Chilworth, Wessex route, Southern region

Network Rail State of Nature Summary Report 2020/21

Contents

1 Personnel & Document Control

All ecologists should state their membership level of a recognised professional body (e.g. CIEEM, IEMA) alongside their name.

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1.1 Document Control

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Foreword

The review I chaired for the Rail Minister in 2018 set out five recommendations for Network Rail; a sixth was directed at the Department for Transport. Fundamental within those recommendations was the need to value the railway vegetation as an asset, not a liability. Alongside the move towards asset management, I asked for a vision of what Network Rail wanted to achieve for its estate. I also asked that progress towards that vision was published in an annual state of nature report.

It is three and a half years since Jo Johnson MP, the then Rail Minister, approached me and I have been hugely impressed by the way the biodiversity and sustainability agenda has been embraced by Network Rail and the rail industry more generally. In 2018, there were concerns over the way that Network Rail was managing vegetation and the impact that this was having on breeding birds – despite the work being considered necessary for safety. A safe and reliable railway should always be the priority. However, alongside this, if informed and guided by the techniques described in this first state of nature report, there is a real opportunity to also deliver hugely positive outcomes for the natural environment.

I am under no illusion about the challenges of shifting approaches to work in an organisation the size and scale of Network Rail. In the end, it will be human and cultural factors that will determine whether Network Rail can capture and execute this new agenda. This report shows that a baseline has been determined, opportunities have been identified and benefits for people and wildlife realised. I have experienced the passion to achieve at all levels of the organisation and I look forward to following the progress in future reports.

John Varley OBE TD
January 2022

2 Introduction

This report, for Network Rail, covers the period April 2020 to March 2021.

It outlines the state of nature on the railway estate and the ambitions and plans we have to protect and maintain the habitats and associated biodiversity found there. It also highlights key examples of the actions we have undertaken to improve these habitats, and where necessary control undesirable species.

This summary report refers to individual reports for each of the five regions of Network Rail as shown in Figure 1.

Figure 1: *Network Rail regions and routes*

The 2018 vegetation management review undertaken by John Varley at the request of the rail minister provided the Department for Transport and Network Rail with six key recommendations:

1. the Government must set out a clear policy position for Network Rail in terms of delivering for the environment
2. appropriate governance must be put in place at organisation, route and project level
3. Network Rail should publish an ambitious vision for the lineside estate
4. Network Rail must value and manage its lineside estate as an asset
5. Network Rail must improve its communication with affected communities
6. Network Rail should lead a cultural change for valuing nature and the environment

Despite John Varley's review focussing on England and Wales, we have always committed to address and implement measures across our whole estate, including Scotland. This approach was welcomed by Transport Scotland and, indeed, a policy statement supplemented the UK Government statements with additional expectations for Network Rail in Scotland including:

- maintenance of a comprehensive website clearly setting out information for neighbours
- following of best practice for management of the lineside estate
- engagement with neighbours in advance of planned work
- employment of suitably trained and experienced individuals

Figure 2: *(left) The Varley review; (right) Transport Scotland's Building a greener railway*

The last three years has seen activity across the business to incorporate these recommendations and expectations into the work that we do. The sustainable land use programme was set up to drive forward work drawing on regional expertise and that within the Technical Authority. As a result, many of the actions required by the review have been completed. This summary report and the regional state of nature reports found at the appendix is the latest recommendation to be completed.

It is important to note that this is the first ever state of nature report produced by the railway in Britain. The sustainable land use programme has drawn upon previous work which investigated the distribution of vegetation across the rail network in the 1980s. However, the methods used do not allow simple comparison and as such it is difficult to quantify improvements. We are therefore taking this opportunity to set the scene and the baseline for future reporting, to demonstrate that work is being done and that it is being monitored by us.

3 Executive Summary

3.1 Overview

Network Rail's baseline biodiversity units for the network are 247,581. The distribution of those units by the five regions are given in Table 1.

Table 1: *Network Rail baseline biodiversity units*

	Units	Area (ha)
Network Rail	**247,581.00**	**51,160.63**
Eastern	62,784.46	15,688.82
North West & Central	49,570.58	11,194.49
Scotland's Railway	42,688.14	7,579.81
Southern	44,790.44	7,662.00
Wales & Western	47,745.78	9,035.51

The number of units within each region is broadly comparable with the size of the region with the largest region, Eastern having 25 % of the network's units. When the whole network is split into the significant habitat types found across the estate, the importance of the rail network for connecting habitats can be seen (Figure 3).

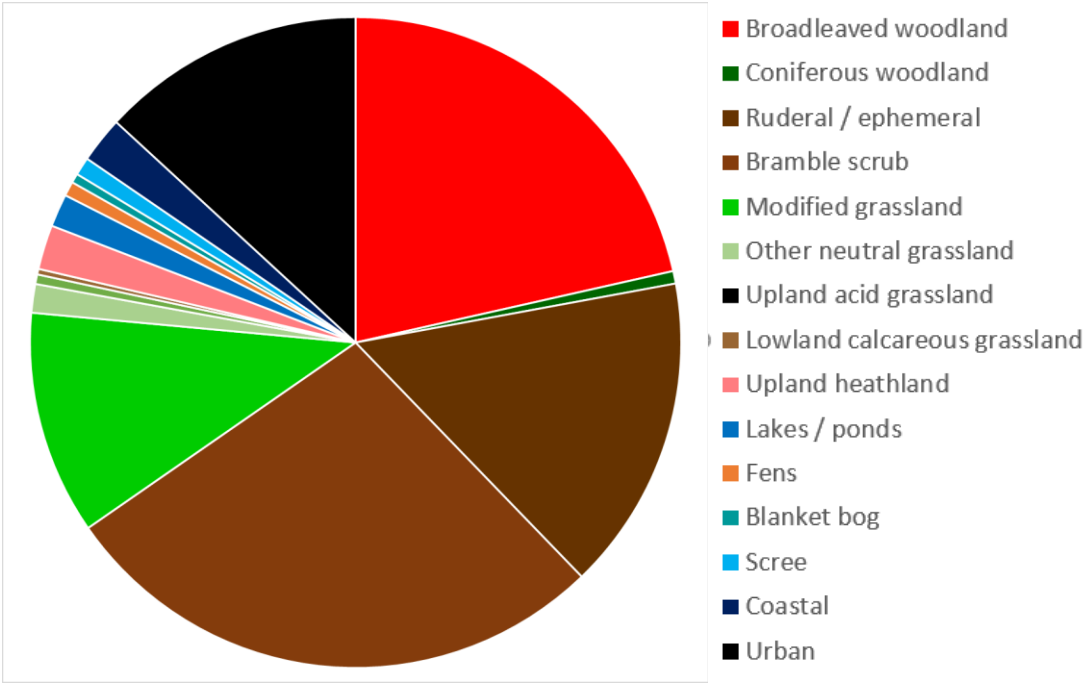

Figure 3: *Area of habitat across the rail estate in Britain*

This chart shows that the railway estate has a woodland cover of 22 %. This is almost double the average found outside the railway fence. Together with bramble scrub and low growing ruderal / ephemeral habitats, the woodland accounts for two-thirds of habitat seen across the railway in Britain. Just over 10 % of the estate is categorised as modified grassland, a not very species-rich category that would be expected for habitats which are subjected to regular mowing and chemical treatment. A similar area of the Network Rail ownership is made up of urban or built-up land; this is likely to be the offices, depots, station areas and car parks associated with the infrastructure.

Alongside the importance of connectivity, the opportunity provided by the railway estate can be seen in Figure 3. The urban designation scores zero in terms of biodiversity units and so the opportunity for enhancing the biodiversity in urban habitats may be key to achieving biodiversity net gain ambitions. Similarly, the five thousand or so hectares of modified grassland could provide locations for habitats of higher distinctiveness. The importance of different habitats providing biodiversity units can be seen in Figure 4.

