WHAT'S THE

DAMAGE?

Why HS2 will cost nature too much

REPORT

BARN OWL © DANNY GREEN/2020VISION

CONTENTS

1. EXECUTIVE SUMMARY

Our natural world is in crisis. Over the past 70 years, UK wildlife and wild landscapes have experienced huge loss and sharp declines, with the reduction and fragmentation of habitat a significant cause. There is an urgent need to reverse these declines and restore nature, and it is not too late. The Government is committed to a national Nature Recovery Network – a joined up network of wild habitats that would allow nature and people to thrive – by identifying and connecting new and existing wild places to create more, bigger, better and joined up wild areas.

Given this and that HS2 is a major infrastructure development, The Wildlife Trusts have commissioned the first comprehensive assessment of the environmental damage that HS2 will cause, assessing the broad range of impacts across all phases of development focusing on protected sites, landscape initiatives and a number of important habitats and species. The data which underpins this report has been gathered from 14 Wildlife Trusts and a number of conservation and landowning organisations along the full route of HS2. The report reveals that the construction of HS2 will destroy and fragment large swathes of natural habitat and important protected wildlife sites, resulting in the loss of irreplaceable habitats, the increased fragmentation of remaining habitats, and the local extinction of endangered species.

1.1 Protected/designated/important wildlife sites at risk

The proposed route of HS2 presents a significant risk to five internationally designated protected wildlife sites, including three Special Areas of Conservation and two Ramsar sites (wetland sites designated to be of international importance), which support internationally significant habitats and species assemblages. The proposed route also presents significant risk to many other wildlife sites protected by law, comprising 33 Sites of Special Scientific Interest (of which two are also designated as National Nature Reserves) and 21 Local Nature Reserves.

Additionally, 693 Local Wildlife Sites (LWS) covering 9,696 hectares (ha) are at risk of being significantly affected or destroyed under current plans for HS2. Local Wildlife Sites are core wildlife-rich habitats which play a critical conservation role by providing wildlife refuges, acting as stepping-stones (in line with Article 10 of the Habitats Directive), corridors and buffer zones to link and protect nationally and internationally designated sites. LWS are crucial for improving ecological coherence and connectivity and contributing to a climate resilient landscape, and may also be of national wildlife value, despite their 'local' designation.

1.2 Habitats at risk

The current proposed route of HS2 will severely impact four Nature Improvement Areas – landscape-scale conservation initiatives, three of which have been funded by Defra at a cost of more than £1.7 million. The route will sever ecological connectivity and fragment habitat within them. The proposed route will further fragment 22 Living Landscapes: landscape-scale partnership schemes for nature's recovery, championed by The Wildlife Trusts. These large initiatives aim to embody the principles set out in the Lawton Review *Making Space for Nature*, creating joined-up and resilient ecological networks. Despite HS2 stating they would take these principles into account, the proposed plans will create physical barriers to the movement of species and interruption of natural processes, further fragmenting natural habitats and making the restoration of resilient, wildlife-rich landscapes more difficult.

HS2 will result in the loss of irreplaceable habitats, including ancient woodlands, veteran trees, wood pasture, old meadows, mires and wetlands. A total of 108 ancient woodlands are known to be threatened with loss or damage under current plans. Many other important wildlife habitats will be negatively impacted by the construction of HS2 and will not recover their existing biodiversity value, under the timescales used in HS2's calculations.

1.3 Species at risk

It is anticipated that HS2 will impact a wide range of wildlife significantly, including a number of scarce and protected species at risk from permanently adverse impacts on their conservation status[1]. These include barn owl, Bechstein's bat, white-clawed crayfish, and the dingy skipper butterfly. This threat is not only contrary to Government biodiversity policies and international obligations, but also to European Law.

Fragmentation of habitats as a result of design proposals will have complex and wide-reaching impacts on populations, meta-populations and dispersal routes.

The current proposals for HS2 are so damaging that they put certain species at risk of becoming locally extinct, greatly reducing the chance that these species can ever recover to their former ranges. For example, the dingy skipper may become locally extinct in Derbyshire. A number of other protected species that are currently the focus of restoration projects, such as otters in the Trent and Erewash, will have their future survival jeopardised as a result of the current design plans for HS2.

1.4 Inappropriate mitigation proposals

Analysis of HS2 Ltd's Environmental Statement (ES) Phase 2a and Working Draft Environmental Statement (WDES) Phase 2b has identified multiple examples of inappropriate mitigation, such as tree planting on habitats that would suffer as a result e.g. vulnerable species-rich grassland, important wetland habitats, or within areas of existing semi-natural woodland. Many of the mitigation areas have been ill thought-through and instead of creating a 'green corridor', may actually destroy important existing habitats.

HS2 Ltd's current Environment Statements do not fully account for impacts to Local Wildlife Sites, local species populations, or wider ecological networks. Nor do they recognise landscape-scale projects for nature's recovery. As a result, current plans for HS2 provide inadequate mitigation and compensation while at the same time damaging habitats and projects, which themselves could offer mitigation and compensation opportunities for HS2 Ltd to invest in significant landscape-scale habitat restoration.

Furthermore, the ES and WDES were found to be inconsistent and inadequate, based on out-of-date and incomplete Local Wildlife Site data. There was also insufficient information on survey methodologies, results and impact assessments within the ES resulting in an incomplete picture of the likely impacts. In addition, in some areas, 47% of sites at risk from HS2 had not been surveyed.

1.5 Net loss of biodiversity

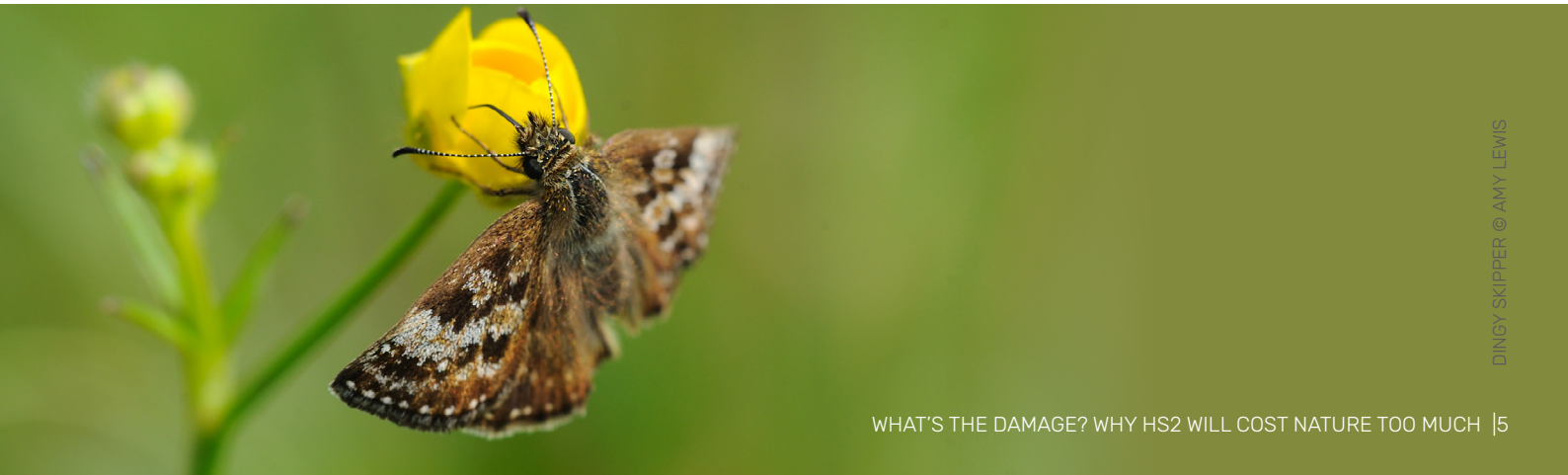
HS2 Ltd made a commitment to no net loss in biodiversity at a route-wide level (an overall no net loss along the whole route of HS2). The findings of this report show unequivocally that 'no net loss' of biodiversity by HS2 is unachievable under current plans.

1.6 Conclusion

This report concludes that the proposed HS2 scheme will be devastating to the natural environment by:

- placing too many protected sites (and the species that depend on them) under potential risk of significant impact;
- frequently failing to propose adequate and appropriate mitigation and compensation for the impacts on these wild places; and
- failing to achieve the commitment to 'no net loss' for biodiversity, let alone Government's wider commitment in the 25 Year Environment Plan[2].

At a time of continued and devastating wildlife declines and climate emergency, this damage will push nature to the brink, cause local extinctions, destroy carbon-storing habitats, and irreversibly damage local biodiversity. **It is time to Stop and Rethink**. Ongoing works to HS2 need to stop immediately, the impact on the natural environment must be fully assessed, and the proposals reviewed in the light of this assessment. Any future solution must deliver a net gain for nature.



DINGY SKIPPER © AMY LEWIS

2. INTRODUCTION

For nearly a decade, The Wildlife Trusts have petitioned HS2 Ltd for changes to the planned High Speed 2 railway route. The current proposed approach will devastate and fragment large swathes of natural habitat and protected sites, including many of the wild places cared for by The Wildlife Trusts and other environmental organisations.

HS2 is a huge infrastructure project, which will cut and divide England's natural habitats in two, from London to Manchester and Leeds. Despite this, the UK Government did not undertake a Strategic Environmental Assessment, which would have required a thorough investigation of the environmental impacts of the HS2 route and consideration of viable alternatives. Furthermore, it is evident from this study that the Environmental Statements for HS2 have fallen considerably short in terms of information, surveys, impact assessment and proposed mitigation and compensation. It is not clear why a project of this scale should have different rules to smaller projects when it comes to providing adequate impact assessment and to ensuring that all necessary environmental data is available in time to inform good decision-making. A scheme that impacts huge areas of the country should not be rushed. Issues missed at an early stage will cause problems, potential delays, and almost certainly increased costs during construction and operation. And critically, with inadequate and inappropriate mitigation and compensation proposals, losses to biodiversity will be unavoidable. This is unacceptable at a time when nature is in crisis.

This is why The Wildlife Trusts commissioned this research – to produce the most comprehensive report on the threats posed to the environment by the current route and plans for HS2. This report, underpinned by data gathered from 14 Wildlife Trusts and a number of conservation and landowning organisations along the full route of HS2, focuses on internationally, nationally and locally protected sites that are at risk. Many thousands of hectares of semi-natural habitat outside of these sites also lie in the path of HS2, including large areas of Section 41 Habitats of Principal Importance, for which there are national Government targets for protection and restoration. All will be lost or significantly reduced in extent, increasing the fragmentation and isolation of species and habitats over a wide area.

Over recent decades, UK wildlife and habitats have declined on an unprecedented scale, with the reduction and fragmentation of habitat a significant cause. We urgently need to reverse these declines and restore nature, and this can be done. But it is no longer enough to merely minimise negative impacts. All developments should support nature's recovery by avoiding impacts in the first place and by helping to restore, improve, expand and increase habitats and wildlife.

The Government has committed to bring about a national Nature Recovery Network – a joined up network of habitats that would allow wildlife and people to thrive – by identifying and connecting new and existing wild places to create more, bigger, better and joined up wild habitats. HS2 will cut right through the heart of England, slashing a large part of the countryside in two, destroying and fragmenting natural areas and species populations; and posing a genuine threat to establishing and maintaining a Nature Recovery Network.

