

Summary
Report



High Speed Rail and Nature Networks

Connecting people, connecting wildlife

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LOSS OF BIODIVERSITY

HAS BEEN RATED BY THE WORLD ECONOMIC FORUM'S ANNUAL GLOBAL RISKS PERCEPTION SURVEY AS THE SECOND MOST IMPACTFUL AND THE THIRD MOST LIKELY RISK FOR THE 2020S.

01 Foreword

IN NOVEMBER 2019 THE HIGH SPEED RAIL GROUP (HSRG) PUBLISHED A REPORT FROM RALPH SMYTH, AN INDEPENDENT ENVIRONMENTAL CONSULTANT AND THE ONLY PERSON TO BE ALLOWED TO PETITION PARLIAMENT IN RELATION TO THE CLIMATE CHANGE IMPACTS OF HS2 LEGISLATION.

The report looked at the role that high speed rail can play in decarbonising transport and enabling the UK to reduce its carbon emissions to net zero, an area that had received little focus. It found that HS2 is essential to accelerate modal shift, support fewer car trips, decarbonise how we get our goods and reduce emissions from international travel - priorities now identified by the Government in its consultation for a Transport Decarbonisation Plan.

This report is a companion to that previous report, and focuses on a similarly under recognised area, how high speed rail can help move our transport system towards biodiversity net gain. With some of the strongest criticisms of the HS2 project focusing on its impact on woodlands, this report looks at these arguments as well as some common (mis)perceptions.

What this report seeks to do for the first time is to explore in detail the project's impacts on nature across its lifecycle, from the planning of HS2 through its consenting and design processes to its construction and operation. This is set in the context surrounding a project of this scale, of the changing policy landscape, wider constraints such as the views and needs of land managers, and wider opportunities such as technological and social change.

With the first ever National Infrastructure Strategy seeking to protect and enhance England's ecosystems and to incentivise industry to deliver better outcomes, this report sets out what HSRG's members are already achieving. Many HSRG members are at the forefront of developing ways to build with less impact, integrate ecological best practice into operations and deploying new technologies and ways of working. HS2 is both a driver for this innovation and a project through which to deliver it. The project's scale is catalysing innovations around surveying, protecting and enhancing nature. The scale of biodiversity losses forecast on a precautionary basis early on are now ebbing away, as detailed design and continuous improvement move towards no net loss and even net gain in places.

1.1

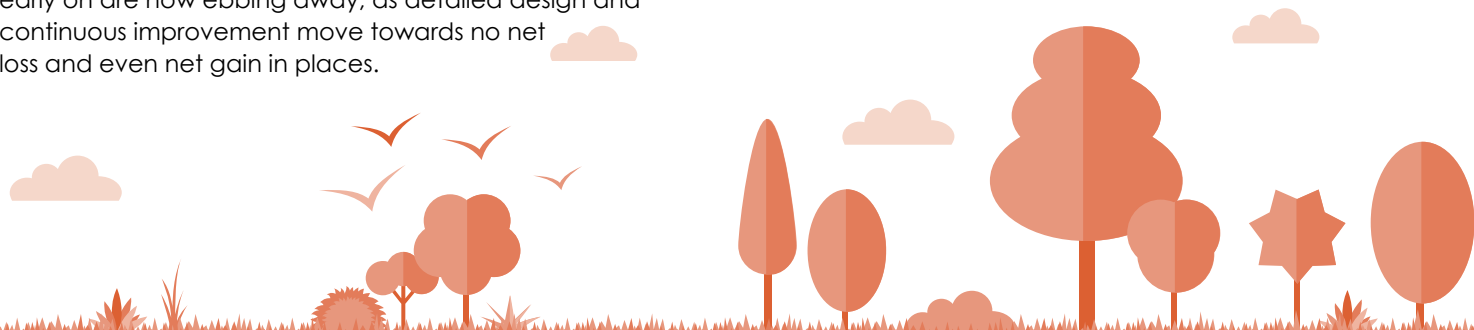
HS2 IS AN ENVIRONMENTAL PROJECT

THE OVERWHELMING FINDING IN THIS REPORT IS THAT HS2 IS AS MUCH AN "ENVIRONMENTAL" PROJECT AS A "TRANSPORT" AND "ECONOMIC" ONE. ONE FACT HIGHLIGHTS THIS CLEARLY.

You are as likely to find environmental professionals working on the route as engineers, with the project creating more jobs for the sector than any other. It has not only provided green jobs, it has developed career paths with graduates working on a wide range of habitats and species at an early stage in their careers.

Of real significance is that this new generation of ecologists can spread their learnings to other schemes. Indeed the project is as much about green data as it is green jobs.

HS2's huge scale, passing across varied landscapes, offers opportunities to modernise the way we gather and manage from biodiversity data and gain wider value from it.



1.2

CONNECTING NATURE AND CONNECTING TO NATURE

WE KNOW THAT HIGH SPEED RAIL CONNECTS PEOPLE AND PLACES, REMAKING THE ECONOMIC GEOGRAPHY OF THE COUNTY AND PROVIDING A GREEN, LOW CARBON WAY TO TRAVEL.

What HS2 also does is connect nature. Originally conceived as little more than a green strip along the tracks, its 'Green Corridor' is being developed along the length of the line.

This involves creating, restoring and better connecting habitats, restoring linear features such as water courses and partnering with land managers at a landscape scale to maximise ecological connectivity.

HS2 also connects us to nature. As we have seen during COVID-19, access to the countryside has been cherished and valued, yet many of the larger and wilder areas are primarily accessed by car. HS2 can help change this.

As the backbone of a new national transport network providing a transformative uplift in capacity and connectivity, HS2 can transform access and catalyse upgrades to enable more city dwellers to reach national landscapes and rural visitor attractions by sustainable means.

1.3

PROVIDING A RENEWED FOCUS AHEAD

AS THE NATIONAL AUDIT OFFICE (NAO) RECENTLY HIGHLIGHTED, THE CONSTRUCTION AND OPERATION OF TRANSPORT INFRASTRUCTURE HAVE AN IMPORTANT INFLUENCE ON WILDLIFE HABITATS.

So there is a growing focus for transport projects to be planned and delivered in ways that deliver environmental net gain, in order to secure the Government's long-term ambitions. As the country's largest infrastructure project, HS2 is very much at the centre of this thinking and practice.