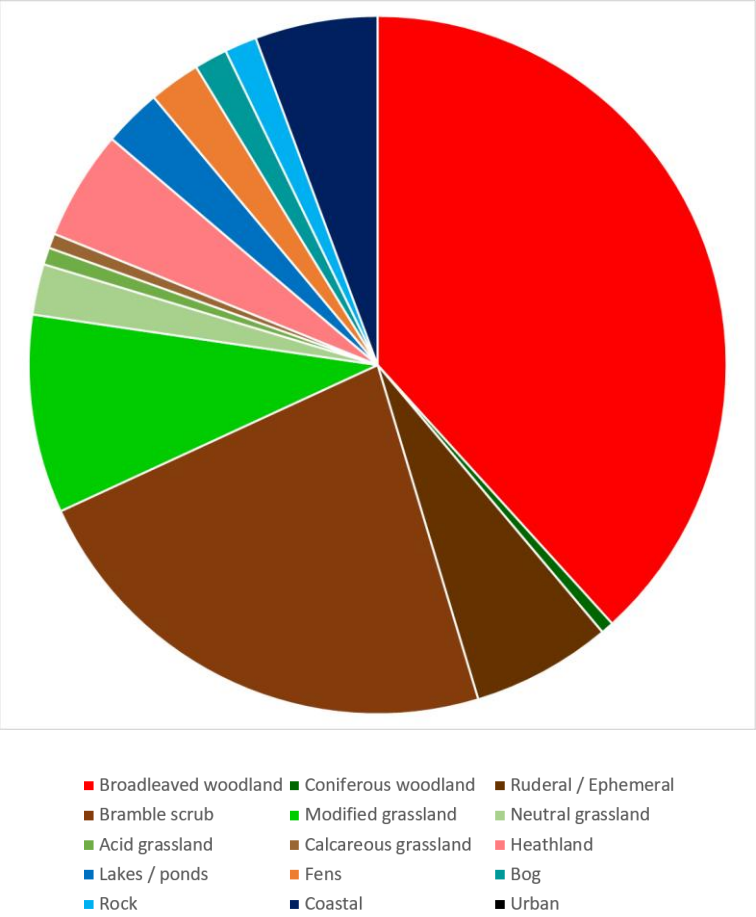

Figure 4: *Habitat biodiversity units found on the rail estate in Britain*

The importance of woodland as a habitat is well documented and tree planting is the focus of many initiatives as part of nature recovery plans across Britain. Woodland accounts for almost two-fifths of the biodiversity units calculated on the Network Rail estate. The importance of the high distinctiveness habitats found in grassland and heathland can be seen by the relative increase in the proportion of units across the network by these.

The opportunity that can be gained by potentially changing or enhancing habitats of modified grassland, bramble scrub and ruderal / ephemeral habitats can be seen by their lower proportional contribution to the overall biodiversity unit score. It must be recognised, however, that whilst these habitats do not provide as many units as woodland, they can also be important for biodiversity at a local, regional or national level. In addition, these habitats are often the ones, especially in urban situations, that are affected by plants like Japanese knotweed. Targeting work to improve the condition of these low scoring habitats can help raise the number of biodiversity units associated. The data we now have will help front-line colleagues to make informed decisions at the correct intervention interval, benefitting both the biodiversity and the operation requirements of the network.

Figure 5: *Sheep grazing to improve the condition of grassland habitat in Eastern region*

This information that we now have demonstrates the opportunity for using our land for the benefit of people and nature. The railway estate may be one of the largest estates in Britain, but there are many challenges still to address if we are to make best use of this opportunity, amongst them:

- initiatives for renewable energy, property development, rail expansion, electrification and biodiversity all competing for the same land
- improving the accuracy and detail of the satellite data (in terms of habitat identification) and biodiversity calculations
- resource of competent and capable people to manage the work in the rail environment
- business cases to obtain the necessary funding to complete the work

Much of the work being undertaken across the company is to gather evidence to support development of the business case for action. Some of these initiatives are described in this summary and the regional appendices.

3.2 Summary of ambitions for biodiversity management

Network Rail's environmental sustainability strategy and biodiversity action plans outline the strategic ambitions for biodiversity across the network, including achieving no net loss of biodiversity by 2024 and biodiversity net gain by 2035. The regional reports in the appendix identify the ambitions around the network, including:

- Eastern
    - openly report our performance on biodiversity and consult and engage with stakeholders at region and route level
    - undertake training of Network Rail staff and engage ecologists to increase ecological competence and awareness
    - better understand the role for the network in connecting habitats and work in partnership with our neighbours and stakeholders
- North West & Central
    - our natural green infrastructure is viewed as an asset not a hindrance managing our land equally considering operation needs, safety and biodiversity net gain
- Scotland's Railway

    - working towards compliance with the Network Rail biodiversity standard across all business units
    - ensuring the Network Rail standard which sets out Network Rail's minimum requirements for the management of environment and social risks and opportunities during design and/or construction activities is embedded within all project design and construction activities across the region
- Southern
    - to understand how engineering works and land management interventions impact on habitat and species assets over time
    - develop a suite of generic Habitat Management Plans (HMPs) aligned to the habitat classes found on Southern region
    - implement a process for biodiversity management maturity assessment
- Wales and Western
    - begin the process of completing HMPs, focusing on areas where there are protected sites within and adjacent to Network Rail's boundary, and against those areas where the baseline ecology surveys are completed
    - actively engage with key external and internal stakeholders in relation to biodiversity
    - aim to have sufficient ecology resource to be compliant with the biodiversity standard
    - continue to look at finding innovative solutions to lower the impact of our engineering works on the environment
    - improve the knowledge base internally at Network Rail to allow staff to recognise opportunities to enhance biodiversity when programming or project management
    - retain a corridor of vegetation wherever it is practicable to do so

In addition, as we look to build a greener railway, we make the following commitments to work during this control period to understand the opportunities, and implications of:

- maintaining at least 20 % woodland on the railway estate
- transitioning from modified grassland to other higher distinctiveness habitat
- utilising the 10 % of the network assigned as urban for local biodiversity initiatives to either change the habitat type or improve environment

- enhancing ruderal / ephemeral habitats to achieve proportionally higher biodiversity units

3.3 Summary of achievements for biodiversity management

3.3.1 Regional achievements

Additional detail for the biodiversity achievements in the regions can be found in the specific regional appendices.

- Eastern
    - The region has developed relationships with charities like those running steam trains (Figure 6). These organisations still need to manage and operate their estate to the same standards as we do. The region is working with a number to deliver biodiversity benefits and manage protected species on our infrastructure. The heritage railways provide opportunities for training staff in a controlled railway environment that does not cause any disruption to freight or passenger services.

Figure 6: *Eastern region site collaborative site visit to Wensleydale Railway*

- North West & Central
    - Work to stabilise the slopes above the railway provided an opportunity to create ideal habitat conditions (Figure 7). These conditions are not only ideal to run the railway through, but over time they will mature into ideal places for rare butterflies. The make-up of the habitats has low growing plants close to the track and hedgerows and trees towards the top of the slopes.

Figure 7: *Harbury Cutting meadow establishment in North West and Central region*

- Scotland's Railway
    - The region's first beaver tunnel was built under the railway (Figure 8). This allows the safe passage of beavers along railway corridors. In addition, this proactive management can prevent disruption to passenger and freight trains caused by beavers constructing dams in areas where the water is meant to flow freely across our estate.

Figure 8: *Beaver tunnel under Scotland's Railway*

- Southern
    - During 2021, the region created a dedicated ecology team to provide, amongst other things, professional ecological guidance to our workforce. Comprising ecologists and an arboriculturist, the team can assure ecological surveys and manage any mitigation work that may be needed. The depth of expertise enables advice to be provided to any discipline carrying out work that may impact biodiversity. This team can also support any enquiries that come from other stakeholders wishing to understand more about our work.
- Wales & Western
    - Wales and borders route are carrying out whole ELR surveys in advance of planned vegetation work. This proactive approach, rather than waiting until the work is due, can provide information to other projects working in the area. Most importantly, the surveys can identify any constraints and whether permission is required to do the work. Having this well in advance means the risk of delays is reduced.

3.3.2 Biodiversity measurement

Network Rail has worked with global remote sensing experts to deliver a safe and efficient method of biodiversity measurement. Biodiversity has been quantified for the first time in the 200-year history of the railway in Britain. Habitats on the railway estate have been

viewed in the context of the landscape through which the cleanest form of mass transport passes.

This landscape view allows our land managers to manage these habitats in conjunction with adjacent landowners to the benefit of all of us, and the wildlife. Natural areas need to be bigger, better and more joined up; whilst we manage 52,000 hectares, the habitat data we have collected covers 3.2 million hectares (Figure 9).

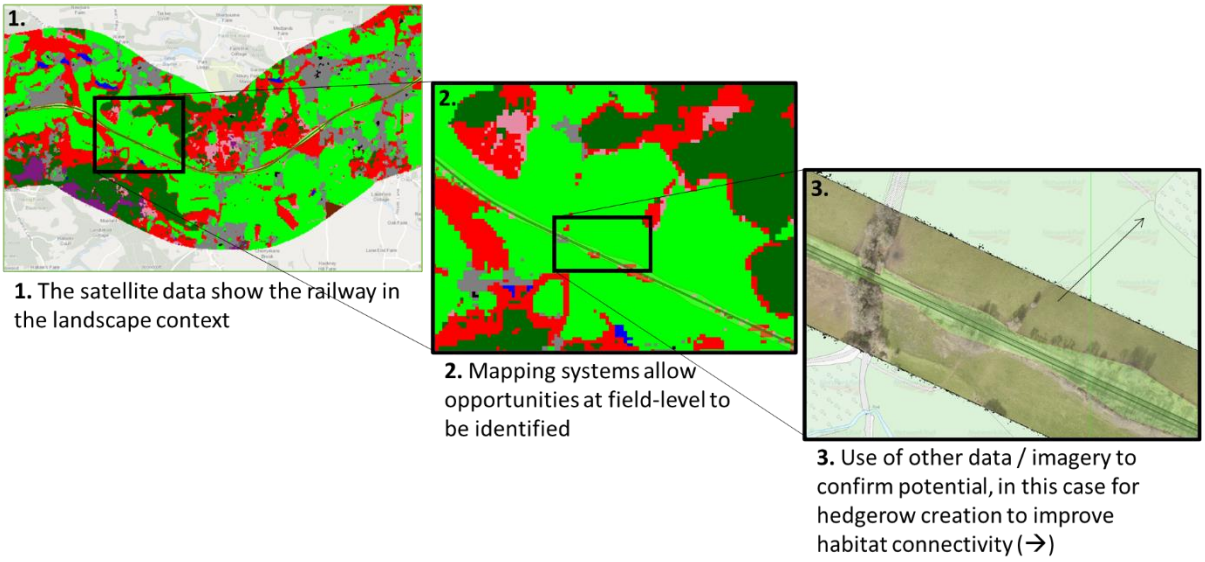

Figure 9: *Satellite data being used to improve habitat connectivity*

This new knowledge informs the better, targeted management of the habitats on the railway estate. These green corridors help the movement of isolated species and wildlife communities, improving genetic diversity and helping to build resilience against changes in climate. Our good management of the railway estate will improve the health and well-being of millions of passengers and neighbours.

