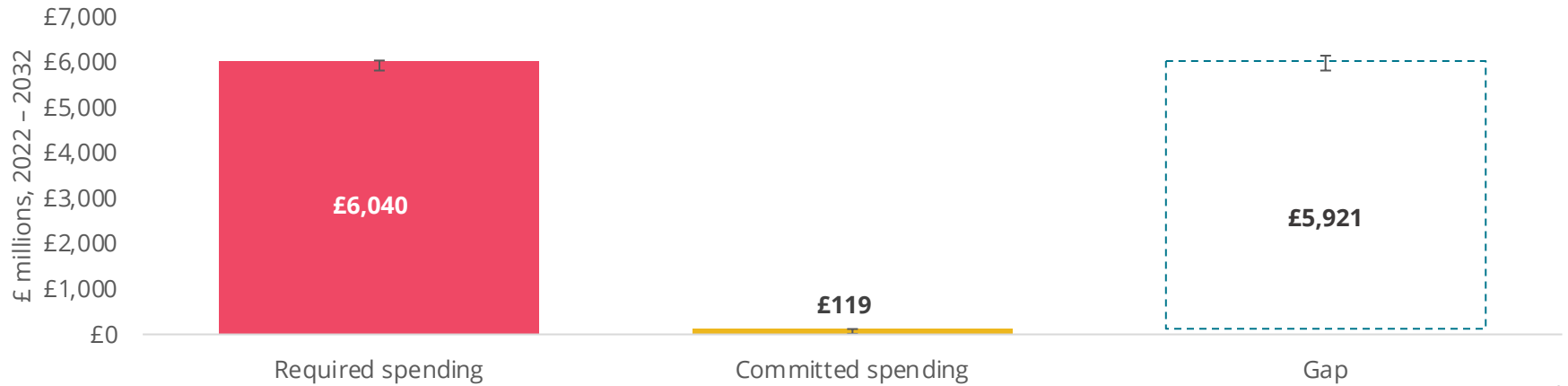
Activities/investments in the estimates

- Spending on management of AONBs, including the potential creation of a new landscape management service for the UK
- Spending on landscape features, such as hedgerows and stonewalls
- Spending on historic environment features, such as the costs of grassland management, scrub control, arable reversion to grassland.

Gaps in current evidence

- No committed spending data identified for field margins and for maintenance of historic environment sites
- No estimate of spending to address climate change
- No estimate of spending to address risks due to other pressures on the environment from population growth, emissions etc.

Safeguard and enhance landscape features – finance gap for the UK



Source: GFI, eftec, & Rayment Consulting (2021)

Required spending

- Central estimate: sum of Rayment (2021) on investment into Glover (2021) and central estimate of investment
- Upper bound: same as central estimate except using upper bound from Glover (2019)
- Lower bound: same as central estimate except using lower bound from Glover (2019)

Committed spending

- Central estimate: central estimate of current spending on AONBs from Glover (2021)
- Lower bound: lower bound estimate of current spending on AONBs from Glover (2021)

Notes

Notes

- We collated the found evidence on required spending and statements of committed or planned spending.
- We accounted for the overlap between items of spending that are likely to deliver multiple outcomes, as much as data allows, to avoid doublecounting.
- Our (project team and board) assessment is that the orders of magnitude for finance gap are right but that all results are likely to be underestimates given the gaps in the data and assumptions that had to be made to extrapolate and apportion available evidence.
- In addition we assumed (for the low and central estimates) that the committed and planning spending will continue as is beyond the time period for which it is committed / planned. This is an optimistic assumption and the readers should make their own assessment of its likelihood. For less optimistic readers, the high finance gap estimates will be much more likely.
- Regardless of how much is spent, spending does not guarantee that the outcomes it intends to deliver will be delivered.
- Most public budgets are set for compliance or overall delivery of departmental / organisational duties. They are not itemised and linked to intended outcomes. This not only makes estimating the finance gap difficult but is also likely to hinder efforts to monitor & evaluate performance.
- In terms of data quality:
 - Data is better for England, with gaps in Devolved Administrations and especially for the Overseas Territories
 - There are no quantitative targets associated with most nature-related outcomes. Agreement on such targets would make costing and budgeting easier and the finance gap estimates would be more realistic.

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