Indeed the amount of funding it is providing to restore nature compares favourably with that provided nationally by the Government. Given the project's scale, it is growing and shaping the supply chain, and influencing how future projects can be planned and delivered too, including schemes promoted by Sub-national Transport Bodies.

Scientific knowledge and the level of ambition are increasing. Not every pioneering intervention will succeed first time. What does succeed will need to be improved upon, if HS2 is to continue to live up to its ambition of being the most sustainable railway of its type in the world. The NAO calls for clarity on the values and behaviours needed to support delivery of these environmental goals. These must include ambition, transparency, partnership and innovation.

HSRG wants this report to spur further improvement, with recommendations for industry and government to assist the delivery of HS2 and development of a wider high speed rail network, bringing forward the most transformative and long-lasting green legacy.



02 About

2.1

HIGH SPEED RAIL GROUP

Representing companies with relevant experience and an interest in high speed rail, the High Speed Rail Group (HSRG) is committed to supporting the successful delivery of a world-class high speed rail network in Britain.

Our members have helped deliver major infrastructure projects in the UK and around the world, including creating entirely new high speed networks and improving the UK's existing rail network.

This gives us a unique insight into both the shortcomings of the current network and the transformative capacity, connectivity, economic and environmental benefits that high speed rail brings.

Members support a national high speed rail network including the delivery of HS2, its extension to Scotland and integration with other rail investments such as Northern Powerhouse Rail and Midlands Engine Rail. This should go hand in hand with wider ambition to maximise the released capacity benefits HS2 brings and to catalyse change through supply chain. A full list of our membership can be found at www.rail-leaders.com

This report would not have been possible without the assistance of all those who most generously gave their time to contribute to it, and both the author and HSRG are most grateful for this. Any inaccuracies remain the responsibility of the author alone.

2.2

THE AUTHOR

Ralph Smyth is an independent consultant, who was formerly head of infrastructure and legal at CPRE, the countryside charity. Ralph's love of the countryside was kindled growing up on England's western edge, surrounded by some of the nation's most extensive ancient woodlands and rights of way.

Leading CPRE's engagement on HS2, including petitioning Parliament on the protection of hedgerow laws, he brought together twelve national NGOs through the Right Lines Charter to challenge HS2 to leave a positive environmental legacy.

After securing the largest ever release of environmental open data from HS2 Ltd and securing a commitment to an open data strategy, he worked with a tech start up to create interactive maps to enable communities to understand the scheme's environmental impacts better.

His experience of major infrastructure projects ranges from appearing as a barrister at public inquiries to advising Highways England on its Strategic Design Panel and commissioning the largest independent evaluation of the environmental impact of transport schemes in Britain.



GREENER OPPORTUNITIES

NEW ENVIRONMENT AND FARMING LAWS CAN HELP
HS2 INTEGRATE FURTHER INTO THE LANDSCAPE.

03 Findings

HOW CAN OPINIONS ABOUT HS2 BE SO DIVIDED, WITH SOME CALLING IT A SUPERHIGHWAY FOR NATURE, OTHERS A BERLIN WALL FOR WILDLIFE?

Biodiversity loss is now one of the greatest risks facing the world alongside climate change. Given the range of species and habitats in the natural world, it is far more complex to assess and set simple metrics for, however. In particular it is vital to look across different time and spatial scales, recognising that nature is dynamic.

So, after setting the context of the latest policy and research about the impacts of transport on biodiversity, this report takes a chronological approach, from planning to constructing and then operating a railway into the longer term, exploring the resilience and restoration of nature in a changing climate.

The report's focus is on nature and access to it, exploring this from the landscape level to that of individual habitats and species.

3.1

TRANSPORT'S IMPACTS ON BIODIVERSITY

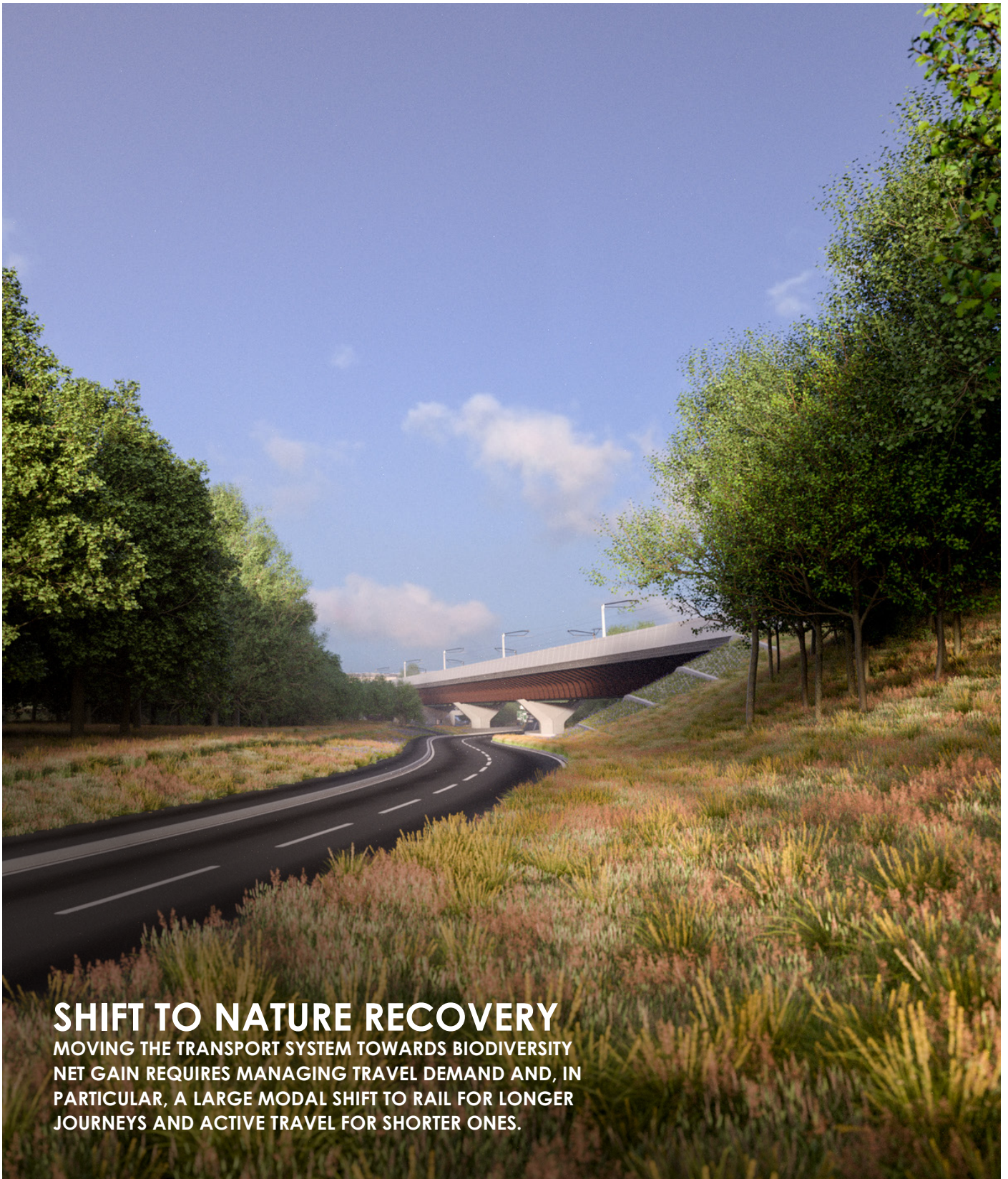
BIODIVERSITY IS A KEY INDICATOR FOR THE HEALTH OF ECOSYSTEMS, AND RELATES TO THE VARIABILITY OF LIVING ORGANISMS AND THE HABITATS THEY LIVE IN.