Satellite data have not been used in combination with the biodiversity metric calculations before. In addition, the satellite imagery can create an overlap of the railway land and any adjacent habitat. As a result, several assumptions have had to be made and these are detailed in appendix 5.1. Investigations are already underway to improve the accuracy of the satellite data which will be applied to the data in future years,

3.3.3 Railway sustainability design guide

The Railway Sustainability Design Guide (Figure 10) has been put together to provide a resource of materials to support the sustainable management of the railway estate. It is

intended to support the standard documents that Network Rail has. The standards detail what actions are necessary. The purpose of the design guide is to give options as to how that work might be done. It provides case studies, not just from the railway, but other linear and estate managers. It is intended to show our railway managers and maintainers what the art of the possible might be. To provide ideas for how activities could be done differently. To show what the opportunities are for protecting, maintaining and enhancing the railway through sustainable land management.

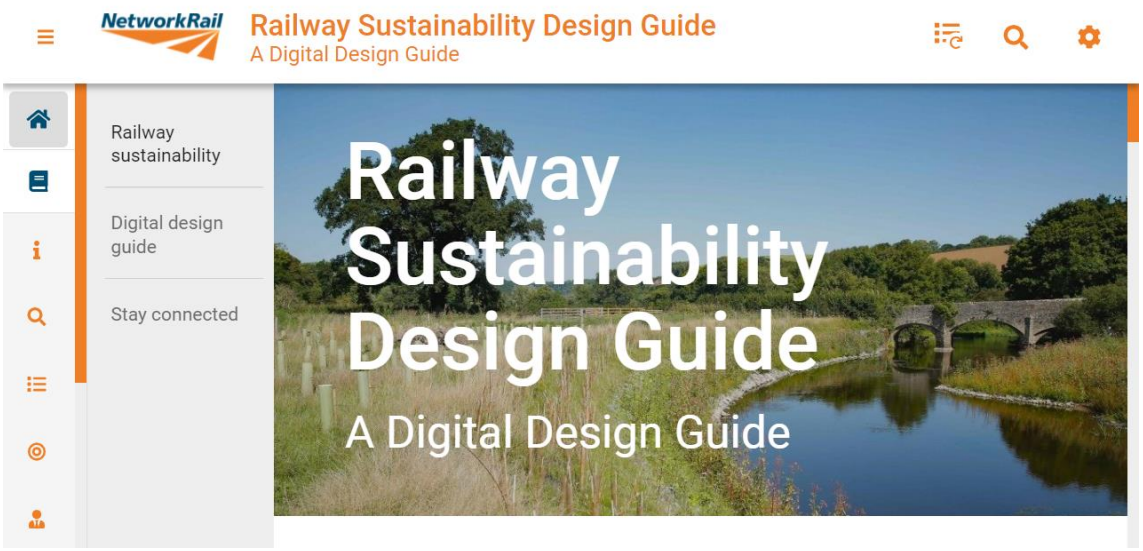

Figure 10: *Home screen of the railway sustainability design guide*

4 Future plans

4.1 Regional plans

Additional detail for the regions' plans for the future can be found in the specific regional appendices.

- Eastern
    - We will establish an ecology team to deploy ecology expertise within each route. This team will be overseen and supported at regional level. This action will further demonstrate the region's desire to take cognisance of the recommendations from the Varley review.
- North West & Central
    - We will be implementing habitat management plans across the region. These plans will drive improved biodiversity management following the regional strategic approach.
- Scotland's Railway
    - To maximise our environmental footprint both inside and outside of our lineside boundary, we will continue to partner with organisations, such as Gone West, to target habitat creation and restoration.
- Southern
    - We are looking to develop processes and systems for our ecology team to deliver a variety of services to the region, including biological recording and mapping, net biodiversity gain calculation and assessment and habitat management plan creation.
- Wales & Western
    - We will be focusing on the change in culture needed to bring about positive management for biodiversity and ecology. We will support this by upskilling and educating our internal staff.

4.2 Audit and assurance

The standard which details how we should manage biodiversity on our land has a compliance date of 1 January 2022. Published in March 2021, the regions have been developing plans for compliance with the clauses within the standard. Where resourcing or other issues prevent immediate compliance, it may be that the regions need to submit application for a Temporary Variation. This would enable an action plan to be developed that details how the region will work towards compliance and over what timescales.

The audit and assurance process will enable the monitoring of the regions' work to the standard and support any variations that may be necessary. The functional audit programme will be used to enable a comprehensive assurance regime to be drawn up.

4.3 Post Implementation Review

Up to 12 months after publication of a railway standard, it is normal for a stakeholder review of the document, known as the post implementation review. This review can identify where there may need to be adjustments to requirements or where errors have been identified.

The review for our biodiversity standard will take place in 2022.

4.4 Lineside 2035

This project aims to support Network Rail's environmental sustainability strategy in partnership with the Forestry Commission and complete the necessary feasibility work to inform and develop a landscape scale project that results in significant areas of new planting on private land. New woodland creation will take place on land adjoining the railway as well as making the most of suitable opportunities within the lineside estate. The innovative project components include:

- developing partnership protocol between the railway and adjoining landowners to deliver maximum biodiversity and carbon sequestration benefits to help Network Rail meet 2035 and 2045 / 2050 targets.
- identify where habitat intervention could reduce risk posed by human / livestock trespass
- creation of specific planting design suitable for restocking linear infrastructure
- development of forestry edge guidance to reduce future risk of managed woodlands adjacent to the railway
- develop economic models for landowners to inspire woodland creation on land adjoining the railway

The findings from this project will be used to develop new processes and ways of working and can provide updates to the railway sustainability design guide. Lessons learnt from this feasibility work will have wider relevance particularly to the other national linear infrastructure operators – Highways England, HS2 and Canal & River Trust.

5 Appendices

Bermondsey, Kent route, Southern region

Network Rail

Biodiversity Metric Calculations 2021

Contents

1 Personnel & Document Control

All ecologists should state their membership level of a recognised professional body (e.g. CIEEM, IEMA) alongside their name.

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2 Introduction

Network Rail has targets of achieving no net loss of biodiversity by 2024 and biodiversity net gain by 2035. These were detailed within a Department for Transport's policy statement having been originally laid out in the Government review of Network Rail's vegetation management in 2018. These ambitious targets were accepted by Network Rail and published within the environmental sustainability strategy in September 2020.

It is standard practice when calculating biodiversity units using the Biodiversity Metric to base the inputs on a field survey, undertaken by a competent ecologist. In order to survey all habitats across the Network Rail estate using a traditional, field survey methodology would require significant resource, both in terms of capable ecologists and funding. The access required to the railway lineside would mean that a number of surveying seasons would be required to cover the Network Rail estate which is in excess of 50,000 hectares. It would not be feasible to complete this annually. Surveyors would also be required to work in the vicinity of the operational railway. Network Rail aim to minimise lineside working wherever possible for safety reasons and the use of lineside 'look out' safety staff ended in 2021. Opportunities to access the trackside environment are now much more restricted and limited to when trains are not running or lines are closed. An alternative methodology to assess the estate was required.

Network Rail commissioned the UK Centre for Ecology and Hydrology (UKCEH) to undertake a remote sensing survey of the rail network in order to produce a 10m pixel land cover map showing 21 habitat types across the rail network. This exercise was undertaken during late 2019, early 2020. The map was produced using similar methods to the most recent UKCEH land cover maps with a conversion to align the land cover classes with the UK-Habitats Classification System (UKHab). The UKHab system aligns with the Department for Environment, Food and Rural Affairs (DEFRA) and Natural England's Biodiversity Metric. This approach will enable subsequent years' datasets to be analysed consistently to determine changes.

Network Rail used the outputs of this piece of work to calculate a baseline using the Biodiversity Metric tool.