The full extent of the losses to our natural world that will come as a result of HS2 is still unknown, but this report draws together the known and potential threats to arrive at an assessment based on the current route proposed.

This report gathers evidence of the loss to wildlife, wildlife sites and important habitats along the route of HS2. It outlines from available data, the:

- extent of the potential damage to wildlife from the current approach;
- mitigation and compensation that would need to be addressed to ensure there is no net loss as a bare minimum.

It presents a summary of information gathered from each of the Wildlife Trusts affected by HS2, and other environmental stakeholders including the Woodland Trust, Royal Society for the Protection of Birds (RSPB), National Trust and Chilterns Conservation Board.

A Freedom of Information request on habitats affected by each phase for the main route of HS2 as well as access roads and temporary construction and enabling sites was submitted to HS2 by The Wildlife Trusts on 31 October 2019. A response was due by 29 November 2019, but is still pending.

This report offers reasonable due confidence about the sites affected by HS2, but may underestimate the full potential impacts. Lack of detailed survey data, information and potential changes to the route all mean that some affected sites may not have been included. It was therefore not possible to calculate overall totals for the different habitats that will be lost or significantly affected by HS2.

3. BACKGROUND

3.1 HS2 route & map

HS2 Phase 1 (London to West Midlands) is underway.

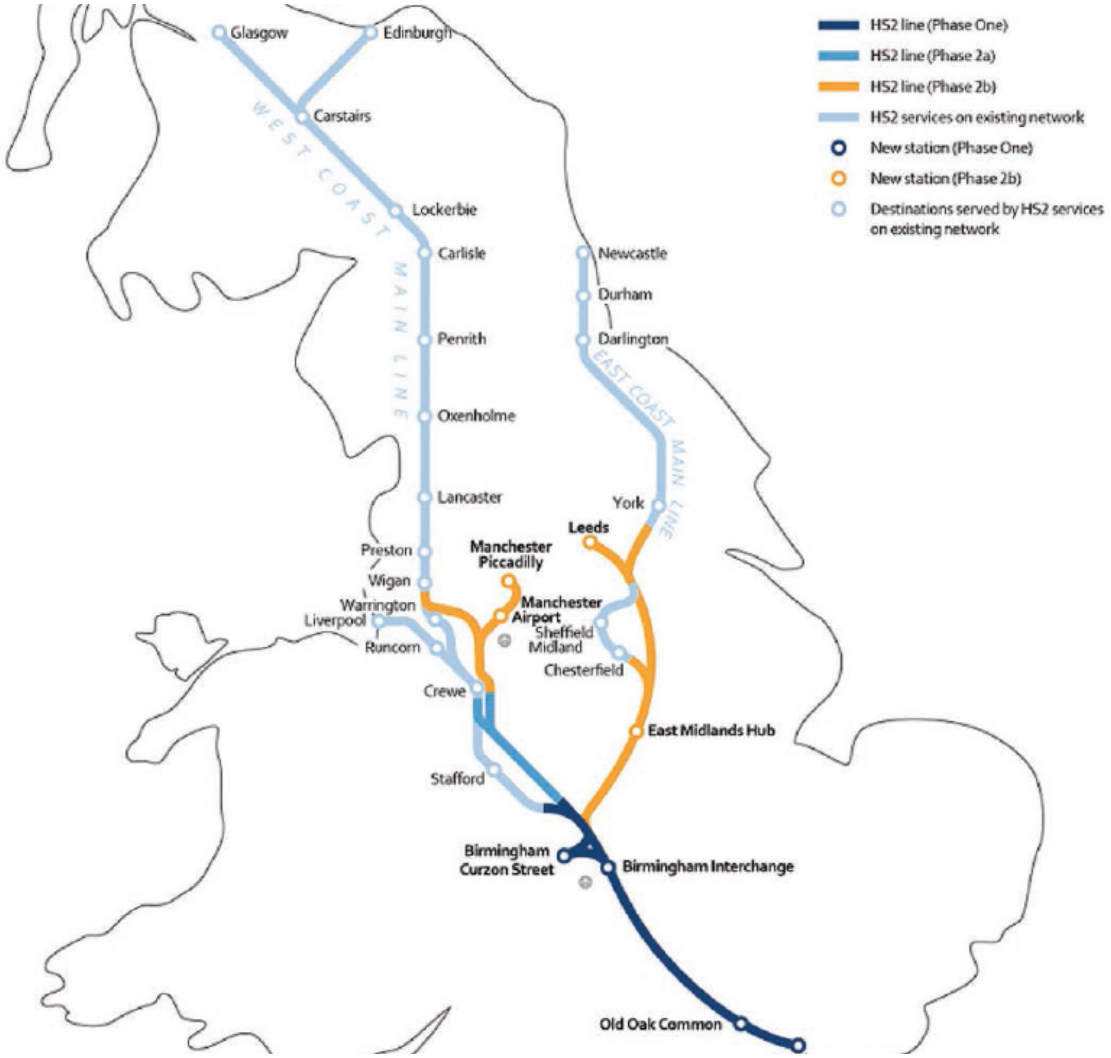
HS2 Phase Two is being delivered in two stages:

- HS2 Phase 2a (West Midlands to Crewe)
- HS2 Phase 2b (Crewe to Manchester, and the West Midlands to Leeds)

On 23 February 2017, Royal Assent was granted for the hybrid bill 'High Speed Rail (London – West Midlands) Bill'[3]. This grants the powers to construct Phase 1 of the HS2 network and to:

- build and maintain HS2 and its associated works
- compulsorily acquire interests in the land required
- affect or change rights of way, including the stopping-up (removal of rights of way) or diversion of highways and waterways (permanently or temporarily)
- modify infrastructure belonging to statutory undertakers (e.g. utility companies)
- carry out work on listed buildings and demolish buildings in conservation areas; and
- carry out protective works to buildings and third-party infrastructure.

It also grants the necessary changes to existing legislation to facilitate construction and operation of Phase 1 of HS2. Changes to the bill are covered by Additional Provisions[4].



Route of HS2 (Image source: https://www.placenorthwest.co.uk/news/hs2-route-onfirmed-details-reactions/)

3.2 Trusts affected

14 Wildlife Trusts are affected by the route of HS2:

- Phase 1 (London to West Midlands)
  - London Wildlife Trust
  - Hertfordshire and Middlesex Wildlife Trust (HMWT)
  - Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT)
  - The Wildlife Trust of Bedfordshire, Cambridgeshire and Northamptonshire (WT BCN)
  - Warwickshire Wildlife Trust
  - Staffordshire Wildlife Trust
  - Birmingham and Black Country Wildlife Trust.
- Phase 2a (West Midlands to Crewe)
  - Staffordshire Wildlife Trust
  - Cheshire Wildlife Trust.
- Phase 2b (Crewe to Manchester and West Midlands to Leeds)
  - Cheshire Wildlife Trust
  - The Wildlife Trust for Lancashire, Manchester and North Merseyside
  - Leicestershire and Rutland Wildlife Trust
  - Derbyshire Wildlife Trust
  - Nottinghamshire Wildlife Trust
  - Sheffield and Rotherham Wildlife Trust
  - Staffordshire Wildlife Trust
  - Warwickshire Wildlife Trust
  - Yorkshire Wildlife Trust.

3.3 Policy context

Biodiversity 2020[5], the Government's strategy for England's wildlife and ecosystem services, states as its mission: "to halt overall biodiversity loss, support healthy and well-functioning ecosystems, and establish coherent networks, with more and better places for nature for the benefit for wildlife and people".

The Government's 25 Year Plan for the Environment[6] includes a commitment to embed environmental net gain in infrastructure projects and to ensure that the requirement for net gain is strengthened.

The 2018 update to the National Planning Policy Framework[7], paragraph 170 states that "Planning policies and decisions should contribute to and enhance the natural and local environment by… minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures."

The draft 2019 Environment Bill introduced to Parliament in October 2019 included a net gain target of 10% for development, though currently allows exclusions for projects such as HS2.

HS2 Ltd commits to an objective of seeking to achieve no net loss in biodiversity at a route-wide level, but does not aim to achieve a net gain. The destruction of ancient woodland, as an irreplaceable habitat, is no longer included in this calculation.

The HS2 Environmental Policy, states HS2's commitment to "developing an exemplar project, and to limiting negative impacts through design, mitigation and by challenging industry standards whilst seeking environmental enhancements".

4. FINDINGS

4.1 Introduction to findings

The findings of this report cover the route-wide impacts, based on the known route at the time of writing. It considers the impacts on internationally, nationally and locally protected sites, Nature Improvement Areas (NIAs), Living Landscapes, Wildlife Trust Nature Reserves, irreplaceable habitats, and the general impacts on habitats that fall outside of these designations. It also reports on some of the impacts of HS2 on scarce and protected species along the route, covering birds, mammals, reptiles and rare invertebrates, like white-clawed crayfish, the dingy skipper and small heath butterflies.

Internationally, Nationally and Locally Protected Wildlife Sites

These include: Special Areas of Conservation (SACs); Ramsar Sites; Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs); Local Nature Reserves (LNRs); and Local Wildlife Sites (LWSs).

Sites of Special Scientific Interest (SSSIs): Sites of Special Scientific Interest are protected through the Countryside & Rights of Way Act (2000), designated nationally for their special interest due to their flora, fauna, geological, geomorphological or physiographical features. SSSIs form a national network of sites that also underpin sites designated to meet international obligations (e.g. Ramsar Sites and Special Areas of Conservation). All National Nature Reserves (NNRs) are notified as SSSIs. In England, NNRs are designated by Natural England under the Wildlife and Countryside Act 1981, as amended.

Special Areas of Conservation (SACs): Special Areas of Conservation are statutory sites, designated to protect one or more special habitat(s) and/or species. They are internationally important areas that are given special protection under the European Union's Habitat Directive, which is transposed into UK law by the Habitats and Conservation of Species Regulations 1994 (as amended). All UK SACs are also designated as SSSIs (although SSSIs cannot extend beyond low tide, whereas SACs can).

Ramsar Sites: Ramsar sites are statutory wetland sites of international importance. They are designated under the criteria of the 1971 Ramsar Convention on Wetlands for containing representative, rare or unique wetland types or for their importance in conserving biological diversity. The designation of UK Ramsar sites has generally been underpinned through prior notification of these areas as Sites of Special Scientific Interest (SSSIs). Accordingly, these receive statutory protection under the Wildlife & Countryside Act 1981 (as amended). Government has also issued policy statements relating to Ramsar sites which extend to them the same protection at a policy level as Special Areas of Conservation and Special Protection Areas.

National Nature Reserves (NNRs): National Nature Reserves were established to protect some of our best examples of important habitats, species and geology, and to provide 'outdoor laboratories' for research. Most NNRs offer great opportunities for schools, specialist interest groups and the public to experience wildlife at first hand and to learn more about nature conservation. All NNRs are notified as SSSIs.

Local Nature Reserves (LNRs): Local Nature Reserves are statutory sites containing special interest within the administrative area of a local authority for their flora, fauna, geological or physiographical features, and which are managed for the purpose of their preservation or for providing opportunities for related study and research. They are also recognised as an important places for the public enjoyment of nature.