It has been in serious decline for decades and is particularly depleted in densely populated countries like Britain. Traditional approaches to conservation, of focusing protection on areas of the highest value, have not stemmed this decline. In the last decade policy has shifted to tackling fragmentation between sites in addition to seeking to improve them, so as to restore ecological connectivity. An important element of this approach is seeking to offset unavoidable harm to habitats through seeking opportunities to deliver biodiversity net gain elsewhere.

Although railways have been around for almost two hundred years, railway ecology has only very recently emerged as a separate discipline. Furthermore there is very little research comparing the impacts of different transport modes at a system level. Even if there was, new evidence would be needed to understand impacts from technological, environmental and social developments, such as electric vehicles, climate change and ambition to restore nature.

Incremental changes, such as the near doubling since 1994 of traffic on minor rural roads, are far less visible than the construction impacts of major projects. Their indirect impacts, disturbance from higher traffic flows or microplastic pollution from tyre wear, have major impacts on our habitats, however. Likewise pressures from the resource inefficiency of private vehicle manufacture and usage impact on ecosystems globally.

Although a move towards Electric Vehicles addresses well-to-wheel carbon emissions and some forms of pollution, it simply does not tackle wider impacts on natural capital. There is no simple technological fix to solve biodiversity loss. Better planning and, crucially, operational management of transport networks are required, as well as behaviour change. Moving the transport system towards biodiversity net gain requires managing travel demand and, in particular, a large shift to rail for longer journeys and active travel for shorter ones.



SHIFT TO NATURE RECOVERY

MOVING THE TRANSPORT SYSTEM TOWARDS BIODIVERSITY NET GAIN REQUIRES MANAGING TRAVEL DEMAND AND, IN PARTICULAR, A LARGE MODAL SHIFT TO RAIL FOR LONGER JOURNEYS AND ACTIVE TRAVEL FOR SHORTER ONES.

3.2

PLANNING

ENVIRONMENTAL LAW AND POLICY HAVE EVOLVED TO REQUIRE DEVELOPERS TO CONSIDER A WIDE RANGE OF OPTIONS AND THEN SET OUT THE SIGNIFICANT ENVIRONMENTAL IMPACTS OF PROPOSED DEVELOPMENTS.

Carefully applying these processes is vital to minimise negative environmental impacts and will be even more important in future as we seek to move towards environmental net gain.

HS2 arose on the back of a national sustainable transport strategy and the Climate Change Act 2008. Although it had an Appraisal of Sustainability rather than a Strategic Environmental Assessment, the Supreme Court and academic experts judged the detailed assessment of a multitude of route options was compliant with the relevant rules. The one exception relates to later stages of phase 2, now being explored again for the creation of the Integrated Rail Plan for the north and midlands.

The Environmental Impact Assessment for phase 1 produced the largest volume of environmental data of any project. Because it collated all of HS2's impacts in one place and had to take a precautionary approach, the project's impacts appear disproportionate. This is common for rail projects, for instance when HS1 was planned, concerns were expressed about its impacts on ancient woodland.

Detailed design is already reducing likely impacts and wider funding will enable compensation to help the project meet its objective, pioneering when it was made, to achieve no net loss. New environmental and agricultural legislation is set to provide the powers and incentives to help HS2 Ltd, the company responsible for developing and promoting the project, partner with land managers more effectively to help move towards net gain.

Where practice fell behind other countries was the lack of national mapping of wildlife corridors and agreed ambitions for restoring nature. HS2 Ltd could not start this conversation unilaterally, as it needs to be led by environmental and planning authorities at the national and local levels. This is now happening through Local Nature Recovery Strategies.