This paper sets out the methodology for determining the national biodiversity baseline for the rail network using the UKCEH remotely sensed data. It details the assumptions made when classifying habitats plus those made when determining the condition and

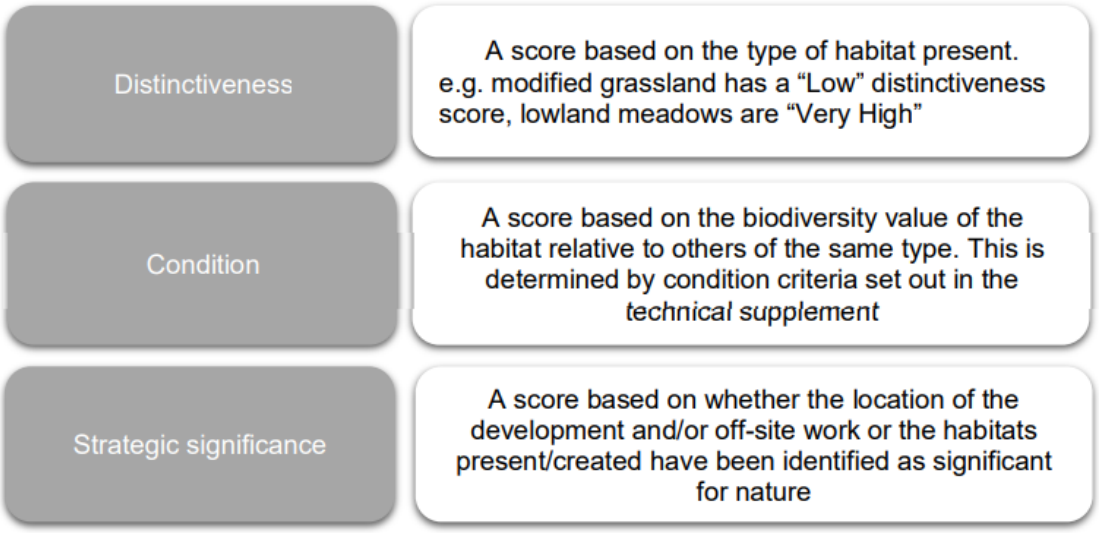
strategic significance of the habitats. It also details the biodiversity units present in each region, and an aggregated table of the national data.

3 Method

3.1 Overview of the Biodiversity Metric method

To use the Biodiversity Metric, you have to define the site boundary and apportions appropriate habitat parcels as needed, e.g. woodland, grassland or scrub. This is normally completed on the basis of an ecological survey in the field by a competent ecologist. The size of each parcel, habitat type and condition of the habitat are each recorded. These are input into the spreadsheet calculation tool. The distinctiveness of each habitat type is pre-determined by the metric. The condition of each habitat type and the strategic significance are determined by the ecologist who is completing the metric calculation.

Figure 1: Definitions of Distinctiveness, Condition and Strategic significance taken from the Biodiversity Metric Technical Supplement.



The metric applies a score to each of these elements (a high distinctiveness habitat receives a higher score than a medium distinctiveness habitat, etc.). The metric multiplies the size of each habitat parcel with each of these three scores to produce a number that represents the biodiversity unit of each habitat parcel on the site.

3.2 Regional habitat data

As described above Network Rail commissioned UKCEH to produce a land cover map truncated to a one-kilometre buffer either side of the rail network. Using the Network Rail ownership boundaries, regional statistics describing habitat types across the five regions

networks have been computed by intersecting the boundary data with habitat types and creating pixel counts for each habitat type within the railway property boundary. These intersections were computed for the land owned by NR, and also the 1km buffer land cover product.

3.3 Habitat classification

The UKCEH land cover classes broadly align to the UK BAP broad habitat classes. These are equivalent to Level 3 of the UK Habitat Classification System. When completing the Biodiversity Metric the user is required to assign a habitat category equivalent to Level 4 (a more specific and detailed descriptor) of UKHab. As we are utilising the Biodiversity Metric for a whole estate exercise based on remotely sensed data, we have had to make judgements as to which UKHab Level 4 habitats best align with the UKCEH broad habitat categories. There are limitations to this exercise as it is important to neither over-inflate the habitat value (through allocation of a habitat categories of High or Very High distinctiveness) of the current estate or to undervalue it (through undue allocation of habitat categories of Low or Very Low distinctiveness). In assigning habitat categories, we have tried to balance these issues to select a 'best fit' based on regional variation in the types of plant communities present, our colleagues' knowledge of the estate and our changing vegetation management practices over the last sixty years.

In certain instances, such as woodland, we have split the total area of a remotely defined habitat across multiple sub-categories of the Level 4 UKHab equivalents. This is to account for the likely presence of some areas of habitats of higher distinctiveness on the estate. We know, for example, that in Scotland the west Highland line runs through and adjacent to Blar na Caillich Buidhe Site of Special Scientific Interest (SSSI) which holds Atlantic oak woodland with bryophyte flora – typical of an oceanic climate. One percent of the woodland cover in Scotland (a total of 22.88 hectares) has been allocated to upland oakwood (the nearest corresponding habitat category in the metric). Table 1 details the UKHab categories assigned to each of the 21 broad UKCEH habitat types.

Table 1. UKCEH habitats and the corresponding habitats chosen for each region

<table>
<tr><th rowspan="2">UKCEH habitats</th><th colspan="5">Habitats categories assigned</th></tr>
<tr><th>Eastern</th><th>Scotland</th><th>Wales & Western</th><th>North West & Central</th><th>Southern</th></tr>
<tr><td>Acid grassland</td><td>Upland acid grassland</td><td>Upland acid grassland</td><td>Upland acid grassland</td><td>Upland acid grassland</td><td>Other lowland acid grassland</td></tr>
<tr><td>Calcareous grassland</td><td>Lowland calcareous grassland</td><td>N/A</td><td>Lowland calcareous grassland</td><td>Upland calcareous</td><td>Lowland calcareous grassland</td></tr>
<tr><td>Neutral grassland</td><td colspan="5">Other grassland neutral</td></tr>
<tr><td>Improved grassland</td><td colspan="5">Modified grassland</td></tr>
<tr><td rowspan="6">Deciduous woodland</td><td colspan="4">Other woodland; broadleaved</td><td rowspan="4">N/A*</td></tr>
<tr><td>Upland oakwood</td><td>Upland oakwood</td><td>Upland oakwood</td><td>Upland oakwood</td></tr>
<tr><td colspan="4">Wet woodland</td></tr>
<tr><td>Lowland beech & yew woodland</td><td>N/A</td><td>Lowland beech & yew woodland</td><td>N/A</td></tr>
<tr><td>Upland mixed ashwoods</td><td>Upland mixed ashwoods</td><td>N/A</td><td>Upland mixed ashwoods</td></tr>
<tr><td>Lowland mixed deciduous</td><td>Upland birchwoods</td><td>Lowland mixed deciduous</td><td>N/A</td><td>Lowland mixed deciduous*</td></tr>
<tr><td>Coniferous woodland</td><td>Other coniferous woodland</td><td>Other Scot’s Pine woodland</td><td>Other Scot’s Pine woodland</td><td>Other coniferous woodland</td><td>Other coniferous woodland</td></tr>
</table>

UKCEH habitats	Habitats categories assigned				
	Eastern	**Scotland**	**Wales & Western**	**North West & Central**	**Southern**
		Other coniferous woodland	Other coniferous woodland		
Heather grassland	Upland heathland	Upland heathland	Lowland heathland	Upland heathland	Lowland heathland
		Bracken	N/A	N/A	N/A
Dwarf shrub and heath	Upland heathland	Upland heathland	Upland heathland	Upland heathland	Lowland heathland
Bog	Blanket bog	Blanket bog	Lowland raised bog	Blanket bog	N/A
Fen, marsh and swamp	Wetland – Fens (upland and lowland)				
Arable and horticulture	Ruderal/ephemeral				Bramble* scrub
Built up areas and gardens	Bramble scrub				
Urban	Built linear feature				Built linear feature & Bramble scrub*
Freshwater	Ponds (non-priority habitat)				
Inland rock	Inland rock outcrop and scree habitats	Inland rock outcrop and scree habitats	Inland rock outcrop and scree habitats	Inland rock outcrop and scree habitats	Other inland rock and scree habitats
	Other inland rock and scree habitats	Other inland rock and scree habitats	Other inland rock & scree habitats	Other inland rock&scree habitats	

UKCEH habitats	Habitats categories assigned				
	Eastern	Scotland	Wales & Western	North West & Central	Southern
Supralittoral rock	Rocky shore – features of littoral rock				
Supralittoral sediment	Littoral mixed sediments				
Littoral rock	Rocky shore – features of littoral rock				
Littoral sediment	Littoral mixed sediments				
Saltmarsh	Coastal saltmarsh – saltmarshes & saline reedbeds				
Saltwater	Coastal lagoon				

*Allocations for the Southern region vary slightly in these categories following direct input from their regional ecology team.

Table 2 details the 'distinctiveness' assigned by the Biodiversity Metric to each of the habitat types allocated to the estate.

Table 2: UKHab Habitat types and their associated distinctiveness).