Local Wildlife Sites (LWSs): Local Wildlife Sites are defined areas, identified and selected locally for their substantive nature conservation value, based on important, distinctive and threatened habitats and species with a national, regional and local context. Together with the statutory sites (SSSIs), they form the essential building blocks of a Nature Recovery Network. Local Wildlife Sites are recognised in national planning policy, which sets out requirements for their protection through local policy and plans. LWS may contain habitats of national value which have not been designated as SSSIs, as the SSSI suite is representative, but not comprehensive.

4.2 Route-wide impacts

4.2.1 Statutory designated wildlife sites within 500m radius of proposed scheme[8]

Number of sites at potential risk of significant harm

(no.)	Total	Phase 1	Phase 2a	Phase 2b
SACs[(i)]	3	0	1	2
SSSIs[(ii)]	28	11	3	14
Ramsar[(iii)]	2	0	1	1
NNRs[(iv)]	2	1	0	1
LNRs[(v)]	18	7	4	7

Note: Some sites have more than one designation.

(i) SACs
Pasturefields Salt Marsh SAC, Staffordshire (HS2 Phase 2a)
Manchester Mosses SAC (HS2 Phase 2b)
River Mease SAC (HS2 Phase 2b)

(ii) SSSIs
See table below

Phase 1	Phase 2a	Phase 2b
Denham Lock Wood	Rawbones Meadow	Rostherne Mere
Frays Farm Meadows	Betley Mere	Wimboldsley Wood
Mid Colne Valley	Sandbach Flashes	Plumley Lime Beds
Ruislip Woods		Holcroft Moss
Finemere Wood		Long Lane Willows
Sheephouse Wood		River Mease
Berkswell Marsh		Breedon Cloud Wood & Quarry
Coleshill & Bannerly Pools		Lockington Marshes
Middleton Pool		Lount Meadows
River Blythe		Pasture & Asplin Woods
Ufton & Long Itchington		Bogs Farm Quarry
		Annesley Woodhouse Quarries
		Bulwell Wood
		Sellers Wood

(iii) Ramsar
Midlands Meres & Mosses Phase 1 Ramsar (HS2 Phase 2a)
Rostherne Mere Ramsar (HS2 Phase 2b)

(iv) NNRs
Ruislip Woods NNR (HS2 Phase 1)
Rostherne Mere NNR

(v) LNRs
See table below

Phase 1	Phase 2a	Phase 2b
Denham Country Park	Christian Fields	Forbes Hole
Fray's Valley	Crown Meadow	Stanton Gate
Wormwood Scrubs	Kingston Pool Covert	Nottingham Canal
Perivale Wood (risk to hydrology of the site)	Stone Meadows	Sellers Wood
		Toton Fields
Northmoorhill Wood		Firsby Reservoir
Crackley Wood		Pit Lane
Lavender Hall		

4.2.2 Statutory designated sites beyond the 500m radius of proposed scheme

Number of sites considered potentially subject to significant effect

(no.)	Total	Phase 1	Phase 2a	Phase 2b
SACs	0	0	0	0
SSSIs[vi]	5	3	0	2
Ramsar	0	0	0	0
NNRs	0	0	0	0
LNRs[vii]	3	3	0	0

Note: Some sites have more than one designation.

(vi) SSSI

Bacombe & Coombe Hills SSSI (HS2 Phase 1)
Froghall Brickworks SSSI (HS2 Phase 1)
Helmdon Disused Railway SSSI (HS2 Phase 1)
Astley & Bedford Moss (HS2 Phase 2b)
Attenborough Gravel Pits SSSI (HS2 Phase 2b)*

**Effects on bird assemblages which use Attenborough SSSI, from habitat loss nearby in the Trent and Soar Valleys.*

(vii) LNR

Bacombe Hill LNR (HS2 Phase 1)
Ferndown LNR (HS2 Phase 1)
Kettlebrook LNR (HS2 Phase 1)

4.2.3 Local Wildlife Sites (including potential and candidate Local Wildlife Sites)

Number of Local Wildlife Sites at risk of significant impact

(no.)	Total	Phase 1	Phase 2a	Phase 2b
Within the proposed scheme*	304	127	57	123
Adjacent to proposed scheme**	147	33	5	109
Sites neither within nor adjacent to the proposed scheme *(which are also considered to be at risk)****	242	56	7	169
Total	693	216	69	401

Area of sites (indicative)

(hectares)	Total	Phase 1	Phase 2a	Phase 2b
Within the proposed scheme*	3,446	1,463	805	1,187
Adjacent to proposed scheme**	4,001	584	115	3,312
Sites neither within nor adjacent to the proposed scheme *(which are also considered to be at risk)****	2,239	871	49	1,319
Total	9,696	2,918	969	5,818

Note: The area figures should be treated with a margin of error due to the different methodologies used to present the areas affected.

Key:
***Within the proposed scheme**: sites within HS2's 'red line' route boundary, plus any known sites for compounds, access roads, ancillary works that are potentially at risk of significant effects.

****Adjacent to the proposed scheme:** sites bordering the outside of the 'red line' route boundary that are potentially at risk of significant effects.

*****Sites neither within or adjacent to the proposed scheme:** any sites that do not fall within the above categories, but were considered to be potentially at risk of significant effects (e.g. hydrological & air quality impacts).

Potential and candidate Local Wildlife Sites: different terms are used by different partnerships. But collectively these sites include those that have potential to be LWS. Either they do not meet the criteria but have potential to do so; or potential sites that have not yet been surveyed or assessed against the criteria.

Local Wildlife Sites (LWS) (also known by other terms e.g. Sites of Importance for Nature Conservation, County Wildlife Site, Site of Nature Conservation Importance) are of great significance and core wildlife-rich habitats of substantive nature conservation value. Taken together with Sites of Special Scientific Interest (SSSI) they represent a major national asset. LWS play a critical conservation role by providing wildlife refuges, acting as stepping-stones (in line with Article 10 of the Habitat Directive), corridors and buffer zones to link and protect nationally and internationally designated sites. Theyimproving ecological coherence and connectivity and contributing to a climate resilient landscape. LWSs are protected through good planning policy and decisions, underpinned by Local Plan policies as directed by the National Planning Policy Framework.

For a long time, it has been recognised that, while important, SSSIs are insufficient to protect and conserve biodiversity in England. So, together with SSSIs, LWS support locally and nationally threatened species and habitats and are the essential building blocks of a Nature Recovery Network and the core from which we can achieve nature's recovery. Unlike SSSIs, which for some habitats are a representative sample of the sites that meet national standards, LWS systems are more comprehensive and select all sites that meet the criteria. As a result, many LWS are of SSSI quality and together with the statutorily protected sites, contain most of the country's remaining high-quality natural habitat and threatened species.

Regardless of statutory status, it is paramount that the country's core sites for biodiversity are protected from developmental loss and damage, if we are to avoid a net loss in biodiversity.

4.3 Nature Improvement Areas and Living Landscapes

4.3.1 Nature Improvement Areas bisected and fragmented by HS2

Nature Improvement Areas (NIAs) are areas of the country where partnerships have been set up to restore and enhance the natural environment, creating joined-up and resilient ecological networks at a landscape-scale. Initially, twelve NIAs were recognised and funded by Defra between 2012 and 2015 at the collective cost of £1,724,200. Other NIAs were locally designated.

Developing a Nature Recovery Network to reconnect wildlife habitats is at the heart of the Government 25-Year Environment Plan[9]. Yet the proposals for HS2 cut through four NIAs, severing ecological connectivity and fragmenting habitats. This undermines publicly-funded work and goes against the principles set out in the Lawton Review - *Making Space for Nature*[10] (which HS2 Ltd stated it would take into account[11]), and government's commitment to leave the environment in a better state than it found it.

Birmingham and Black Country NIA
(Nationally-designated. Defra-funded. NIA grant awarded **£595,750**) HS2 Phase 1
This partnership of over 50 organisations works towards a vision of an urban landscape permeated by a network of high-quality greenspace rich in wildlife and enjoyed by the people who live and work there. The proposed route will slice through the NIA and destroy 80-90% of the Birmingham and Black Country Wildlife Trust's Park Hall Nature Reserve.

Meres and Mosses of the Marches NIA
(Nationally-designated. Defra-funded. NIA grant awarded **£568,470**) HS2 Phase 2a
The Meres and Mosses NIA is a partnership of 12 organisations making better places for nature, people and communities, improving and protecting core sites and connecting them by restoring the wetland habitats in and around them. It includes Blakenhall Moss, a Cheshire Wildlife Trust nature reserve that is being returned to lowland raised bog. The proposed route runs straight through the NIA, cutting a swathe 500-780m wide (min and max width using GIS data published by HS2 in 2017). With multiple tracks, this is one of the widest sections in Phase 2a. It will result in the loss of up to 61 ha of the 105 ha Randilow Farm and Bunker Hill LWS, which is an integral part of the NIA. The partial loss of this core site would increase ecological fragmentation within the NIA. The loss of habitat for breeding and overwintering farmland birds at this site is unmitigated and losses of potential ancient woodland, hedgerows and other habitat for bats are not adequately compensated and mitigated.

Great Manchester Wetlands NIA
(locally-designated) HS2 Phase 2b
The proposed route of HS2 Phase 2b severs the east-west connectivity of the whole of the Great Manchester Wetlands NIA and the wider Manchester Mosses Special Area of Conservation (Community Area MA05). This is an essential network of wildlife corridors and stepping stones to connect wetland habitats. It is already split by the M62 and the Liverpool to Manchester Railway. HS2 will fragment it further. This NIA was locally-determined by two Local Nature Partnerships and is recognised by local planning frameworks and strategies, but it is not included in the Working Draft Environmental Statement (WDES) for Phase 2b.

This means the importance of the area in terms of ecological connectivity and restoration potential are not considered, and the significance of the peatland and wetland habitats present at designated sites is missed. Holcroft Moss is not limited to the Site of Special Scientific Interest (SSSI) but extends a much greater distance north and west towards Risley and Pestfurlong Mosses. Although farmed, the remaining peatland is still very wet in parts and provides suitable habitat for species such as wintering birds, dragonflies and brown hares and could be rewetted to recreate peatland habitats. The M62 bisected Holcroft Moss east-west in the 1970s and HS2 is set to further fragment it on a north-south axis, leaving the SSSI isolated from the rest of Holcroft Moss and the wider Manchester Mosses area. This will impact species movement, and fragment existing habitats into more, smaller, isolated spaces, making future restoration on a landscape-scale harder to achieve. Sufficient and appropriate compensation should be made across the NIA for this massive impact on biodiversity and ecological functionality.

The current plans for the WDES show that the scheme will run along an embankment next to Holcroft Moss SSSI/SAC, owned and managed by Cheshire Wildlife Trust. If HS2 Ltd were to opt for a viaduct as it passes close to the SSSI it would help retain ecological and hydrological connectivity between the SSSI and Pestfurlong Moss LWS / Risley Moss SSSI to the west and south. By contrast, the embankment option will sever connectivity for a number of UK Priority Species including brown hares and common lizards, and will alter the hydrology of the wider peat body.