3.3

DESIGN AND CONSENTING

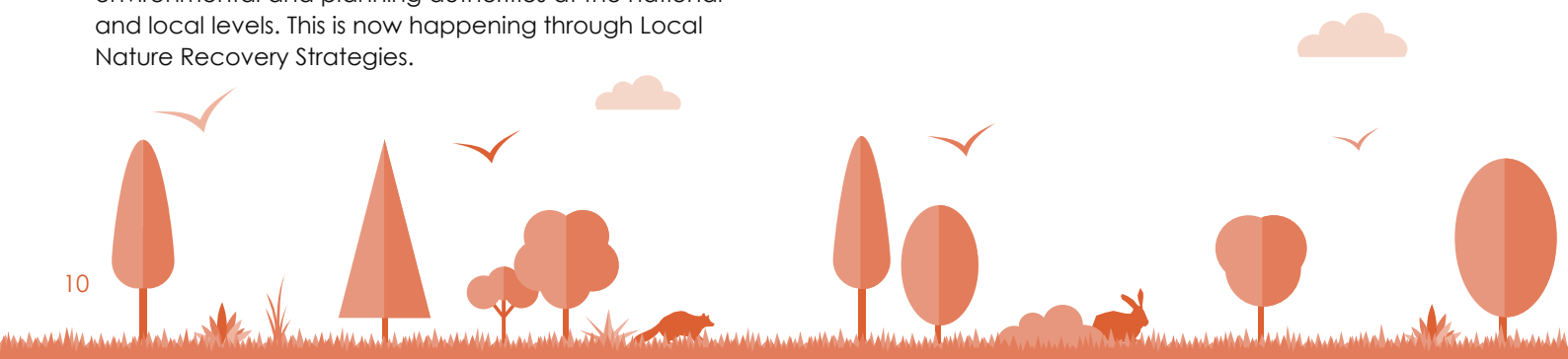
RATHER THAN THE RAILWAY AND SURROUNDING HABITATS BEING DESIGNED ALL AT ONCE, HS2'S DESIGN PROCESS IS BASED ON A SERIES OF STAGES OVER A DECADE.

These involve gathering data, engaging with a wide range of people and iterating accordingly. With many criticisms alleging a lack of detail, better public understanding is needed of this design process, the level of detail required (or not) at each stage, and how early decisions might impact on subsequent opportunities to inject more biodiversity gains into the scheme.

HS2 has been taken forward through hybrid bills, a process dating from the early days of the railways. Focused on the needs of land owners, the adversarial nature of this process hindered the ability of HS2 Ltd to make the case for the land needed to deliver landscape-scale mitigation or build the necessary partnerships to influence land management further afield.

Nature is not readily reduced down to numbers. This poses a challenge when trying to guarantee good environmental outcomes at the same time as seeking to maximise value. A compliance culture focused on cost can get in the way of a vision to restore nature, but it is in no one's interest for environmental budgets to balloon out of control. HS2 Ltd has pioneered the use of BREEAM Infrastructure, part of the international BREEAM family of sustainability standards, of biodiversity units at scale for calculating compensation, as well as setting up its Independent Design Panel early.

Far from simply looking at designs, the Panel helped evolve the Green Corridor concept and ambition for long-term monitoring of soil translocation, to maximise the potential for HS2's green legacy. Assurance and aspiration are needed at different times and scales in a project's lifecycle and sometimes need to learn to dance together. This is a complex and largely hidden area but one that offers very important lessons for other schemes.



3.4

NATURALLY INNOVATING

THE SCALE OF THE CHALLENGE TO PROTECT AND RESTORE OUR HABITATS REQUIRES INNOVATION.

While hi-tech solutions help deliver more efficient and accurate desk studies and field surveys, when it comes to creating habitats and enhancing ecological connectivity, innovation is about delivering truly integrated design.

The huge volume of surveying of protected species required to build HS2 has helped the supply chain to roll out radio tracking of bats, eDNA for great crested newts and harness Artificial Intelligence to map habitat types. Managing the volume of biodiversity data obtained has been one of the biggest challenges faced, though the pace of technological change is helping tackle this.

In under a decade, the reliance on paper based surveys entered into spreadsheets is being superseded by handheld devices feeding into spatial databases. "Newt-counting" may hit the headlines but opportunities are being missed in the National Data Strategy to recognise the importance of biodiversity data and its potential value. All the more so as we move from agricultural subsidies to a system of rewarding environmental gain.

The companies building HS2 are striving to blend bigger, better and more joined up habitats into the patchwork of surrounding landscapes. Minimising the need for long-term management is crucial. This has been driving the design of the flagship site at the entrance of the Chiltern Tunnel that will deliver 130 hectares of new chalk grassland, connected to woods and wetlands. Elsewhere orchard trees that veteranise quickly, so creating nooks and crannies for bats, are being planted as medium term mitigation, filling the gap between artificial bat boxes and other tree species.

Phase 1 provides more green bridges than currently exist in the rest of Britain. These are part of HS2's Green Corridor that forms the spine of this network of new and enhanced habitats. It is seeking to make the connectivity HS2 delivers as much for nature as it is for people.

HS2

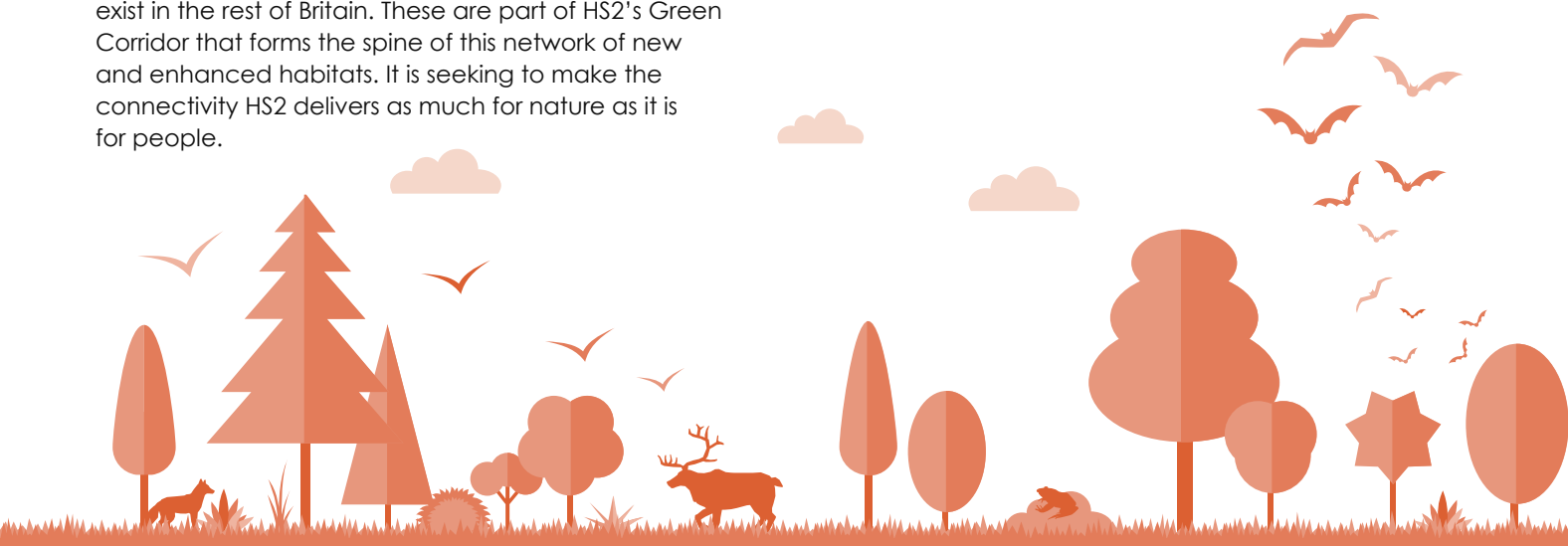
appraised many different route options. Both the Supreme Court and leading academic experts judged this as complying with environmental laws.