Habitat	Distinctiveness
Upland dry acid grassland	Medium
Other lowland acid grassland	Medium
Upland calcareous	High
Lowland calcareous grassland	High
Other grassland neutral	Medium
Modified grassland	Low
Upland oakwood	High
Wet woodland	High
Lowland beech & yew woodland	High
Upland mixed ashwoods	High
Lowland mixed deciduous	High
Upland birchwoods	High
Other woodland; broadleaved	Medium

Habitat	Distinctiveness
Other coniferous woodland	Low
Upland heathland	High
Lowland heathland	High
Blanket bog	Very High
Lowland raised bog	Very High
Wetland – Fens (upland and lowland)	Very High
Ruderal/ephemeral	Low
Bramble scrub	Medium
Urban - Vegetated garden	Low
Built linear feature	Very Low
Ponds (non-priority habitat)	Medium
Inland rock outcrop and scree habitats	High
Other inland rock and scree habitats	Medium
Rocky shore – features of littoral rock	High
Littoral mixed sediments	High
Coastal saltmarsh – saltmarshes & saline reedbeds	High
Coastal lagoon	High

3.4 Habitat condition

To account for the varying nature of habitat condition across the estate we have allocated a score of 'moderate' to each habitat with the exception of three. The metric automatically assigns a 'Poor' or 'N/A' condition status to 'bracken' and 'urban built linear features'. Additionally, there is one further habitat which we have allocated a score of 'Poor' condition. This was the 'Ruderal/ephemeral' category.

This category is what we allocated to land that the remotely sensed data referred to as 'Arable/horticulture'. Discussions with UKCEH suggested that this is typically unvegetated or recently ploughed fields. We know that we do not have arable/horticultural activity happening on the estate, so we attributed this category to ruderal/ephemeral 'short patchy plant associations typical of unmanaged areas in arable landscape, derelict urban sites, quarries and railway ballast'. We have allocated a Poor condition to this category following the criteria in the Biodiversity Metric Technical Supplement. In certain areas ruderal vegetation on the ballast is subject to treatment by a weed spray train and

diversity is often lacking with species like Butterfly-bush (*Buddleja davidii*) dominating. We currently do not have enough information on the potential presence of areas of 'Open Mosaic Habitat' on the estate. If we gain more accurate data, a subset of the ruderal / ephemeral category will be allocated to this higher distinctiveness habitat in future iterations of the metric calculation.

For the most part the estate's habitats have not been subject to a management regime that would improve their condition as defined by the Biodiversity Metric Technical supplement. There are some exceptions where the estate intersects a boundary of a designated site such as a SSSI and there are measures in place to manage notable habitats. One such case is part of Great Stukeley SSSI in Huntingdonshire (Eastern region) where lineside habitat is fenced and subject to a grazing regime to benefit the calcareous grassland. In future metric calculations, if we can gain accurate information on areas of land that are under particular management to improve habitat condition then we will include these figures and refine our methodology.

3.5 Strategic significance

When assessing strategic significance there are three options:

- within area formally identified in local strategy
- location ecologically desirable but not in local strategy
- area / compensation not in local strategy / no local strategy

The remote sensing exercise undertaken by UKCEH provided us with aggregated blocks of habitat, e.g. all the wet woodland in Scotland is grouped together. It is not possible to meaningfully assign strategic significance to an aggregated block of habitat (some areas of woodland may be included in local strategies, others may not) and so we decided not to attempt to disaggregate this in this baseline. As we have allocated 'Area / compensation not in local strategy / no local strategy' to all habitats. This will remain the same in future iterations of the metric unless we gain more meaningful data on which to base our assumptions.

3.6 Area or linear units

The Biodiversity Metric 3.0 tool assesses linear habitats such as hedgerow or lines of trees separately to 'area habitats' such as woodland but the user needs to be able to define the length of each hedgerow / line of trees in question. Whilst there are definitely linear habitats present on Network Rail's estate, we could not separate this data from the

remotely sensed data and therefore all habitats have been accounted for using area units.

3.7 Limitations

In this exercise we have used remotely sensed data and aggregated areas of habitat for each region to complete the Biodiversity Metric. This is a novel approach, and the Biodiversity Metric was not designed with input data such as these in mind. The purpose of this report is to provide transparency in our methods for calculating that data and to detail the assumptions about the habitat categories, the condition of the habitats and the strategic significance. It may be possible in future to rework this baseline if we gain more refined data which enables us to split more confidently the 21 UKCEH habitat types into habitat categories recognised by the Biodiversity Metric or to assign habitat condition or strategic significance more accurately.

4 Results

4.1 Whole estate calculation

This table is derived from the results of each of the regional metric calculations.

Table 3: A summary of the biodiversity units on Network Rail's Estate 2020

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
NWC	Other woodland; broadleaved	2205.41	Medium	17643.28
Scotland	Other woodland; broadleaved	2196.75	Medium	17574.00
Southern	Bramble scrub	3989.79	Medium	15959.16
Southern	Lowland mixed deciduous woodland	1320.73	High	15848.76
Wales & Western	Other woodland; broadleaved	1884.16	Medium	15073.28
Eastern	Bramble scrub	3382.43	Medium	13529.72
NWC	Bramble scrub	3047.84	Medium	12191.36
Wales & Western	Bramble scrub	2127.56	Medium	8510.24
Eastern	Sparsely vegetated land - Ruderal/Ephemeral	3870.61	Low	7741.22
Wales & Western	Saltmarshes and saline reedbeds	642.43	High	7709.16
Scotland	Bramble scrub	1555.48	Medium	6221.92
Eastern	Grassland - Modified grassland	1298.38	Low	5193.52
Wales & Western	Modified grassland	1285.58	Low	5142.32
Southern	Modified grassland	1134.37	Low	4537.48
NWC	Modified grassland	1094.96	Low	4379.84
Scotland	Upland Heathland	309.44	High	3713.28
Eastern	Lakes - Ponds (Non-Priority Habitat)	456.01	Medium	3648.08
NWC	Ruderal/Ephemeral	1781.29	Low	3562.58
Scotland	Modified grassland	874.02	Low	3496.08
Scotland	Blanket bog	217.47	V.High	3479.52
NWC	Other neutral grassland	428.27	Medium	3426.16
Southern	Lowland Heathland	278.74	High	3344.88

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
Eastern	Wetland - Fens (upland and lowland)	170.88	V.High	2734.08
Wales & Western	Ruderal/Ephemeral	1324.23	Low	2648.46
Wales & Western	Fens (upland and lowland)	146.95	V.High	2351.2
Scotland	Ruderal/Ephemeral	1050.25	Low	2100.50
Eastern	Grassland - Other neutral grassland	178.88	Medium	1431.04
Scotland	Upland Heathland	115.55	High	1386.60
NWC	Upland Heathland	112.55	High	1350.6
NWC	Saltmarshes and saline reedbeds	108.67	High	1304.04
NWC	Other inland rock and scree	155.3	Medium	1242.4
Southern	Lowland calcareous grassland	99.56	High	1194.72
Wales & Western	Ponds (Non- Priority Habitat)	140.74	Medium	1125.92
Wales & Western	Other inland rock and scree	138.14	Medium	1105.12
Eastern	Coastal saltmarsh - Saltmarshes and saline reedbeds	90.54	High	1086.48
Southern	Ponds (Non- Priority Habitat)	125.77	Medium	1006.16
Scotland	Other inland rock and scree	117.31	Medium	938.48
NWC	Upland acid grassland	116.7	Medium	933.6
Southern	Saltmarshes and saline reedbeds	77.73	High	932.76
Wales & Western	Other neutral grassland	112.43	Medium	899.44
NWC	Ponds (Non- Priority Habitat)	101.22	Medium	809.76
Scotland	Upland acid grassland	98.91	Medium	791.28
NWC	Features of littoral sediment	65.23	High	782.76
Wales & Western	Features of littoral sediment	58.59	High	703.08
Southern	Fens (upland and lowland)	41.86	V.High	669.76
Scotland	Saltmarshes and saline reedbeds	49.89	High	598.68

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
Eastern	Heathland and shrub - Upland Heathland	47.23	High	566.76
Wales & Western	Upland Heathland	46.57	High	558.84
Southern	Other coniferous woodland	116.86	Low	467.44
Southern	Lowland Heathland	36.61	High	439.32
NWC	Upland Heathland	35.66	High	427.92
Eastern	Woodland and forest - Wet woodland	31.39	High	376.68
Eastern	Woodland and forest - Lowland mixed deciduous woodland	31.39	High	376.68
Eastern	Woodland and forest - Upland oakwood	31.39	High	376.68
Eastern	Woodland and forest - Lowland beech and yew woodland	31.39	High	376.68
Eastern	Woodland and forest - Upland mixed ashwoods	31.39	High	376.68
NWC	Upland calcareous grassland	29.92	High	359.04
Wales & Western	Lowland Heathland	24.43	High	293.16
Eastern	Heathland and shrub - Upland Heathland	24.29	High	291.48
Scotland	Other coniferous woodland	71.33	Low	285.32
Scotland	Other Scot's Pine woodland	35.66	Medium	285.28
Scotland	Upland oakwood	22.88	High	274.56
Scotland	Upland birchwoods	22.88	High	274.56
Scotland	Upland mixed ashwoods	22.88	High	274.56
Scotland	Wet woodland	22.88	High	274.56
NWC	Wet woodland	22.74	High	272.88
NWC	Upland oakwood	22.74	High	272.88
NWC	Upland mixed ashwoods	22.74	High	272.88
Wales & Western	Lowland mixed deciduous woodland	19.63	High	235.56