Current compensation measures are not aligned with the aims and objectives of the Great Manchester Wetlands NIA; for example, woodland planting is not the best option for the open habitats and specialised species associated with the NIA. Cheshire Wildlife Trust has urged HS2 Ltd to mitigate for the impacts in this sensitive area by helping to reconnect Holcroft Moss following the damage that occurred as a result of the M62 construction. This includes:

- creating a green bridge to aid species movement across the motorway; and
- creating and providing long-term management of wetland buffer habitats in the vicinity of Holcroft moss.

Dearne Valley Green Heart NIA
(Nationally-designated. Defra-funded. NIA grant awarded **£559,980**) HS2 Phase 2b
The aim for this NIA in Yorkshire is to help restore and enhance the ecological networks of the river and its floodplain, linking it to habitats on surrounding slopes and hills. At its core will be 1,300 ha of reedbed, wet grassland, wet woodland and woodland, with a 2,690 ha buffer of farmland, amenity grassland and reclaimed industrial areas (which are hotspots for riparian mammals in south Yorkshire, but fast declining). The route of HS2 will result in loss of habitat and fragmentation, together with indirect effects from construction and ongoing disturbance.

4.3.2 Living Landscapes impacted by HS2

A Living Landscape is a recovery plan for nature, championed by The Wildlife Trusts since 2006 to create a resilient and healthy environment rich in wildlife for everyone. The vision can only be achieved by connecting up wildlife-rich areas throughout the urban and rural landscape, so that wildlife is able to move between them, respond to changes in conditions and colonise new areas. The Wildlife Trusts are involved in more than 100 Living Landscape schemes around the UK, where they work in partnership at a landscape-scale to create more, bigger, better and joined up habitat networks, allowing nature to recover and people to thrive.

There are 22 Living Landscapes that will be adversely affected by the route of HS2. These landscape areas are vital to the future recovery of nature:

- **Colne Valley Living Landscape** (London Wildlife Trust / Herts & Middlesex Wildlife Trust)
- **Yeading Valley Living Landscape** (London Wildlife Trust)
- **Bernwood Forest and Ray Valley Living Landscape** (BBOWT)
- **Feldon Living Landscape** (Warwickshire Wildlife Trust)
- **Dunsmore Living Landscape** (Warwickshire Wildlife Trust)
- **Avon Valley Living Landscape** (Warwickshire Wildlife Trust)
- **Tame Valley Living Landscape** (Warwickshire Wildlife Trust)
- **Great Manchester Wetlands Living Landscape** (The Wildlife Trust for Lancashire, Manchester and North Merseyside / Cheshire Wildlife Trust)
- **Soar and Wreake Living Landscape** (Leicestershire & Rutland Wildlife Trust)
- **Doe Lea & Rother Coalfields Living Landscape** (Derbyshire Wildlife Trust)
- **Erewash Valley Living Landscape** (Derbyshire Wildlife Trust / Nottinghamshire Wildlife Trust)
- **Trent Valley Living Landscape** (Nottinghamshire Wildlife Trust)
- **Nottingham City Living Landscape** (Nottinghamshire Wildlife Trust)
- **Nottinghamshire Magnesian Limestone Living Landscape** (Nottinghamshire Wildlife Trust)
- **West Leeds Green Corridor Living Landscape** (Yorkshire Wildlife Trust)
- **River Went Corridor Living Landscape** (Yorkshire Wildlife Trust)
- **Lower Aire Valley** (Yorkshire Wildlife Trust)
- **Elmet Magnesian Limestone Living Landscape** (Yorkshire Wildlife Trust)
- **Dearne Valley Living Landscape** (Yorkshire Wildlife Trust)
- **Ouse Wharfe Corridor Living Landscape** (Yorkshire Wildlife Trust)
- **Lower Calder Valley Living Landscape** (Yorkshire Wildlife Trust)
- **South Yorkshire Magnesian Limestone Living Landscape** (Yorkshire Wildlife Trust)

Beyond direct habitat destruction, the main impact to these landscape initiatives is the barrier effect – HS2 could act as a physical barrier to the movement of species and interruption of natural processes such as hydrology. This would make the restoration of resilient, wildlife-rich landscapes more difficult.

4.4 Wildlife Trust nature reserves will be impacted

Wildlife Trust nature reserves are cherished sites that have been cared for over the years by staff and volunteers, and represent considerable investment of charitable time and resources. Based on information from Wildlife Trusts along the route, 18 Wildlife Trust nature reserves will be affected:

A total of 13 sites within a 500m radius of the proposed scheme

- **Frays Farm Meadows SSSI** (London Wildlife Trust), London Wildlife Trust faces uncertainty over the future of Frays Farm Meadows, a nature reserve in the Colne Valley, which may be affected by a proposed haulage road that will be in place for nine years.
- **Denham Lock Wood** (London Wildlife Trust), part of Frays Valley LNR.
- **Dew's Farm Sand Pits**, part of Dew's Dell Site of Important Nature Conservation (London Wildlife Trust).
- **Broadwater Lake**, part of mid-Colne Valley SSSI (Herts & Middlesex Wildlife Trust). A proposed viaduct cuts through the nature reserve.
- **Finemere Wood SSSI** (Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust), where paths were closed from 7 January 2019 to 30 November 2019 to allow National Grid to carry out works for HS2.
- **Calvert Jubilee Nature Reserves** (BBOWT)
- **Crackley Wood LNR** (Warwickshire Wildlife Trust)
- **Cloud Wood Nature Reserve** (Leicestershire & Rutland Wildlife Trust)
- **Bogs Farm Quarry SSSI** (Nottinghamshire Wildlife Trust)
- **Holcroft Moss SSSI** (Cheshire Wildlife Trust), part of the Manchester Mosses SAC which is discussed in statutory sites affected by Phase 2b.
- **Rothwell Country Park** (Yorkshire Wildlife Trust managed on behalf of Leeds City Council)
- **Water Haigh Woodland Park** (Yorkshire Wildlife Trust managed on behalf of Leeds City Council)
- **Park Hall Nature Reserve** (Birmingham and Black Country Wildlife Trust)

A further five sites outside the 500m radius but still considered potentially subject to significant effects

- **Bacombe Hill Nature Reserve** (BBOWT), designated as a SSSI and LNR.
- **Astley Moss,** part of the Astley and Bedford Moss SSSI matrix and the Manchester Mosses SAC (Wildlife Trust for Lancashire, Manchester and North Merseyside)
- **Park Hall Nature Reserve** (Birmingham and Black Country Wildlife Trust)
- **Carr Vale Flash LWS** (Derbyshire Wildlife Trust)
- **Sean Hawkins Meadow Nature Reserve** and potential LWS (Cheshire Wildlife Trust), which contains potential ancient woodland that appears on the tythe maps for Millington, Cheshire in 1848 and is located immediately adjacent to the Phase 2b scheme.

Some Wildlife Trust nature reserves are also SSSIs, LWS and/or LNRs so are also referenced under section 4.2.1 and 4.2.2 and some are also ancient woodlands (see more on ancient woodlands under section 4.6.1).

GREYLAG GEESE © LANCASHIRE WILDLIFE TRUST

Park Hall Nature Reserve (Birmingham and Black Country Wildlife Trust) is affected by HS2 Phase 1. HS2 has taken possession of this site, a 40-hectare area of remnant farmland on the edge of Birmingham. The Trust anticipates that 80-90% of the site will be destroyed. Commitments made by HS2 Ltd in 2014 include preserving some areas of ancient woodland and improving public access in the future.

Rothwell Country Park (Yorkshire Wildlife Trust managed on behalf of Leeds City Council) is affected by HS2 Phase 2b. Designated a LWS in 2019, this is a hub for creating a connected environment to support nature's recovery and the Leeds Wildlife Habitat Network and it has been invested in over decades. The route refinement brings the route further south into Rothwell Country Park, through the most valuable part of the site for biodiversity, an area less disturbed by the public and with the highest species diversity on the site. In addition to this habitat loss, during the construction phase a greater area of the site will be damaged. The proposed viaduct is less likely to fragment the site in the long-term but will still require extensive time and resources to recover the site from the works. Non-native invasive species Japanese knotweed and giant hogweed have been eradicated from the site but are present along boundaries and could recolonise. The inability to secure external funding to support ongoing management is restricting the Wildlife Trust's ability to maintain the quality of the site and improve the ecological value or visitor experience.

Calvert Jubilee Nature Reserve (Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust) is affected by HS2 Phase 1. This unique 20 hectare open-water habitat is a haven for large numbers of overwintering waterfowl and wading birds. It supports a range of species including mallard, tufted duck, pochard and bittern and all five UK hairstreak butterfly species. In February 2019, the Wildlife Trust received notice from HS2 Ltd about its intentions to carry out clearance works (for Phase 1) at Calvert Jubilee. The Trust objected on the basis that the works would cause unnecessary and unwarranted destruction of important breeding and feeding habitats for a range of species; and it denied access to HS2 contractors a few months later on account of there being no scheme of works and no adequate mitigation plans. In December 2019 (during the review of the HS2 scheme[12]), contractors entered the nature reserve and began irreversible clearance of wildlife habitat, without advance warning to the Wildlife Trust.

Water Haigh Woodland Park (Yorkshire Wildlife Trust managed on behalf of Leeds City Council) is affected by HS2 Phase 2b. The WDES Phase 2b estimates that 70% of this 97-hectare site will be lost. This site is significant for local wildlife as it represents one of the final natural sites south of Leeds. The Wildlife Trust has created a 'Coronation Meadow' on the flood plain and plan to expand the wildflower areas over the coming year but are unable to fund this due to the risk posed by HS2.

4.5 National Trust sites

The National Trust identifies impacts from both construction and operation of HS2 Phase 2b at their properties:

- **Hardwick Hall**, Derbyshire – significant adverse impacts
- **Nostell Priory**, West Yorkshire – significant adverse impacts
- **Dunham Massey**, Cheshire – significant adverse impacts
- **Tatton Park**, Cheshire (operated under lease by Cheshire East Council) – some adverse impacts.

4.6 Irreplaceable habitats will be lost

Planning guidance requires impacts on irreplaceable habitats to be avoided, but currently the HS2 scheme does not consider siting temporary works such as compounds and access tracks in a way that avoids these habitats.

4.6.1 Ancient woodland

HS2 is the biggest single threat from development to ancient woodland in this country. At least 108 ancient woods are threatened with loss or damage (see table below). Natural England is responsible for recording ancient woodland on the Ancient Woodland Inventory, but not all of it is currently mapped, particularly areas less than 2 ha in size, so this number is likely to be higher.

	Ancient woodland sites affected		
	Direct	Indirect	Total
HS2 Phase 1	34	27	61
HS2 Phase 2a	10	7	17
HS2 Phase 2b	19	11	30
Total	63	45	108

Source: TWT spreadsheet of data from the Woodland Trust's map of 'Woods under threat from HS2"[13]

Whitmore Wood (HS2 Phase 2a, Staffordshire) would currently be the single biggest loss of ancient woodland on the entire HS2 scheme with the loss of 5.5 ha, around half the wood. The wood could be saved by tunnelling, but this option has so far been dismissed on the grounds of cost.

Nor Wood (HS2 Phase 2b, Yorkshire) ancient woodland is part of a much bigger Local Wildlife Site. 18 ha of the Local Wildlife Site would be lost and of that, 4.1 ha is ancient woodland. In Phase 2b this is currently the single biggest potential loss of ancient woodland.