Managing Biodiversity Data

with tens of thousands of surveys carried out already along the route, HS2 Ltd is working with the supply chain to develop new standards and solutions for this huge volume of data.

21 Green Bridges

More green bridges are planned across phases 1 & 2a of HS2 than exist today in the UK. This will make the railway more permeable for nature than other transport infrastructure.



3.5

CONSTRUCTION

ALTHOUGH CONSTRUCTION OF HS2 ONLY OFFICIALLY COMMENCED IN SEPTEMBER 2020, TREE PLANTING AND THE CREATION OF MITIGATION HABITATS STARTED YEARS BEFORE.

HS2 Ltd has committed to undertake all works lawfully and there is a complex regulatory web of national legislation, including species licensing, internationally recognised certification systems, such as ISO 14001, plus binding rules that are project specific, such as the Environmental Minimum Requirements. To comply with these, one contractor alone has had to carry out 20,000 surveys in the last four years. While comprehensive, these rules and their outputs are not simple for NGOs and communities to keep track of. There are surely opportunities to innovate and design better ways of reporting to reflect the needs of these important stakeholders, to foster more trust and improve outcomes.

Fragments of ancient woodland are spread across England's countryside and it is not possible in practice to build a new railway through it without affecting some of them. Techniques such as soil translocation, pioneered when building the Channel Tunnel, reduce the irreversible impacts of losing ancient woodland along the route. Most importantly, 50 years of monitoring will fill gaps in scientific knowledge about the technique and soil microbiology.

On phase 2a alone, HS2 has committed (as of September 2020) to 9.6ha of ancient soils translocation, 13.4ha of ancient woodland enhancement and 78ha of new woodland planting. HS2's wider environmental funding is now of a similar level to that announced in the Government's 10 Point Green Plan in 2020. The green jobs and skills that HS2 is generating as a result of all this investment are rarely recognised, compared to those in construction and engineering. This needs to change if we are to scale up our capacity and capability nationally to restore nature.

3.6

OPERATION

BRINGING THE RAILWAY INTO OPERATION DOES NOT MEAN "JOB DONE".

Maintenance, intensive at first, and monitoring of new habitats will be essential, as lessons from other infrastructure schemes show. Although Highways England is well regarded for its evaluation of completed schemes, this evaluation has been very limited for biodiversity and other natural capital. What long-term monitoring there is shows gaps in maintenance and mixed ecological outcomes. By contrast HS1 has a comprehensive strategy with up to 170 landscape maintenance plans for habitats along its route, which sits along a necklace of urban green spaces and rural nature reserves. HS2's Green Corridor has similar aspirations to improve public access to nature along its route, although some habitats will need time to establish themselves first and the details of site ownership need to be agreed too.

As part of HS1's recent commitment to become the "green gateway to Europe", it plans to go further by working with the Kent Wildlife Trust and move towards biodiversity net gain. Sharing its monitoring, best practice and emerging learnings widely with other operators and NGOs would be most helpful, as Swiss railways have done. Much of HS2's route is in tunnel or beneath the lie of the land, reducing severance, while the high frequency of its services should discourage birds perching on its overhead lines. Nonetheless there are risks of mortality for some species flying over or along the railway, which are being addressed through markers and bioacoustic deterrents and should be monitored by fitting cameras on some trains. There are important opportunities to develop machine readable standards for habitat management plans and to build in monitoring of how different British species are affected by trains.

Many people found solace in nature during the COVID-19 pandemic, though at times this highlighted the pressures of car based leisure travel on cherished countryside. Less visibly, those living car free, often in cities, had less access to wilder areas. HS2 is often described simply as providing access to cities, but it will step change accessibility of transport hubs to national landscapes. Extending high speed rail to Scotland could catalyse reopenings, such as extending the Borders Railway to Carlisle. It's time for government bodies, transport operators and tourism bodies to explore this agenda further.

3.7

TRANSFORMING ENGAGEMENT

CREATING COHERENT ECOLOGICAL NETWORKS AROUND TRANSPORT NETWORKS REQUIRES INFLUENCING LAND MANAGERS WELL BEYOND THE BOUNDARY OF A SCHEME: IT SIMPLY IS NOT POSSIBLE TO DO SO THROUGH PURCHASING LAND.

Fostering the necessary partnerships requires fundamentally different capabilities to managing contracts across supply chains. The clear lesson from world leading railway projects abroad is that innovation in engagement is as important as in engineering and ecology. This is as much about partnering with big land owners and NGOs as with local interests and community groups who may be the best “eyes on the ground”.

Although it has funded partnerships on sensitive parts of the route, HS2 Ltd has struggled in this area, partly due to the reaction to building a new railway but also due to its earlier approach. Its prior performance has not been dissimilar to other transport infrastructure companies and there have been successes, indeed its outsourcing of its environmental funding has worked well. Since it received Notice to Proceed for phase 1, HS2 Ltd has been further exploring this agenda, from hosting online ecology seminars and offering its experts for questions, to setting up a board level Environmental Sustainability Committee.

Going forward there is a need to tailor ecological information better to different user groups' needs and to share it in a more timely way. Because of repeated criticism of inadequate detail by stakeholders, often unjustified given the early stage, it is understandable why some working on the project have been reluctant to share ecological proposals with stakeholder until complete, missing opportunities for early feedback. To change this, movement is needed on both sides.

20,000+

One contractor has carried out 20,000 surveys in 4 years on the section of HS2's route between Long Itchington Tunnel to the Handsacre connection.