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
Wales & Western	Lowland beech and yew woodland	19.63	High	235.56
Wales & Western	Wet woodland	19.62	High	235.44
Wales & Western	Upland oakwood	19.62	High	235.44
Eastern	Wetland - Blanket bog	14.53	V.High	232.48
Scotland	Bracken	98.92	Low	197.84
Eastern	Sparsely vegetated land - Other inland rock and scree	24.29	Medium	194.32
Wales & Western	Features of littoral rock	15.17	High	182.04
Scotland	Littoral mixed sediments	13.97	High	167.64
Southern	Other inland rock and scree	20.31	Medium	162.48
Eastern	Woodland and forest - Other coniferous woodland	34.84	Low	139.36
NWC	Other coniferous woodland	34.84	Low	139.36
Wales & Western	Upland acid grassland	17.41	Medium	139.28
Southern	Features of littoral sediment	10.05	High	120.6
Wales & Western	Lowland calcareous grassland	9.64	High	115.68
Scotland	Fens (upland and lowland)	6.74	V.High	107.84
Wales & Western	Other Scot's Pine woodland	12.36	Medium	98.88
Eastern	Intertidal sediment - Features of littoral sediment	7.58	High	90.96
Scotland	Ponds (Non- Priority Habitat)	11.3	Medium	90.40
NWC	Blanket bog	5.22	V.High	83.52
Eastern	Grassland - Upland acid grassland	8.65	Medium	69.2
NWC	Features of littoral rock	5.39	High	64.68
Scotland	Features of littoral rock	4.98	High	59.76
Wales & Western	Other coniferous woodland	12.36	Low	49.44
Eastern	Rocky shore - Features of littoral rock	4.01	High	48.12

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
Southern	Features of littoral sediment	3.98	High	47.76
Southern	Other neutral grassland	5.25	Medium	42
Scotland	Features of littoral rock	3.18	High	38.16
Wales & Western	Features of littoral sediment	2.54	High	30.48
Wales & Western	Features of littoral rock	2.42	High	29.04
NWC	Fens (upland and lowland)	1.57	V.High	25.12
Eastern	Intertidal sediment - Features of littoral sediment	1.74	High	20.88
Eastern	Grassland - Lowland calcareous grassland	1.68	High	20.16
NWC	Inland rock outcrop and scree habitats	1.57	High	18.84
Southern	Other lowland acid grassland	2.33	Medium	18.64
Scotland	Coastal lagoons	1.55	High	18.60
Scotland	Other neutral grassland	2.29	Medium	18.32
Wales & Western	Coastal lagoons	1.45	High	17.4
Wales & Western	Inland rock outcrop and scree habitats	1.39	High	16.68
Scotland	Inland rock and scree	1.18	High	14.16
Scotland	Features of littoral sediment	0.52	High	6.24
NWC	Features of littoral sediment	0.47	High	5.64
Wales & Western	Lowland raised bog	0.29	V.High	4.64
Eastern	Sparsely vegetated land - Inland rock outcrop and scree habitats	0.25	High	3
NWC	Features of littoral rock	0.12	High	1.44
Eastern	Coastal lagoons - Coastal lagoons	0.01	High	0.12
Southern	Coastal lagoons	0.01	High	0.12
Scotland	Built linear features	651.6	V.Low	0.00
Wales & Western	Built linear features	950.17	V.Low	0

Region	Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Eastern	Woodland and forest - Other woodland; broadleaved	2982.51	Medium	23860.08
Eastern	Rocky shore - Features of littoral rock	0	High	0
Eastern	Urban - Built linear features	2932.53	V.Low	0
NWC	Coastal lagoons	0	High	0
NWC	Built linear features	1794.07	V.Low	0
Southern	Blanket bog	0	V.High	0
Southern	Features of littoral rock	0	High	0
Southern	Features of littoral rock	0	High	0
Southern	Built linear features	398.05	V.Low	0
	GRAND TOTAL	**51160.63**	**GRAND TOTAL**	**247581.00**

4.2 Eastern

Table derived from Network Rail Eastern Biodiversity Metric Baseline 2020 v2.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland: broadleaved	2982.51	Medium	23860.08
Ruderal/Ephemeral	3870.61	Low	7741.22
Bramble scrub	3382.43	Medium	13529.72
Modified grassland	1298.38	Low	5193.52
Ponds (Non- Priority Habitat)	456.01	Medium	3648.08
Fens (upland and lowland)	170.88	V.High	2734.08
Other neutral grassland	178.88	Medium	1431.04
Saltmarshes and saline reedbeds	90.54	High	1086.48
Upland Heathland	47.23	High	566.76
Wet woodland	31.39	High	376.68
Lowland mixed deciduous woodland	31.39	High	376.68
Upland oakwood	31.39	High	376.68
Lowland beech and yew woodland	31.39	High	376.68
Upland mixed ashwoods	31.39	High	376.68
Upland Heathland	24.29	High	291.48
Blanket bog	14.53	V.High	232.48
Other inland rock and scree	24.29	Medium	194.32
Other coniferous woodland	34.84	Low	139.36
Features of littoral sediment	7.58	High	90.96
Upland acid grassland	8.65	Medium	69.2
Features of littoral rock	4.01	High	48.12
Features of littoral sediment	1.74	High	20.88
Lowland calcareous grassland	1.68	High	20.16
Inland rock outcrop and scree habitats	0.25	High	3
Coastal lagoons	0.01	High	0.12
Features of littoral rock	0	High	0
Built linear features	2932.53	V.Low	0
TOTAL	**15688.82**	**TOTAL**	**62784.46**

4.3 North, West & Central

Table derived from Network Rail North West & Central Biodiversity Metric Baseline 2020 v2.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	2205.41	Medium	17643.28
Wet woodland	22.74	High	272.88
Upland oakwood	22.74	High	272.88
Upland mixed ashwoods	22.74	High	272.88
Other coniferous woodland	34.84	Low	139.36
Ruderal/Ephemeral	1781.29	Low	3562.58
Modified grassland	1094.96	Low	4379.84
Other neutral grassland	428.27	Medium	3426.16
Upland calcareous grassland	29.92	High	359.04
Upland acid grassland	116.7	Medium	933.6
Fens (upland and lowland)	1.57	V.High	25.12
Upland Heathland	35.66	High	427.92
Blanket bog	5.22	V.High	83.52
Inland rock outcrop and scree habitats	1.57	High	18.84
Other inland rock and scree	155.3	Medium	1242.4
Coastal lagoons	0	High	0
Ponds (Non- Priority Habitat)	101.22	Medium	809.76
Features of littoral rock	0.12	High	1.44
Features of littoral sediment	65.23	High	782.76
Features of littoral rock	5.39	High	64.68
Features of littoral sediment	0.47	High	5.64
Saltmarshes and saline reedbeds	108.67	High	1304.04
Built linear features	1794.07	V.Low	0
Bramble scrub	3047.84	Medium	12191.36
Upland Heathland	112.55	High	1350.6
TOTAL	**11194.49**	**TOTAL**	**49570.58**

4.4 Scotland's Railway

Table derived from Network Rail Scotland Biodiversity Metric Baseline 2020 v2.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	2196.75	Medium	17574.00
Upland Heathland	309.44	High	3713.28
Modified grassland	874.02	Low	3496.08
Blanket bog	217.47	V.High	3479.52
Bramble scrub	1555.48	Medium	6221.92
Ruderal/Ephemeral	1050.25	Low	2100.50
Upland Heathland	115.55	High	1386.60
Other inland rock and scree	117.31	Medium	938.48
Upland acid grassland	98.91	Medium	791.28
Saltmarshes and saline reedbeds	49.89	High	598.68
Other coniferous woodland	71.33	Low	285.32
Other Scot's Pine woodland	35.66	Medium	285.28
Upland oakwood	22.88	High	274.56
Upland birchwoods	22.88	High	274.56
Upland mixed ashwoods	22.88	High	274.56
Wet woodland	22.88	High	274.56
Bracken	98.92	Low	197.84
Littoral mixed sediments	13.97	High	167.64
Fens (upland and lowland)	6.74	V.High	107.84
Ponds (Non- Priority Habitat)	11.3	Medium	90.40
Features of littoral rock	4.98	High	59.76
Features of littoral rock	3.18	High	38.16
Coastal lagoons	1.55	High	18.60
Other neutral grassland	2.29	Medium	18.32
Inland rock and scree	1.18	High	14.16
Features of littoral sediment	0.52	High	6.24
Built linear features	651.6	V.Low	0.00
TOTAL	**7579.81**	**TOTAL**	**42688.14**