Much of the proposed loss of ancient and semi-natural woodland is due to land being used during construction that could be avoided with design amendments and route refinements.

The extent of proposed impacts on ancient woodland in Phase 2 of the route, as set out in the Environmental Statement for Phase 2a and Working Draft Environmental Statement for Phase 2b shows that measures to avoid impacts on ancient woodland are inadequate and risk setting a precedent for accepted levels of loss which may increase as the project progresses. Any loss of ancient woodland is unacceptable as ancient woodland is irreplaceable. HS2 Ltd has produced Ancient Woodland Strategies[14] for Phase 1 and Phase 2a. They propose the following compensation measures:

- translocation of ancient woodland soils
- translocation of coppice stools
- new woodland creation
- enhancement and/or restoration of existing woodlands (ancient and non-ancient).

However, it is important to note that: translocation is a method of last resort and will never replace what has been lost; no set ratios of losses to gains have been set; and compensation planting has been based on 'professional judgement.'

4.6.2 Ancient and veteran trees

Ancient and veteran trees are irreplaceable[15] and their loss should be avoided. HS2 Ltd has written a veteran tree report for Phase 2a (and one is expected to be produced for Phase 2b). There are at least 27 ancient veteran trees being lost to Phase 2a, and 24 of these are on the Ancient Tree Inventory. Of the 27, Six are being lost to temporary works.

4.6.3 Wood pasture

Wood pasture is an irreplaceable historic habitat. Areas of wood pasture will be lost in Yorkshire and Nottinghamshire, and it is also present at the National Trust's Hardwick Park where it is also at risk of severe adverse impacts.

4.6.4 Other significant habitats

Habitats such as mires and wetlands will take a very significant time to recreate, restore and manage back to anything approaching their current ecological value. They should therefore be considered irreplaceable, but are not currently.

Unimproved grassland has not been "improved" for agriculture through the addition of artificial fertilisers. It is rich in species, which would otherwise be crowded out by the few fast-growing grasses that respond to high soil fertility. The WDES Phase 2b, makes an unjustifiable assumption that grassland lost outside of designated areas is not unimproved. Unimproved grassland is a Priority Habitat that is difficult to identify without a field survey. Ancient unimproved grasslands should be considered irreplaceable as they cannot be recreated in the 32 years used in HS2 Ltd's calculations. Unimproved grassland areas are likely to be understated.

4.7 Undesignated habitats

The assessment for HS2 Phase 2b does not fully account for loss of habitats along the proposed route, including potential and candidate Local Wildlife Sites. Experience with Phase 1 showed that the scale of loss was not apparent until late in the process, so the same can be reasonably expected in Phase 2. The net biodiversity loss calculation for Phase 1 (see Section 7) shows that HS2 estimate almost 6,600 ha of habitat will be directly lost or affected by Phase 1. This figure includes designated sites. A Phase 1 habitat survey of the whole route is urgently required to properly assess priority but undesignated habitat. Much more work is therefore needed for Phase 2 to understand impacts and to develop satisfactory mitigation and compensation that complies with the policies of Biodiversity 2020[16] and the Government's 25 Year Environment Plan[17].

4.8 Off-route effect

A number of off-route effects cause concern:

- Adverse impacts of further works required to the conventional rail network to accommodate growing demand for passenger and freight services, and HS2;
- Biodiversity impact of replacement dwellings for those destroyed along the route of HS2; and
- Land-take and habitat loss for power units, compounds and access roads.

The WDES for Phase 2b states that the ecological assessment of off-route effects will be based "largely on information available from existing sources, recognising the constraints of such an approach". This will inevitably result in an under-estimation of the likely impacts, as much of that existing information will be incomplete or out of date. For example, the WDES does not calculate the potential habitat loss from the new development that would be required to replace the 220+ houses that would be destroyed in Nottinghamshire and Derbyshire by the proposed route.

4.9 Wildlife impact

It is likely that this scheme will significantly affect a wide range of scarce and protected species, in some cases this could be at a level as to permanently adversely impact their conservation status. This is not only contrary to Government biodiversity policies and international obligations, but also to European Law. Understanding the impacts on species populations and meta-populations, dispersal routes and use of habitats is crucial for effective mitigation. Further assessments are needed (Phase 2) on the direct impacts for legally protected and Biodiversity Action Plan/Section 41 species[18]. These need to consider direct loss of habitat, habitat fragmentation and isolation, lighting, noise, and air pollution. Concerns relating to specific species impacts are set out below.

4.9.1 Birds

Many impacts to birds, especially assemblages of farmland and wetland birds, are not specifically mitigated in current proposals for HS2 Phases 2a and 2b. Data is missing from areas where surveys for birds on the Schedule 1 list of the Birds Directive[19] were required, so the Precautionary Principle has not been applied.

Barn owls (see Section 4.9.3) are singled out as a Schedule 1 bird species that may suffer from risk of colliding with trains. Other species, including other Schedule 1 bird species, such as Bewick's swan, bittern, brambling, Cetti's warbler, fieldfare, hobby, kingfisher, peregrine, redwing and whooper swan are not included in the ES. Ground-nesting birds could also be at risk. There are also potential impacts upon roosting locations for red kite. Furthermore, known significant impacts to farmland birds in Cheshire were omitted from the Phase 2a ES.

4.9.2 Wetland, farmland, breeding and overwintering birds

Large areas of wetland and farmland habitats will be lost, impacting breeding and overwintering birds, especially conservation priority birds that forage or nest in open habitats. Lapwing and skylark populations have more than halved between 1970 and 2017[20] and most species of farmland and wetland birds are in decline. The loss of habitat on declining farmland and wetland bird species (all of which are listed on the Red List of Birds of Conservation Concern) could be of notable impact, including on: grey partridge, lapwing, curlew, cuckoo, willow tit, skylark, grasshopper warbler, starling, spotted flycatcher, tree sparrow, yellow wagtail, linnet and yellowhammer.

In Nottinghamshire, the loss and fragmentation of the floodplain grasslands of the Soar and Trent is likely to impact resident wildfowl and wading birds who use this extensive ecological network for feeding, loafing and roosting. The fragmentation of this nationally important migratory flyway is also likely to have significant adverse effects. Both of these effects may also impact the bird populations in Attenborough Gravel Pits SSSI.

At present, Phase 2 plans do not include specific mitigation for many impacts to birds, particularly farmland and wetland bird assemblages, despite identification by HS2 Ltd of county-scale impacts. The most recent population data available from the British Trust for Ornithology (BTO) should be taken into consideration to value populations correctly. Where the proposed scheme is likely to impact >1% of the county population there will be significant impacts at a county level. This has not been considered adequately for Phase 2a, nor Phase 2b. Off-site (off-route) compensation habitat will be required as it is unlikely that sufficiently large areas of land for mitigation for impacts to ground-nesting farmland birds or overwintering birds can be secured within the confines of the route.

4.9.3 Barn owls

HS2 represents a national level risk to barn owls. The BTO recommends that new high-quality habitat aimed at mitigating the impacts of HS2 should be located 3-15 km away from the route to reduce the likelihood of fatal collisions[21]. This is reflected in the emerging Phase 1 Barn Owl Strategy, but mitigation proposals for Phase 2 are not in line with this. Proposals are currently to fence the line to prevent bird strikes, which is inadequate as barn owls fly down over the other side of fences, hence why strikes are still common on roads. The proposed mitigation is for boxes erected away from the line, but this does not consider current territories or loss of habitat.

4.9.4 Willow tit

Willow tits are the UK's most threatened resident bird with a 94% decline since the 1970s[22]. The route of HS2 Phase 2b passes through several significant areas of willow tit habitat in Yorkshire and Greater Manchester. Loss of habitat and fragmentation of known territories will lead to genetic isolation and possible local extinction. Yorkshire Wildlife Trust, in partnership with RSPB and funded by the Heritage Lottery Fund, has a Back from the Brink project working in the Dearne Valley.

The location of a proposed compound at Abram Flashes SSSI in Lancashire includes willow tit habitat. If constructed in this location, this habitat could take many years to recover after the compound's later removal, by which time the population would be locally extinct; a case of temporary works leading to permanent loss.

4.9.5 Bats

HS2 Ltd has asserted an assumption that "impacts will result in a permanent adverse effect on the conservation status of the bat populations that will be significant at up to the regional level" and during operation at the county / metropolitan level due to collision with trains and loss of foraging and roosting habitat. There is insufficient information about how these impacts will be mitigated or compensated for. Where hedgerows are removed, this may impact the breeding success of local bat populations unless additional habitat is created ahead of losses to compensate for them. The net loss calculation for Phase 1 shows a net loss in length and biodiversity units for hedgerows. Substantial mitigation and compensation would be needed for bats to address the loss of suitable roosting opportunities and foraging grounds and routes, and would need to include structures to enable safe crossing or to dissuade bats from crossing the route. As species protected under EU and national law, this failure to adequately address the impacts on bats is unacceptable. One protected species at risk is the Bechstein's bat, which is listed as Near Threatened on the global IUCN Red List.

4.9.6 Badgers

We assume that references to badgers have been omitted from Community Area reports due to the sensitivities surrounding this species. We expect HS2 Ltd to fully assess the impact of proposed work on this species and provide appropriate mitigation.

4.9.7 Water voles

Water voles are one of the fastest disappearing mammals in the UK due to habitat loss and degradation, as well as mink predation. Most Wildlife Trusts have worked hard and invested significant sums of grant funding to restore habitat, manage mink and in some cases re-introduce water voles. HS2 Ltd fails to offer mitigation for water voles where significant county-scale impacts have been identified[23] or proposes inappropriate mitigation that does not address the impacts, unless water voles are trapped and re-located to suitable mitigation habitat.

As an example, water voles in Cheshire have experienced a rapid decline with only four meta-populations remaining and 62% of previously active water vole sites empty. 300m of habitat is due to be lost or directly impacted on Swill Brook in south Cheshire leaving water voles with no where to go. HS2 Ltd has given assurances to Cheshire Wildlife Trust that it will work with them and Natural England to secure this population. This is essential to ensure the proposed post-construction mitigation habitat does not physically isolate water voles from existing populations by poor habitat downstream and inhospitable land use upstream, leading to likely permanent loss from this area. There are also likely to be significant adverse impacts on water vole in the Erewash floodplain, at Doe Hill Community Park, within Toton Fields LNR and along parts of the Doe Lea in Derbyshire as a result of fragmentation and habitat loss.

4.9.8 Other mammals

In addition to bats, badgers and water voles noted above, there are likely to be adverse impacts on other species of mammal including otter and Section 41 species as listed in the Natural Environment and Rural Communities (NERC) Act 2006, such as brown hares, hedgehogs, and harvest mice. The impact on these species have not been included in HS2 Ltd's mitigation proposals.

The re-colonisation of the Trent and Erewash by otters in recent years has been a positive news story, reflecting the results of a range of measures for their conservation. The proposed route would adversely impact the Trent and Erewash floodplains in a number of places; in effect, turning large swathes into a construction corridor with new barriers to movement. This is likely to be damaging to otter populations, which are also a species protected under EU and UK Law

4.9.9 Reptiles and amphibians

Grass snake and common lizard will be adversely affected as key breeding sites are lost and habitats become fragmented. HS2 Ltd identified grass snake during its surveys in Cheshire and this area is now flagged as a potential Local Wildlife Site. East Derbyshire is particularly important for grass snake and supports some of the most significant populations still remaining in Derbyshire. These will be impacted by HS2. A wide swathe of floodplain habitats in the Erewash Valley would be devastated by the proposed route, including areas of high importance for grass snakes in Nottinghamshire and Derbyshire.