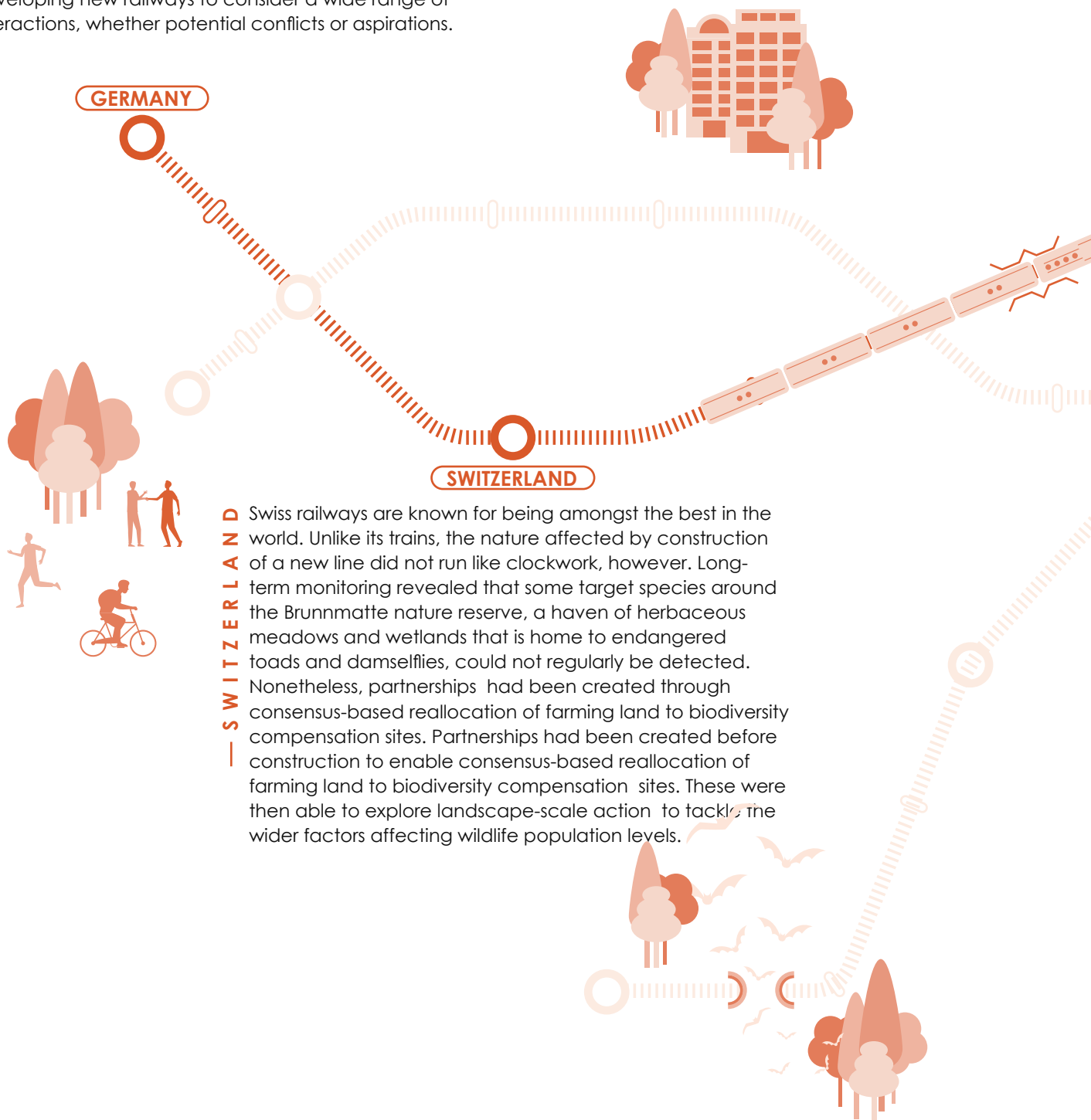
170

HS1 has long-term environmental commitments, including 170 landscape maintenance plans for habitats along its 108 km route.

3.8

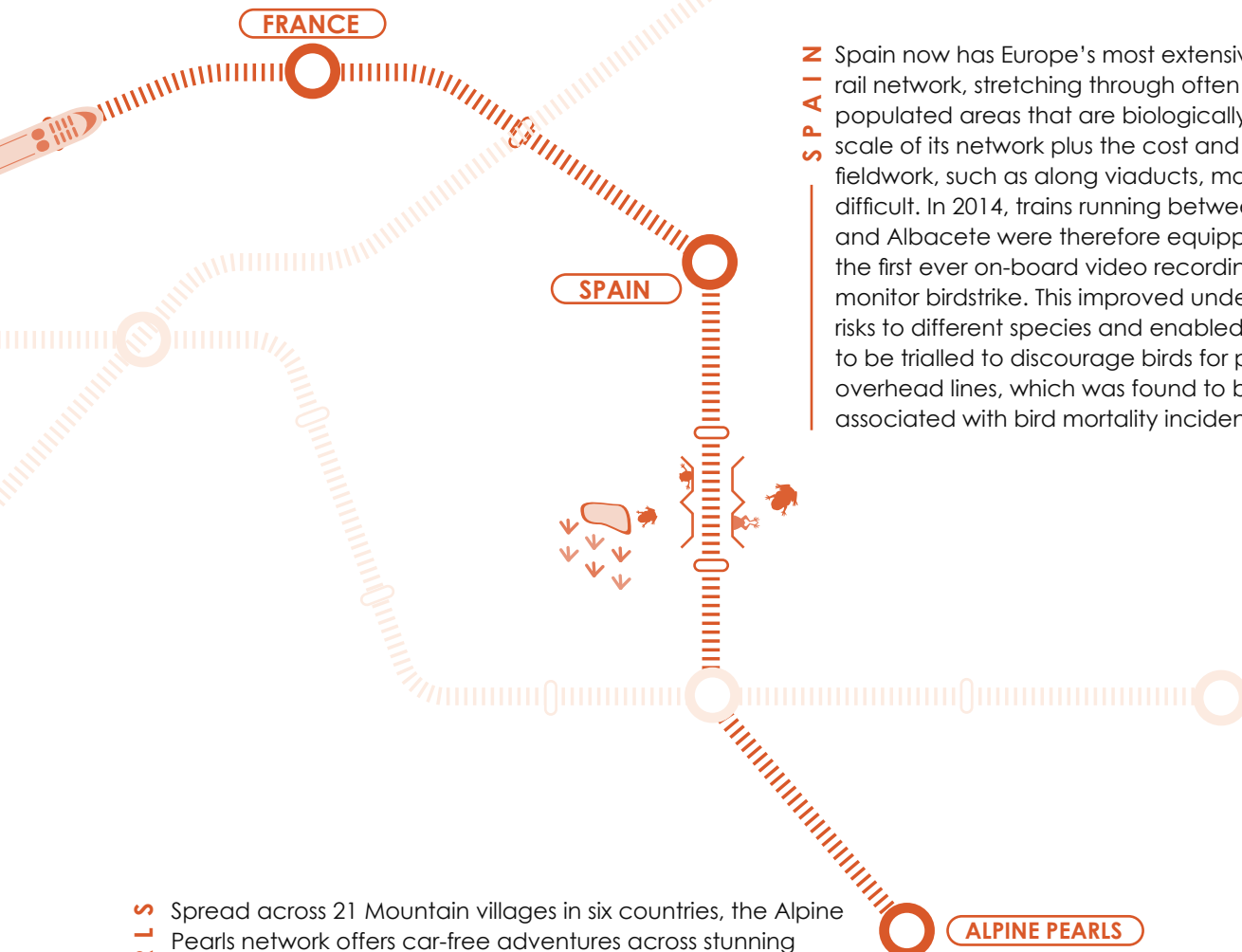
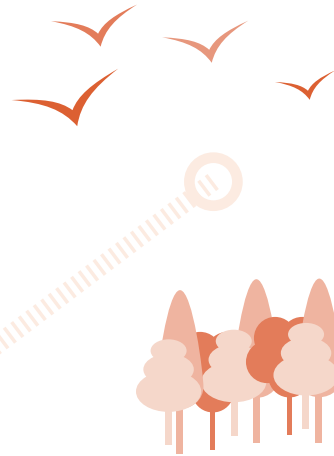
HIGH SPEED RAIL AND NATURE IN EUROPE