4.5 Southern

Table derived from Network Rail Southern Biodiversity Metric Baseline 2020 v2.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Lowland mixed deciduous woodland	1320.73	High	15848.76
Other coniferous woodland	116.86	Low	467.44
Modified grassland	1134.37	Low	4537.48
Other neutral grassland	5.25	Medium	42
Lowland calcareous grassland	99.56	High	1194.72
Other lowland acid grassland	2.33	Medium	18.64
Fens (upland and lowland)	41.86	V.High	669.76
Lowland Heathland	278.74	High	3344.88
Blanket bog	0	V.High	0
Other inland rock and scree	20.31	Medium	162.48
Coastal lagoons	0.01	High	0.12
Ponds (Non- Priority Habitat)	125.77	Medium	1006.16
Features of littoral rock	0	High	0
Features of littoral sediment	10.05	High	120.6
Features of littoral rock	0	High	0
Features of littoral sediment	3.98	High	47.76
Saltmarshes and saline reedbeds	77.73	High	932.76
Built linear features	398.05	V.Low	0
Bramble scrub	3989.79	Medium	15959.16
Lowland Heathland	36.61	High	439.32
TOTAL	**7662.00**	**TOTAL**	**44792.04**

4.6 Wales and Western

Table derived from Network Rail Wales and Western Biodiversity Metric Baseline 2020 v2.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	1884.16	Medium	15073.28
Saltmarshes and saline reedbeds	642.43	High	7709.16
Modified grassland	1285.58	Low	5142.32
Bramble scrub	2127.56	Medium	8510.24
Ruderal/Ephemeral	1324.23	Low	2648.46
Fens (upland and lowland)	146.95	V.High	2351.2
Ponds (Non- Priority Habitat)	140.74	Medium	1125.92
Other inland rock and scree	138.14	Medium	1105.12
Other neutral grassland	112.43	Medium	899.44
Features of littoral sediment	58.59	High	703.08
Upland Heathland	46.57	High	558.84
Lowland Heathland	24.43	High	293.16
Lowland mixed deciduous woodland	19.63	High	235.56
Lowland beech and yew woodland	19.63	High	235.56
Wet woodland	19.62	High	235.44
Upland oakwood	19.62	High	235.44
Features of littoral rock	15.17	High	182.04
Upland acid grassland	17.41	Medium	139.28
Lowland calcareous grassland	9.64	High	115.68
Other Scot's Pine woodland	12.36	Medium	98.88
Other coniferous woodland	12.36	Low	49.44
Features of littoral sediment	2.54	High	30.48
Features of littoral rock	2.42	High	29.04
Coastal lagoons	1.45	High	17.4
Inland rock outcrop and scree habitats	1.39	High	16.68
Lowland raised bog	0.29	V.High	4.64
Built linear features	950.17	V.Low	0
TOTAL	**9035.51**	**TOTAL**	**47745.78**

5 References

Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). *The UK Habitat Classification User Manual Version 1.1.* at http://www.ukhab.org

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Network Rail (2020) *Biodiversity Action Plan.* Available online Network Rail Biodiversity Action Plan [Accessed 27/10/21]

UKCEH (2020) *Network Rail Estate Baseline data set*. (Unpublished)

6 Appendices

Copies of the 2020 Biodiversity Metric Excel spreadsheets for each region are provided separately in a zip file.

Eastern region State of Nature Report 2020/21

Contents

1 Personnel & Document Control

All ecologists should state their membership level of a recognised professional body (e.g. CIEEM, IEMA) alongside their name.

Report author	Dr Neil Strong MICFor MArborA
Position	Biodiversity strategy manager
Date	29 December 2021
Report reviewer	Alistair Huntly BSc. (Hons) MCIEEM
Position	Ecologist
Date	5 January 2022
Report authoriser	Russell Knight
Position	Principal Environment & Social Value Manager
Date	7 January 2022

1.1 Document Control

Version number	Approved by Date	Description	Prepared by	Reviewed by	Authorised by
0.1	05/01/22	V0.1	Neil Strong	AH	AH
0.2	07/01/22	V0.2	Neil Strong	AH	RK

2 Foreword

Within the past year Network Rail published its Biodiversity Action Plan (BAP) which sets out its vision of '*a lineside managed sustainably for safety, performance, the environment, our customers, and our neighbours*'. This document outlines how we will turn this vision into practice, what our ambitions are for our biodiversity assets, and how we intend to protect, manage, and enhance their condition over the current five-year Network Rail Control Period and beyond.

This will require us to develop new skills and competencies in ecology and vegetation management and apply these to decision making at all levels of our organisation. It will also involve forming and maintaining partnerships with our stakeholders and neighbours to maximise the benefits a well-managed transport infrastructure can bring for biodiversity. By achieving this we will ensure a positive environmental legacy for the future.

As part of the BAP, each region will produce an annual State of Nature Report. This is the first annual report for the Eastern region covering the period April 2020 to March 2021.

It outlines the state of nature on the Eastern region's estate and the future ambitions and plans to protect and maintain its habitats and associated biodiversity. It also highlights some of our achievements over the previous year regarding protecting species and improving these habitats, and where necessary, control undesirable species.

3 Executive Summary

3.1 Overview

Eastern region stretches from the Scottish borders along the entire east coast of England. The region comprises four routes: Anglia; East Coast; East Midlands; and North & East (see **Error! Reference source not found.**, below). Some of the busiest and most congested rail l ines in the country are found on Eastern region. We work closely with 16 train operators transporting many commuters to and from busy cities, together with over a million tonnes of freight each week.

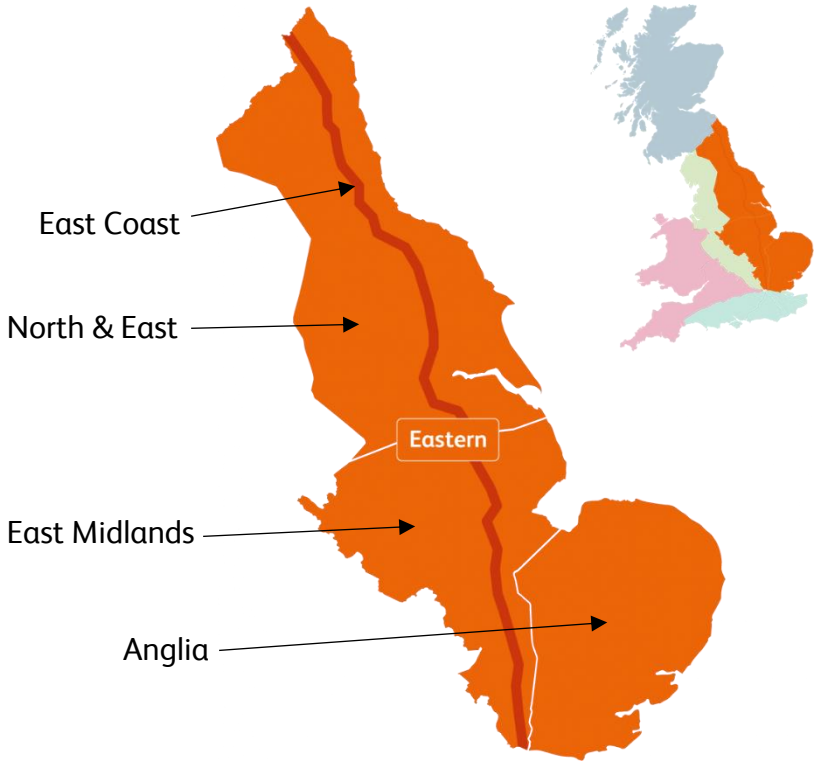

Figure 1: Eastern Region

Eastern region has over 6,000 kilometres of track within 15,688 hectares of land. This extensive estate (the largest region of Network Rail) passes through national parks and areas of outstanding beauty amongst other environmentally protected sites; this includes over 60 sites of special scientific interest (SSSI). Many of these designations, especially the SSSIs, are of geological interest due to the rock formations exposed during the creation of the railways. However, even these sites now often have interesting flora and fauna associated with them and any work on them follows Site Management Statements (SMS) drawn up with Natural England.

Within our environmental strategy, we set out how we will play our part in delivering a cleaner, greener railway for the future and we promise that we will be fitting and responsible custodians of the land we own.

3.2 Summary of ambitions for biodiversity management

Eastern region has published a biodiversity plan for operating, managing and enhancing a railway fit for the future. Within this we commit to:

- deliver biodiversity net gain (BNG) in line with up-to-date, published guidance
- openly report our performance on biodiversity and consult and engage with stakeholders at region and route level
- undertake training of Network Rail staff and engage ecologists to increase ecological competence and awareness
- better understand the role for the network in connecting habitats and work in partnership with our neighbours and stakeholders

3.3 Summary of achievements for biodiversity management

We have had a number of achievements over the last year which set good examples for a baseline of our management of the biodiversity on our estate. These achievements have come about during both project and routine maintenance activities as well as partnerships with external stakeholders. Some have been driven by the work of frontline colleagues across the region. Others have been in response to concerns from external parties about our management processes; in these situations, the resulting work will not only benefit biodiversity in the long term, but also bolster improved working relationships going forwards.