The loss of so many ponds will impact on common toads and other amphibians, as well as great crested newts (see below).

4.9.10 Great crested newt

Mitigation proposals for great crested newts do not appear to be strategically thought through or combined with other proposed developments along HS2 that will impact the same populations. Numerous ponds will be lost along the route of HS2. One-to-one replacement is proposed, and in some areas, where there are important populations of great crested newt, two will be created for each pond lost. This is in contrast to the new District Level Licensing approach being rolled out by Natural England, which proposes four compensation ponds for every pond that is lost where great crested newts are present (4:1 ratio) - twice the existing metric (2:1 ratio) under traditional mitigation licensing. There is little ecological evidence that the proposals for HS2 will be sufficient, as the replacement habitat will not be of an equivalent quality nor have the same level or type of prey found in the existing ponds. Great crested newt mitigation has a poor history of monitoring to show long term success, so substantive evidence and information is needed to show how this will be overcome.

Great crested newt meta-populations face fragmentation by HS2 in both Derbyshire (16 sites) and Wakefield, Yorkshire, with further habitats in Nottinghamshire under threat (19 great crested newt water bodies). Specifically, plans are expected to have a critical impact on the important amphibian populations in Strelley, Nottinghamshire, where breeding ponds and associated habitat for great crested newts are at risk.

4.9.11 Invertebrates

40% of insects have been lost since 1970 and 40% of insect species face extinction[24]. Yet insufficient invertebrate surveys have been carried out or planned along the route of HS2 and there are no records of terrestrial invertebrates along some stretches of the route, e.g. LA12[25]. The impacts on invertebrates have not been quantified but are likely to be substantial.

4.9.12 White-clawed crayfish

Globally endangered and European-protected white-clawed crayfish is present in watercourses and ponds along the route (noted in Cheshire, Nottinghamshire and Yorkshire). Changes in water quality and quantity, and possible pollution events, could have a serious adverse effect and cause loss of sites designated for this species, but this has not been properly assessed. For example in Cheshire, tributaries to Mere Gutter and Basford Brook LWS have not been surveyed.

4.9.13 Butterflies

The impact of HS2 on several conservation priority butterfly species is a concern. In Derbyshire, the dingy skipper occurs on several sites that will be significantly affected by HS2. On land at Stavely, one of the largest remaining populations of dingy skipper in lowland Derbyshire could be lost or significantly reduced due to habitat loss. Small heath and white-letter hairstreak are also likely to be adversely affected, potentially enough to reduce distribution of these species across eastern Derbyshire.

4.9.14 Lizard orchid

The design refinement (route-change) for HS2 Phase 2b will destroy a nationally rare plant: the second most northerly lizard orchid site in the world. This species is protected under Schedule 8 of the Wildlife and Countryside Act 1981, which prevents intentional picking, uprooting or destruction. HS2 Ltd has not set out how its loss would be mitigated.

4.9.15 Indirect impacts on species

Volume 3 of WDES Phase 2b refers to the need to undertake assessment of impacts on species from noise and lighting disturbance, air emissions and fragmentation, but no information has been provided on how this will be done, i.e. what modelling/methodology will be used. It is essential that this assessment is undertaken in a robust and transparent way following a scientifically rigorous methodology. For example, noise can have different effects between taxonomic groups, e.g. bats compared to birds, and species, e.g. owls versus passerines.

4.10 Habitats

A greater emphasis is needed on the avoidance of impacts by the HS2 route on habitat. At a minimum, every effort should be made to reduce the land potentially needed for construction or by changing the proposed location of access roads and storage compounds. Many impacts are wholly avoidable, for example, access roads could be diverted to avoid impacts on woodlands and veteran trees.

It will be essential to have robust assessments of the impacts of changes in hydrology and hydrogeology on sensitive habitats, which properly consider both short- and long-term effects.

WILLOW TIT © HARRY HOGG

5. MITIGATION AND COMPENSATION

The mitigation heirarchy expects avoidance to be undertaken first. This has not been adequate, with failure to make route amendments to avoid SSSIs. Throughout ES Phase 2a and WDES Phase 2b, a number of examples of inappropriate mitigation being proposed and inadequate mitigation and compensation and been identified.

Mitigation for loss of land of value to wildlife across the scheme should be implemented and proven to be effective, prior to the commencement of construction. This will help ensure there are no significant temporary impacts upon populations which would result in substantial biodiversity loss, in line with good practice.

Due to the scale of the scheme, in terms of size and timescale, it is important that there is flexibility within the project to include retrospective compensation opportunities if mitigation and compensation does not achieve its original objectives.

5.1 Inappropriate mitigation

There are numerous examples identified by Wildlife Trusts of inappropriate mitigation being proposed. Examples include:

- In Cheshire, there are proposals for tree-planting in traditional orchards (which are recognised as conservation priority habitats in their own right) or on species-rich grassland, and wetland mitigation habitat on areas of existing high value wetland/reedbed. There are also numerous examples where woodland habitat creation is proposed on existing semi-natural woodland, particularly in Community Area MA02.
- In Derbyshire, there are proposals for planting trees and shrubs on semi-improved neutral grassland that already has nature conservation interest, and proposals for tree-planting on an area where wetlands have been created.
- In Nottinghamshire, wetland and grassland habitat creation are proposed as mitigation in the areas of remaining LWS where those habitats already exist, and therefore deliver no additional mitigation or compensation. Areas of woodland creation are proposed on existing grasslands of high biodiversity value. A large area of habitat creation next to the proposed East Midlands Hub Station would be undertaken on an area of existing high-quality habitat resulting in further biodiversity losses.
- In Lancashire, plantation woodland is proposed for restoration adjacent to Abram Flash SSSI, where wet grassland habitat would be more appropriate given the wider ecological landscape's characteristic habitats and species.
- In Staffordshire, wetland creation is proposed on an area that is dry and improved.
- There are numerous examples where woodland habitat creation has been mapped over existing semi-natural woodland.
- In some areas, plantation woodland habitat creation is proposed; this type of woodland provides little landscape or biodiversity value.

Mitigation measures need to be tailored to the needs of local habitats and species. In areas of willow tit corridors, tree-planting should be appropriate to and tailored for the needs of this nationally rare species, and suitable intermediate layer tree and shrub species such as hawthorn, birch and willow should be used rather than canopy species such as oak, beech and ash. An ecologist should be consulted where scrub planting is proposed on new embankments and regular areas of clear space created up to the railway line to benefit reptiles such as slow worm, and help increase the ecological network for these animals.

Many of the mitigation areas risk destroying important habitats instead of creating a 'green corridor'.

5.2 Inadequate mitigation

The HS2 scheme will have a landscape-scale impact on ecological connectivity, although this has not been properly assessed. For example, ecological connectivity analysis using LIDAR and aerial data could be provided to assess locations to recreate it through appropriate habitat creation and green bridges. This is particularly important within NIAs and Living Landscape schemes in which project work is increasing ecological connectivity to create a Nature Recovery Network.

The ES for HS2 focuses on the red-line boundary of the proposed route for each phase, ignoring wider ecological networks. They do not recognise landscape-scale projects such as The Wildlife Trusts' Living Landscapes. As noted earlier, the route cuts through 22 Living

Landscapes. These could offer mitigation and compensation opportunities for HS2 Ltd to invest in significant landscape-scale habitat restoration, connecting ecological networks and creating a Nature Recovery Network. Conversely their fragmentation will result in a significant loss of habitats and wildlife.

In general, there needs to be a far better understanding of habitats and species connectivity using local and national biodiversity data to set out appropriate mitigation for the damage HS2 will cause the natural world.

For example, in Cheshire, the ES for Phase 2a fails to acknowledge and address the impacts of the partial loss of Randilow and Bunker Hill LWS, a 105-hectare site at the heart of the Meres and Mosses NIA. Extensive losses of habitat at this site will increase ecological fragmentation within the NIA. The LWS supports a farmland breeding bird assemblage of county importance, areas of habitat of county importance and an assemblage of bat species of county importance. It meets the LWS criteria for lowland mixed deciduous woodland, birds, mammals and possibly high value hedges. The residual impacts of the loss of this site are of county and/or regional significance, and the loss of habitat for breeding and overwintering farmland birds is unmitigated. The loss of woodland, hedgerows and other habitat for bats is not adequately mitigated due to significant shortfalls in the amount of compensatory habitat provided at a local level according to HS2 Ltd's own methodology. Phase 2a Additional Provision still has shortfalls in compensatory habitat in Cheshire with no additional provision of compensatory habitat for additional land-take of woodland (0.8 ha semi-natural broad-leaved woodland and 1.7 ha plantation woodland), and grassland (6 ha). There are further unmitigated losses of Randilow and Bunker Hill LWS, bringing the total loss to 61 ha (58 ha + 3 ha in AP2).

In Nottinghamshire, new woodland planting, ponds, hedgerows and grassland are proposed. Whilst these are welcomed, it is clear that the creation of new habitats does not outweigh the loss of highly complex, species-rich habitats that have developed over thousands of years in most cases. These habitats cannot be replaced in a short time span and may never achieve the quality and diversity of the original habitats. It is essential that following the quantification of biodiversity losses, it is recognised that substantively larger areas of new habitat are required for adequate mitigation (and even then, over a long timescale). There are extensive areas of land-take with small areas of habitat creation proposed.

The WDES Phase 2b falls short in respect of the mitigation and compensation measures presented to address the likely impacts. For many impacts, there are insufficient or no details about the type and extent of habitat creation, restoration and/or enhancement. In some cases, compensatory habitats are different to those being lost and are of lower value for wildlife or at least support different wildlife. There is little detailed assessment of the impacts on protected species and no specific details for how species impacts will be mitigated.

Much of the proposed mitigation and compensation habitats are fragments 'left over' within the boundary of the proposed route. These will be difficult to manage in the future and risk falling out of conservation management with subsequent failure of the mitigation. This approach is misaligned with the Lawton principles of 'more, bigger, better and joined sites'. There are some examples where landowners of large areas have made more opportunities available further away from the route; this approach could be applied more widely as long as it meets criteria for connectivity and habitat-type.

Cheshire Wildlife Trust notes in response to WDES Phase 2b that riparian habitat losses are not adequately mitigated, compounding issues of reduced habitat connectivity. The proposed areas for wetland habitat creation are too small and fragmented to offset the impacts, particularly where water vole may be affected.

There is no mitigation of the negative impacts on habitats of local importance. This will lead to net loss of local biodiversity.

Overall, there is a lack of commitment to the large-scale restoration of nature that is necessary given the level of damage and degradation of habitats, and destruction of ecological networks that is proposed as a result of this scheme.