GERMANY For decades, Germany has used detailed ecological data to plan its transport infrastructure better. Its Federal Agency for Nature Conservation has mapped out nationally important habitat arteries and corridors as well as “unfragmented functional areas” with a low density of road traffic. This has enabled it to plan its nature networks as precisely as its transport ones. Its habitat network is made up of 4,550 links with a length of around 60,923 km and the transport infrastructure network in 2010 was found to sever these habitat arteries in 9,257 cases. This has enabled planners developing new railways to consider a wide range of interactions, whether potential conflicts or aspirations.



SWITZERLAND Swiss railways are known for being amongst the best in the world. Unlike its trains, the nature affected by construction of a new line did not run like clockwork, however. Long-term monitoring revealed that some target species around the Brunnamatte nature reserve, a haven of herbaceous meadows and wetlands that is home to endangered toads and damselflies, could not regularly be detected. Nonetheless, partnerships had been created through consensus-based reallocation of farming land to biodiversity compensation sites. Partnerships had been created before construction to enable consensus-based reallocation of farming land to biodiversity compensation sites. These were then able to explore landscape-scale action to tackle the wider factors affecting wildlife population levels.

FRANCE France's famous TGV was one the earliest high speed railways, so it is no surprise the country has also been leading on reducing the environmental impact of its latest lines. The network extensions to Brittany and Bordeaux both opened in 2017 and were the first to seek to achieve no net loss of biodiversity. Engagement was front-loaded to build local partnerships as early as possible. A "general wildlife innovation agreement" between key stakeholders led to some tasks, such as evaluating the effectiveness of compensation measures, being delegated to respected national NGOs. At the core of this approach was the creation of genuine partnerships as opposed to supplier relationships.



SPAIN Spain now has Europe's most extensive high speed rail network, stretching through often sparsely populated areas that are biologically diverse. The scale of its network plus the cost and difficulty of fieldwork, such as along viaducts, makes monitoring difficult. In 2014, trains running between Madrid and Albacete were therefore equipped with the first ever on-board video recording system to monitor birdstrike. This improved understanding of risks to different species and enabled new ways to be trialled to discourage birds for perching on overhead lines, which was found to be strongly associated with bird mortality incidents.

PEARLS Spread across 21 Mountain villages in six countries, the Alpine Pearls network offers car-free adventures across stunning scenery and sensitive habitats, whether in winter or summer. Offering guests an abundance of local eco-mobility options integrated with longer distance rail, the initiative seeks to foster sustainable tourism and transport, so as to be gentle on wildlife and the climate. By encouraging visitors out of their cars to be closer to nature, the initiative helps preserve the area's traditions, not to mention encourage a healthy appetite for local farmers' produce.

ALPINE PEARLS

3.9

LONGER TERM THINKING

FEW THINGS ARE BUILT TODAY WITH THE INTENTION OF LASTING AS LONG AS HS2, INDEED THINKING ABOUT SUCH TIME PERIODS IS OUTSIDE MOST PEOPLE'S EXPERIENCES.

Average UK temperatures are expected to rise by 1.8°C in 2050 even if climate commitments are met. The Committee on Climate Change is calling for investments, especially in infrastructure, to be resilient to 2°C and for extreme warming scenarios of 4°C by 2100 to be considered. Arguably this should apply to the investment in biodiversity mitigation and compensation not simply the railway infrastructure. That could in places mean a different countryside to what we are used to.

The primary way this issue has arisen so far has been the origin of seeds chosen for tree planting. Although HS2 Ltd has promised to use many local species, it plans to seek up to one third of seeds from species 3-5° latitude south, so around the middle of France, in order to help future woodland adapt to higher temperatures.

There will inevitably be a lack of evidence now about climate impacts thirty years or more ahead, so a precautionary approach seems sensible. How to protect and adapt our existing species and habitats or consider providing a home for 'wildlife refugees' are complex issues, which should urgently move up the public agenda.

Nature was long viewed as an impediment to building railways or a risk, such as from falling trees, to operating them. A more balanced 'asset based' approach has taken hold, seeking safety alongside good environmental outcomes. Embracing the inherent dynamism of nature in the long-term and the resulting complexity may pose a challenge for traditional asset management mindsets.