The Wildlife Trusts highlight a number of issues that should be considered in the proposals to mitigate the impacts of HS2:

- A full regional assessment of the impact of ecological fragmentation. There is a risk that a project level focus may not fully consider how structures fit into the wider landscape.
- A 1km wildlife habitat buffer either side of the proposed scheme, as standard, to help

retain and enhance connectivity. It should incorporate green bridges, underpasses and tunnels throughout to protect fragmentation and impacts to local species, as well as benefitting people by reconnecting fragmented communities. Any areas where the 1km cannot be achieved, should be offset elsewhere to achieve the HS2 proposed minimum of 'no net loss'.

- More and better green bridges. While some green bridges are considered in the proposals, there is little detail about their design, structure and location. A landscape-wide approach should be taken to the planning of green bridges, tunnels and underpasses. The proposed 'green' bridges within the scheme are not sufficient to allow species recolonisation and migration, especially given rapid climate change; at best the proposals meet the "grey bridge" standards set by Natural England and Landscape Institute standards[26]. The designs of green bridges: natural bridges, wildlife bridges and mixed-use bridges, need to meet the appropriate standards. Further green bridges should be considered where there are significant bat populations or to connect valuable disconnected habitats. We recommend that green bridges be considered as the standard design for crossings. Research has found that the use of bridges by wildlife increases with the width of the bridge, so in sensitive areas these should be made as large as possible within the scope of the project. More crossings should be adapted and 'greened' so they can serve multiple functions of reconnecting communities with each other, providing benefits of access to nature as well as connectivity for wildlife itself.
- Lengthening viaducts to reduce direct habitat losses and impact on important species assemblages. Innovative design of viaducts could reconnect and enhance ecological networks.
- Tunnels should be bored, not constructed through cut and cover, to protect the habitats above them.
- All structures within the scheme should include features for wildlife in consultation with an ecologist.
- Noise barriers proposed in South Yorkshire are ugly, intrusive, making landscaping difficult and acting as a barrier to wildlife. Using earth works or false cuttings, where this would not result in loss of quality habitat, could be effective. If barrier fences are used, natural habitat (e.g. trees, shrubs or hedgerows) should be used outside the fences to mask them visually and to provide linear habitat for species such as bats and hedgehogs.
- Consideration should be given to the protection of small mammals, reptiles and amphibians that may use cable troughing, sleepers and ballast, and vegetation management to support wildlife.
- New trees and shrubs (of local provenance) need to be suited to National Character areas and any locally recommended tree species for planting.
- Measures to reduce fragmentation along water courses could ensure that all culverts are less than 30m in length, >1m headroom and have mammal ledges incorporated. The work on watercourses should be timed so it doesn't coincide with active periods for species such as water vole. Where possible, watercourses should be bridged with structures that are large enough to allow wildlife to pass through and with light penetration for fish. Marginal wetland habitat should also be created upstream or downstream.

5.3 Inadequate compensation

Where loss of wider habitat has an impact on the ability of species to forage, breed and find shelter, the proposed compensatory habitats need to be improved:

- Bats: shortfall in areas of grassland, waterbodies, woodland and hedgerows to be provided (currently not fully compensating for impacts on bat foraging).
- Amphibians: shortfall in area of ponds, species-rich neutral grassland and woodland provided (so impacts on amphibian breeding and foraging are not fully compensated for).
- Reptiles: shortfall in area of ponds and grassland to be provided (so impacts on reptile breeding, foraging and places of shelter are not fully compensated for).
- Birds (Farmland and Wetland): no mitigation for impacted species provided so known significant impacts on breeding birds not compensated for.
- Aquatic invertebrates: survey data is missing and there is a shortfall in compensatory habitat provided so the Precautionary Principle has not been applied.
- Water vole: no mitigation for impacts were provided and survey data missing for several water courses in 'Local Key Area' for water voles (National Water Vole Steering Group 2013), so known impacts on water vole habitat have not been compensated for and the Precautionary Principle has not been applied. Similar concerns were also identified for otters.

Colne Valley Regional Park Additional Mitigation Plan The Colne Valley Regional Park Panel (CVRPP), on which Hertfordshire and Middlesex Wildlife Trust, London Wildlife Trust and Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust sit, produced the Colne Valley Regional Park Additional Mitigation Plan. The proposals set out in the plan identified additional mitigation and enhancements beyond the mitigation proposed within the HS2 scheme. This may encompass proposals both within and outside the present HS2 Bill limits. It was published[27] in 2017. HS2 Ltd has made an assurance to work with the CVRPP to deliver the key proposals in the additional mitigation plan.

5.4 Monitoring and management

There is little detail about the plans for monitoring and management for Phase 2. Without this, it is difficult to have any confidence in the proposals for mitigation and compensation or ongoing monitoring of 'no net loss of biodiversity'.

- All mitigation, compensation and enhancement proposals put forward as part of the scheme must be subject to ongoing management, including control of invasive species, appropriate habitat and species management and protection from future development. This should last for the lifetime of the scheme (construction and operation) and be achieved through S106 agreements and landowner consent.
- Access for management and monitoring of areas of habitat creation must be secured.
- The monitoring plans should be long enough for the establishment of the habitat in question. For example, creating new habitat for species requires several years of monitoring and the creation of a new woodland will need to be monitored over several decades.
- Along with management of the habitats created for mitigation and compensation, details of regular ongoing maintenance and management of the proposed rail corridor must be provided. It is expected that the long-term management of the scheme would minimise the impact to wildlife and would not, for example, result in the removal of large areas of woodland or other features, as has happened on land managed by Network Rail throughout the country.

5.5 HS2: The case for a greener vision

Early on in the planning stages of HS2, The Wildlife Trusts developed "A Greener Vision for HS2"[28]. This report provided the large-scale thinking lacking from HS2 Ltd plans and showed how HS2 could provide the net gain for wildlife - so vital for allowing our natural world to recover - at a fraction of the total cost of the scheme.

As the HS2 process has developed, the extent of the damage to nature has become clearer. As set out above, HS2 Ltd has failed to provide or implement adequate proposals to avoid, mitigate or compensate for this damage. The Wildlife Trusts are not confident that a greener vision is possible for HS2, which is why we are calling for the proposals to be fully reviewed.

Our vision - a wild green ribbon from London to the north

The Wildlife Trusts' vision is for a ribbon of wildlife-rich landscape designed around HS2 and connected via green bridges (and potentially tunnels) to enable habitats and species to thrive and to improve access to nature for people. There are places along the route where areas of woodland, wetland, and grassland can be created to increase the size, or improve the quality, of existing habitat patches or re-establish links between them. This would create a strip of wild landscape for wildlife and people, stretching from London to Birmingham and north to Leeds and Manchester in Phase 2. The plans are focussed around a 1km buffer strip either side of the corridor where the tracks are laid. Provisional habitat opportunity mapping has identified around 15,000 hectares of new habitat that could help to more than replace hectares lost, ensuring that HS2 truly delivers a 'net gain' for wildlife.

The approach can be broadly summarised as combining habitat creation, for example creating new areas of woodland and grassland, by letting nature regenerate and naturally colonise areas of land along the line. This would provide a large-scale and high-profile demonstration of the Government recognising the value of nature and its benefits for people. This green corridor could also reconnect local communities currently bisected by the proposed line via an ambitious programme of green bridges, pathways and cycle tracks ('Low Speed 2'), helping to spread the benefits of HS2 to all communities along the route rather than just those located near the few stations HS2 will serve.

If a large-scale infrastructure project like HS2 is to go ahead, it must have a large-scale commitment to the communities, landscapes and wildlife that it fragments.

From HS2: The case for a greener vision

6. ENVIRONMENTAL STATEMENTS

6.1 Missing baseline data

The HS2 Phase 2a ES and Phase 2b WDES used out-of-date and incomplete Local Wildlife Site (LWS) data, rendering them inadequate:

- They do not include all of the candidate and potential LWS.
- They do not recognise landscape-scale projects such as The Wildlife Trusts' Living Landscapes or locally-designated Nature Improvement Areas.

6.2 Phase 2a Environmental Statement

There is insufficient information on survey methodologies, results and impact assessments. The ES does not represent an accurate picture of the likely impacts. Adequate surveys are required for the entire area with re-visits/in-depth surveys where necessary, to allow an iterative design process to respond to environmental and engineering constraints/opportunities.

The ES details that between 21% and 47% of sites along the route (dependent on community area) have not been surveyed. No net loss is impossible to assess without adequate survey information.

There is a failure to acknowledge or address the multiple county and regional-scale impacts that will result from the partial loss (up to 60.95 hectares) of Randilow and Bunker Hill LWS, a 105-hectare core site of the Meres and Mosses NIA designated in 2012 to 'create joined-up and resilient ecological networks at a landscape-scale".

There is little evidence of impacts being avoided. Many of the significant habitat losses reported should be avoidable, such as proposed compensatory habitats causing loss of existing valuable habitats, or proposing temporary or flexible infrastructure in inappropriate locations, e.g. balancing ponds and temporary road or path diversions causing losses of veteran trees. Once any losses have been permitted, there is no guarantee they will be avoided in the future.

There are inconsistencies between the Phase 2a ES documents:

- Phase 1 habitat maps appear to be inaccurate and need to be updated to reflect all data collected, areas that have been mapped via other data sources, and those not visited on foot. The locations of many areas of valued habitat and species populations are not provided on maps. There should be maps showing any features/ populations that are of county or district value.
- There are major inconsistencies with baseline habitat area values and overviews provided in some Community Area reports, e.g. CA5: South Cheshire.
- The non-technical summary does not give an accurate reflection of ecological impacts and exaggerates the value and certainty of mitigation / compensation measures.
- Habitats are categorised and described in a variety of ways using Phase 1 definitions, priority habitats and NVC habitat types and proposed compensation habitats are not specific enough to enable biodiversity metric calculations to be carried out.

It is clear from the ES Phase 2a that there will be shortfalls in the amount of compensatory habitat provided: Cheshire Wildlife Trust identifies a shortfall of approximately 58 ha of compensatory habitat for the loss of priority and high value habitats and a shortfall of 31.1 km of hedgerows (according to HS2 Ltd's own no net loss methodology). This could lead to significant impacts to many groups of species, making them more vulnerable to local extinctions.

6.3 Phase 2b Working Draft Environmental Statement (WDES)

As noted for ES Phase 2a, there is a lack of information about sites, surveys, mitigation and compensation, and significant omissions. For example, the National Trust identifies impacts relating to Nostell Priory in Wakefield are missing from the WDES. In addition, the WDES does not contain any impact assessment for species, as species surveys had not been completed when it was produced. It is therefore clear that impacts on protected and Section 41 species was not factored into the design of the scheme. The WDES for Phase 2b fails to consider impacts on the UK BAP priority habitat 'open mosaic habitats on previously developed land', a habitat that is found on some of the sites that will be lost. There are significant gaps regarding the impacts on other sites and habitats and species in the wider countryside.

The final ES, when published, should avoid assertions that the new habitats will be comparable to existing LWS and SSSIs unless substantive and rigorously assessed evidence can be provided. In most cases any assertions of this kind are likely to be false. (See rationale in section 7 for calculation of biodiversity loss and gain.)

The level and scale of detail of mitigation and compensation measures falls short for a project of this magnitude. Far smaller projects provide a greater level of detail. The loss of LWS and / or priority habitat types requires a more bespoke approach in terms of mitigation and compensation that provides a net gain for biodiversity and is, as far as possible, based on a like-for-like approach in terms of habitat types lost and replaced (area provided should be greater than like for like under 'no net loss').

REED WARBLER © JON HAWKINS SURREY HILLS PHOTOGRAPHY

7. NET LOSS OF BIODIVERSITY

Despite HS2 Ltd's commitment to seeking no net loss in biodiversity at a route-wide level, on their current trajectory they are unlikely to achieve this. Net loss or gain of biodiversity is measured using a modified version of Defra's biodiversity offsetting metric, developed in consultation with Defra and Natural England.

In 2015, HS2 Ltd published a no net loss in biodiversity calculation[29] for Phase 1 of the scheme and Phase 2a. The summary of the no net loss calculation for habitat polygons (area-based units) found that there was a net reduction in biodiversity units of 1,066.19 comparing estimated units post-construction with pre-construction, taking into account habitat category and distinctiveness. The habitat categories include woodland, woodland and scrub, grassland and other habitats.

	Pre-construction		Post-construction			
Habitat	Area (ha)	Biodiversity units generated	Area (ha)	Biodiversity units generated	**Net change in area (ha)**	**Net change in biodiversity units**
Total	6,596	33,249	6,599	32,183	3	-1,066

Table: Phase 1 summary of biodiversity units generated pre- and post- construction (area-based features) Source: HS2

For linear features: hedgerows and watercourses, there was a net reduction in biodiversity units for hedgerows and an increase for watercourses.

	Pre-construction		Post-construction			
Habitat	Length (m)	Biodiversity units generated	Length (m)	Biodiversity units generated	**Net change in length (m)**	**Net change in biodiversity units**
Hedgerow	444,190	2,201,764	397,847	1,926,041	-46,343	-275,724
Watercourse	74,517	136,040	92,516	144,684	8,999	8,645

Table: Phase 1 summary of biodiversity units generated pre- and post- construction (linear features) Source: HS2

There is no guarantee that the post-construction 'biodiversity units' will be achieved. Habitats that have been in existence for decades, in some cases millennia, cannot simply be 'recreated'. HS2's ES and WDES assume that habitats created as mitigation or ecological compensation will adequately replace those that would be lost. There is little evidence of high quality, diverse habitats of LWS-quality having been created for mitigation or compensation for major infrastructure projects, certainly not within a reasonable time-frame. It will take decades for some of these habitats to reach an equivalent quality to that which is lost. This temporal gap means that species depending on the habitat may not be able to find similar habitats nearby to which they could move, leading to their local extinction. Furthermore, habitat creation will require ongoing management and monitoring and the financial resources to ensure this. Fragmentation and loss of habitats at the scale of HS2 is likely to have damaging effects for years to come, some of which will be irreparable.

Yet, no such calculations have been published for HS2 Phase 2b. Phase 2a has no net loss (NNL) calculations which show a 17% loss in biodiversity. These have not been done according to the agreed methodology and the actual loss is estimated as being at least 20%.

Given the increased number of designated sites affected by Phase 2 (see section 4.2), it seems most unlikely that no net loss can be demonstrated by HS2, let alone a net gain for biodiversity. This is in direct conflict with Biodiversity 2020, the National Planning Policy Framework and the Government's 25 Year Environment Plan.

There needs to be a transparent and credible method used for quantifying the biodiversity loss and any proposed habitat creation, restoration or enhancement so that a rigorous comparison can be made. This should be done at a Community Area level so that it is clear where losses and any potential gains are occurring. It is important that loss of green infrastructure at a local level is fully addressed. Once biodiversity losses and gains are understood spatially at a local level, and mitigation opportunities have been maximised, plans can be made to compensate for these at a regional and / or national level. This would benefit local wildlife networks and local communities and avoid disproportionate localised negative impacts, allowing wildlife to recover and thrive along the length of the route.

Cheshire Wildlife Trust used HS2's previous 2015 methodology to do the calculation at a local level for notable habitats and habitats of principal importance. This found significant shortfalls in the area of habitat provided to compensate for the loss of these in the local area. It falls far short of the stated aim of "achieving no net loss of biodiversity". These calculations do not include the loss of habitats of district or local importance so the actual 'net loss of biodiversity' is likely to be higher than the figures for loss of notable habitats and habitats of principal importance. Failure to provide enough compensatory habitat in the local area means that residual impacts on protected and notable species, such as bats, amphibians and reptiles, in the local area are not adequately addressed.

Biodiversity loss calculations need to be provided for 2b, using the correct risk multipliers when determining the amount of compensation required.

At present, it is clear that 'no net loss' of biodiversity by HS2 is unachievable under current plans. Habitat is likely to be downgraded, exacerbating the ongoing decline of England's wildlife.

SMALL RED DAMSELFLY © LANCASHIRE WILDLIFE TRUST

8. CONCLUSION

The purpose of this research was to look at the threats to the natural environment posed by the current route and plans for HS2, drawing together the known evidence from 14 Wildlife Trusts and several conservation and landowning organisations along the full route of HS2. It focuses on the internationally, nationally and locally protected sites and the landscape-scale initiatives which are at risk of significant impact and fragmentation, and the effects these impacts are likely to have on species populations. But it should be recognised that there will be many thousands of hectares of semi-natural habitat outside of these protected sites, areas and initiatives not captured by this report, but which also lie in the path of HS2. These too, will be directly impacted and reduced in extent, increasing the fragmentation and isolation of species and habitats over a wide area.

The findings clearly show that the proposed plans for HS2 are ecologically devastating. It places many of our most precious wild places and the wildlife they support at an unacceptable risk of loss and damage. It will fragment vital landscape initiatives that have been the focus of reconnecting and restoring our natural environment, reversing current efforts and ultimately impacting future plans for nature's recovery.

Specifically, the evidence shows that the development presents significant risk of impact to:

- **5 sites of international importance** which are statutory protected and support internationally significant habitats and species assemblages (including three Special Areas of Conservation and two Ramsar sites (wetland sites designated to be of international importance)).
- **33 Sites of Special Scientific Interest** (including two National Nature Reserves) which are protected by law. Some SSSIs underpin/comprise the component habitats of internationally important sites of nature conservation but many account for independent sites which form vital refuges for wildlife in an increasingly fragmented landscape.
- **693 (9,696 hectares) Local Wildlife Sites** which are selected for their substantive nature conservation value, based on important, distinctive and threatened habitats and species with a national, regional and local context. They are core wildlife-rich habitats which play a critical conservation role by providing wildlife refuges, acting as stepping-stones, corridors and buffer zones to link and protect nationally and internationally protected sites.
- **21 Local Nature Reserves** which are designated for their special interest within the administrative area of a local authority for their flora, fauna, geological or physiographical features, and which are managed for the purpose of their preservation or for providing opportunities for related study and research and public enjoyment.
- **26 Landscape scale initiatives**, including:
  - **4 Nature Improvement Areas** which were established to restore and enhance the natural environment, creating joined-up and resilient ecological networks at a landscape-scale. All involve investment and action from multiple partners and three have been funded by Defra at a cost of more than £1.7 million.
  - **22 Living Landscapes** which similarly to NIAs are large-scale landscape initiatives, championed by The Wildlife Trusts, aimed at creating joined-up and resilient ecological networks. Like NIAs, these involve years of investment and action from multiple partners.
- **18 Wildlife Trust Nature Reserves** many of which are also designated as protected sites (SSSI, LWS, and/or LNR)
- **108 Ancient woodlands**, which are irreplaceable habitats and defined in national planning policy[30] as an area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland and plantations on ancient woodland sites.
- **Other irreplaceable and significant habitats** such as veteran trees, wood pasture, old meadows/unimproved grassland, mires and wetlands will be impacted, but were not specifically quantified by this report. Irreplaceable habitats are defined in national planning policy as habitat which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity.
- **Extensive areas of unquantified wider habitat**. Many thousands of hectares of semi-natural habitat outside of these protected sites, areas and initiatives also lie in the path of HS2, which will be lost or significantly reduced in extent, increasing the fragmentation and isolation of species and habitats over a wide area.

The significant risk to sites and habitats posed by HS2 will in turn seriously impact a wide range of scarce and protected species from birds, mammals, insects, reptiles and amphibians to rare plants like the lizard orchid. Species will be affected directly and indirectly from impacts ranging from habitat loss, reduction, change, fragmentation and isolation; to noise, lighting, air pollution and collision. The extent of which could be enough to permanently adversely impact the conservation status of some, including barn owl, white-clawed crayfish, the dingy skipper butterfly, and the willow tit.

Not only will the proposed route fragment and reduce the functionality and biodiversity of ecosystems, it will reduce people's access to wildlife-rich spaces along the length of the route, negatively impacting on health and wellbeing.

The findings also reveal that proposals for mitigating and compensating these losses are generally inadequate and inappropriate. For example, they do not appear to be spatially planned or tailored to the needs of local habitats and species, resulting in proposals like tree planting on existing areas of wildlife-rich semi-improved neutral grassland; wetland mitigation on areas of existing high value wetland; or mitigation proposals on isolated, unconnected sites.

The proposed scheme has the objective of seeking 'no net loss' in biodiversity at a route-wide level, measured using a modified version of Defra's biodiversity offsetting metric, developed in consultation with Defra and Natural England. The evidence presented through this study shows the potential risk of habitat loss and fragmentation at the scale of HS2 is likely to have damaging effects for years to come, some of which will be irreparable. There is:

- no transparent and credible method used for quantifying the biodiversity loss and any proposed gains through habitat creation, restoration or enhancement so that a rigorous comparison can be made between pre- and post-development and therefore no guarantee that 'biodiversity units' and 'no net loss' will be achieved;
- no recognition of the temporal gaps for newly created habitat proposals to attain the same quality as the habitats they are replacing (which for some habitats could be years);
- often a 'downgrading' of distinctiveness for proposed habitat creation;
- a potentially significant loss of hedgerows; and
- no biodiversity loss calculation for Phase 2b to determine the correct amount of mitigation and compensation.

The research therefore concludes that the proposed HS2 scheme will be unacceptably devastating to the natural environment because it:

- places too many protected sites (and the species that depend on them) under potential risk of significant impact.
- frequently fails to propose adequate and appropriate mitigation and compensation for the impacts on these wild places.
- will fail to achieve the commitment to 'no net loss' for biodiversity, let alone Government's wider commitment in the 25 Year Environment Plan for infrastructure to achieve a biodiversity net gain.

The policy and proposed legislative context for securing nature's recovery has changed dramatically since HS2 was first proposed in 2009. Government has committed to securing nature's recovery and development has a key role to play in this. We face a climate and biodiversity crisis and it is no longer acceptable to destruct any of our valuable wild places that are crucial to nature's recovery and pivotal to climate solutions, let alone the potential scale of impact that HS2 risks. This damage will push nature to the brink, cause local extinctions, decimate carbon-storing habitats, and irreversibly damage local biodiversity. This cannot be allowed to happen.

The time has come for Government to STOP and RETHINK the proposals. Ongoing works to HS2 need to stop immediately, the impact on the natural environment must be fully assessed, and the proposals reviewed in the light of this assessment. Any future solution must deliver a net gain for nature. We recommend that HS2 reconsider The Wildlife Trusts' A Greener Vision for HS2 proposals as part of this rethink.

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ROTHWELL COUNTRY PARK © DANNY HILL

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