Designing in resilience may require adding in features and areas that may be difficult to value. Just as HS2 provided a testing ground to pioneer the use of biodiversity units at scale, so it should be used to assess new ways being developed to value biodiversity.

Future phases of high speed rail development in northern England could go hand in hand with ambitious nature restoration. The region currently has a larger number of higher value habitats as well as greater potential to enhance biodiversity in the future. Integrating the design and ongoing management of high speed rail and nature restoration networks will require ambitious vision and a joined up approach with other infrastructure providers, particularly around the areas where the different networks interface with each other.



DESIGN FOR RESILIENCE

HOW TO HELP HABITATS AND SPECIES ADAPT TO CLIMATE CHANGE IS A DIFFICULT AND COMPLEX ISSUE: HS2 IS HELPING BY ADDING ECOLOGICAL CONNECTIVITY AND GENETIC DIVERSITY.

04 Conclusions

INEVITABLY A TRANSFORMATIONAL PROJECT OF THIS SCALE WILL CAUSE HARM AND IT WILL SEEM WORST AT THIS STAGE WHEN CLEARANCE OPERATIONS ARE AT THEIR PEAK.

We lack easy ways to compare the biodiversity impacts of journey choices let alone the metrics to contrast strategic transport choices in the long-term. Nonetheless, the case for a shift to rail is stronger than ever, as the ecological emergency worsens, the climate heats and the roads become busy again.

HS2 has been controversial because of its scale in a densely populated country and because it was born into a decade of fast changing policy. Land owners complained about the land take it sought to deliver no net loss of biodiversity, environmentalists objected to it not seeking more land in order to deliver a net gain.

The fact that infrastructure processes in Britain have become outdated, whether the adversarial consenting processes or being decades behind our neighbours in mapping wildlife corridors, have been a hindrance too. At times there has been misunderstandings and exaggerations about HS2's impact, such as its land take, ignoring the value of the enhancements it will give back.

There is potential, even for phase 1 of HS2, to leverage new environmental powers and agricultural subsidies to improve biodiversity outcomes significantly. Seizing this opportunity requires all sides to generate mutual trust to build new partnerships. The illuminating international case studies of innovative engagement demonstrate that the benefits of taking a long-term view, even if not everything goes to plan initially.

While Britain is unlikely ever to be a biodiversity hotspot, it can take advantage of its long history of conservation and its leadership on open data. Through further pioneering efforts with HS2, it can lead the world on unlocking value from biodiversity data and partnerships to restore nature at scale.



A REMARKABLE ACHIEVEMENT

HOW THE HOUSE OF LORDS COMMITTEE EXAMINING
HS2 DESCRIBED ITS EFFORTS TO MINIMISE IMPACTS
ON ANCIENT WOODLAND.

05 Recommendations



EXPLORE HOW THE TRANSPORT SYSTEM CAN DELIVER ENVIRONMENTAL NET GAIN -

- through a study by the National Infrastructure Commission, and using HS2's phases to trial new ways of valuing existing biodiversity and by using potential for restoring nature;



INNOVATE AROUND HOW TO ENGAGE AND PARTNER -

- developing new ways to share species data and licensing, emerging ideas to improve habitats and to build trust by outsourcing some monitoring to other sectors;



REFINE DESIGN AND CONSENTING PROCESSES TO RESTORE NATURE

- by learning from France how to front-load engagement and build cooperation early, and by further increasing the potential of design panels to set ambitious visions;



UNLOCK THE VALUE OF BIODIVERSITY DATA -

- through including it in the National Data Strategy, improving availability and comparability of data (including the content of management plans) from building and operating HS2 and other transport infrastructure, and setting up competitions to find new uses for it;





**ENABLE COMPARISON OF
TRANSPORT'S IMPACTS ON
BIODIVERSITY**

- such as through creating a new standard for Biodiversity Management in Infrastructure, aimed at companies, and new metrics to compare journey choices aimed at individuals;



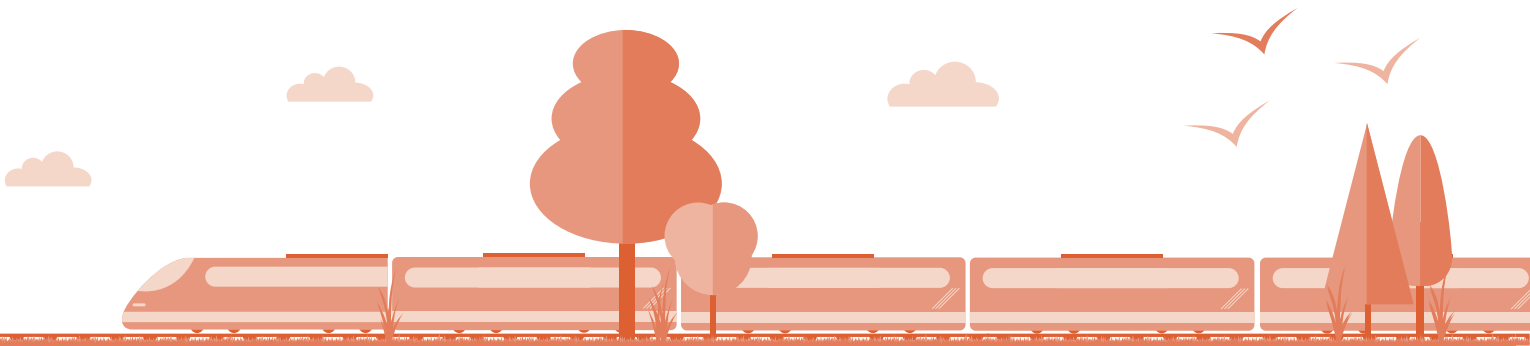
**CONTINUE TO IMPROVE HS2'S
ENVIRONMENTAL OUTCOMES**

- taking advantage of green reforms to deliver better, broader ecological networks around the route, apply learnings on future phases, integrating planning for a nature recovery network into extensions of high speed rail to Scotland and beyond.



**LEVERAGE THE GREEN POTENTIAL
OF HS2**

- to show how HS2 is "more than a railway", it needs to communicate its role in delivering green data, green jobs and green travel to nature, widening its narrative beyond cutting carbon to wider environmental gains;



HIGH SPEED RAIL GROUP



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