Some of our activities over the past year have included:

- working with Buglife to align pollinator habitat creation and enhancement in the Norwich area with the national B-Lines initiative
- successful application to Natural England for licences to enable management of overhead line equipment to continue throughout the bird nesting season
- supporting national colleagues in Route Services with the ongoing works at the Whitemoor facility to support environmental planning conditions in place for the last decade

- building relationships with the Wildlife Trusts within the region and put in place the agreements, which when completed, will enable a contractual arrangement to provide expert ecological support to be provided to the region
- continuing work with The Conservation Volunteers at the site of special scientific interest at Great Stukeley on the east coast main line where the condition of the site has been improved through a regime of grazing management
- recognition of some locations within the region where practices over the last few years have fallen below our own exacting standards and taking good practice from lessons learned from within the region, and across the business, to move forward and improve
- trialling an approach on the Hertford Loop to treat vegetation as an asset and apply appropriate management techniques
- working with external stakeholders, such as the Wensleydale Heritage Railway and North York Moors Railway, to understand how we can work together to deliver biodiversity benefits and manage protected species on our infrastructure

3.4 What further action will we take?

Over the next 12 months in Eastern Region, we will establish an ecology team to deploy ecology expertise within each route, overseen and supported at regional level. This action will further demonstrate the region's desire to take cognisance of the recommendations from the Varley review published in 2018.

Using this knowledge and support will enable regional environment leaders to steer and coordinate the implementation of the Eastern Region Biodiversity Plan across all four Routes. This will support development of both Habitat Management Plans (required by the biodiversity standard (NR/L2/ENV/122) and Vegetation Management Plans (mandated by NR/L2/OTK/5201).

Building upon goals already in the Eastern environmental strategy, including an Eastern region Biodiversity Plan which was adopted in September 2020, we want to identify locations to undertake in-depth ecological studies on the lineside. We want to take this knowledge of habitats and work with our stakeholders to improve or expertise in land management.

4 State of nature on Eastern region

4.1 Biodiversity metric calculation for the region

The assessed number of biodiversity units for Eastern region is 62,784.46. Table 1 below shows the distribution of habitat types by both area and number of units.

Table 1: Eastern region biodiversity metric baseline

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland: broadleaved	2982.51	Medium	23860.08
Ruderal/Ephemeral	3870.61	Low	7741.22
Bramble scrub	3382.43	Medium	13529.72
Modified grassland	1298.38	Low	5193.52
Ponds (Non- Priority Habitat)	456.01	Medium	3648.08
Fens (upland and lowland)	170.88	V.High	2734.08
Other neutral grassland	178.88	Medium	1431.04
Saltmarshes and saline reedbeds	90.54	High	1086.48
Upland Heathland	47.23	High	566.76
Wet woodland	31.39	High	376.68
Lowland mixed deciduous woodland	31.39	High	376.68
Upland oakwood	31.39	High	376.68
Lowland beech and yew woodland	31.39	High	376.68
Upland mixed ash woods	31.39	High	376.68
Upland Heathland	24.29	High	291.48
Blanket bog	14.53	V.High	232.48
Other inland rock and scree	24.29	Medium	194.32
Other coniferous woodland	34.84	Low	139.36
Features of littoral sediment	7.58	High	90.96
Upland acid grassland	8.65	Medium	69.2
Features of littoral rock	4.01	High	48.12
Features of littoral sediment	1.74	High	20.88
Lowland calcareous grassland	1.68	High	20.16
Inland rock outcrop and scree habitats	0.25	High	3.00
Coastal lagoons	0.01	High	0.12
Features of littoral rock	0	High	0
Built linear features	2932.53	V.Low	0
TOTAL	**15688.82**	**TOTAL**	**62784.46**

Biodiversity units have been calculated using data collected by the Sentinel 2 satellite array and collated by the UK Centre for Ecology and Hydrology. The data were converted to UK Habitats Classification and biodiversity unit values were calculated using Biodiversity Metric 3. Due to the method of data collection and the methodology of the metric calculation, a number of assumptions were made. Primarily, this was due to the lack of '*distinctiveness*' and '*condition*' data for habitat types. The methodology for the metric calculations, together with any assumptions made is found as an appendix to this document ("*Network Rail Biodiversity Metric Calculations 2021*").

These satellite data, and similar data to be collected annually, will provide the basis for demonstration of the progress towards no net loss of biodiversity (by 2024) and biodiversity net gain by 2035. It is recognised, and accepted, that the collection of data using satellite remote sensing is a step away from the anticipated methodology when the biodiversity metric was being developed. However, the extent of the Network Rail estate, both at a region level and nationally, precludes the use of ecologists to collect such data. The metric calculations report describes the assumptions made. Furthermore, this state of nature report provides the narrative around work across the Eastern region and enables specific location examples to be described where the metric has been used, for example, specific development sites where the changes and techniques used can be described.

Notwithstanding the above, the region will obtain detailed data (using methods described in Natural England's Biodiversity Metric 3) captured by projects and maintenance works. It is hoped such data will also be captured as part of a stratified sampling and monitoring programme throughout the region. Together, these detailed data will be used to refine the accuracy of satellite data and subsequent calculations (such as those presented above in Table 1). They will also be used to understand the efficacy of vegetation management that will be prescribed in future.

4.2 Region habitat types

Table 1 shows the habitats, in terms of area and number of units, that are found across the whole of Eastern region. It includes the significant area of built linear features, almost one-fifth of the region, that contributes zero biodiversity units. That is not to say there is no biodiversity on this part of the Network Rail estate, because wildlife will always find somewhere to live. It is, however, an indication of the limitation of the biodiversity metric when used for this purpose. Nevertheless, it is an area of the region that can be targeted for biodiversity initiatives in the work towards net gain.

Table 1 shows the most significant areas of habitat to be broadleaved woodland, bramble scrub and ruderal/ephemeral habitats. This is emphasised within Figure 2 (below) where two-thirds of the region can be seen to be made up by these three habitats. This is not surprising given the generally-disturbed nature of the railway lineside estate and the techniques of management that have been used over the last century or so.

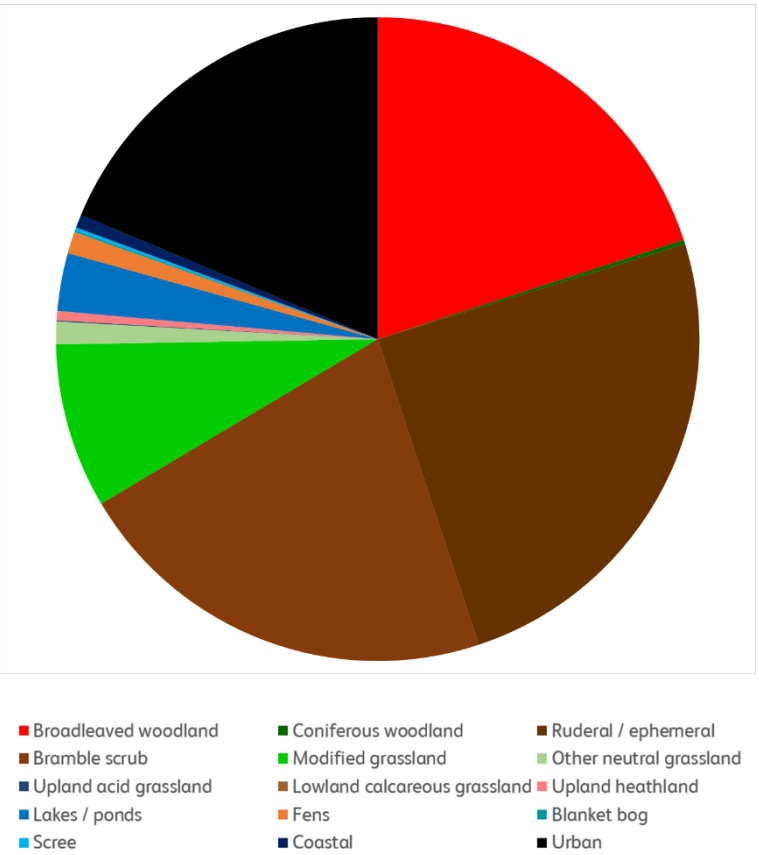

Figure 2: Chart showing the proportions, by area, of habitat across Eastern region

The next most abundant habitat within the region is that of the modified grassland. Likely to be those areas adjacent to agricultural fields or playing fields in urban areas, this makes up almost 10 % of the region. The opportunity for biodiversity afforded by this habitat of relatively low importance could be through expansion of woodland habitats or transition to another grassland type of higher value.

These data provide the baseline by which the progression of Eastern region to achieving net positive biodiversity by 2035 can be measured. It is important to recognise that there is almost 50 % of the region currently identified as ruderal / ephemeral habitat and bramble scrub. These habitats are not the 'pin-ups' of the ecology world but do provide a significant resource for pollinators and other species – especially in urban environments. The advantage of having data such as these now enables correct intervention decisions to

be made that balance the needs of the operational railway with the environmental objectives of the business – work that can be targeted by route (see Figure 3).

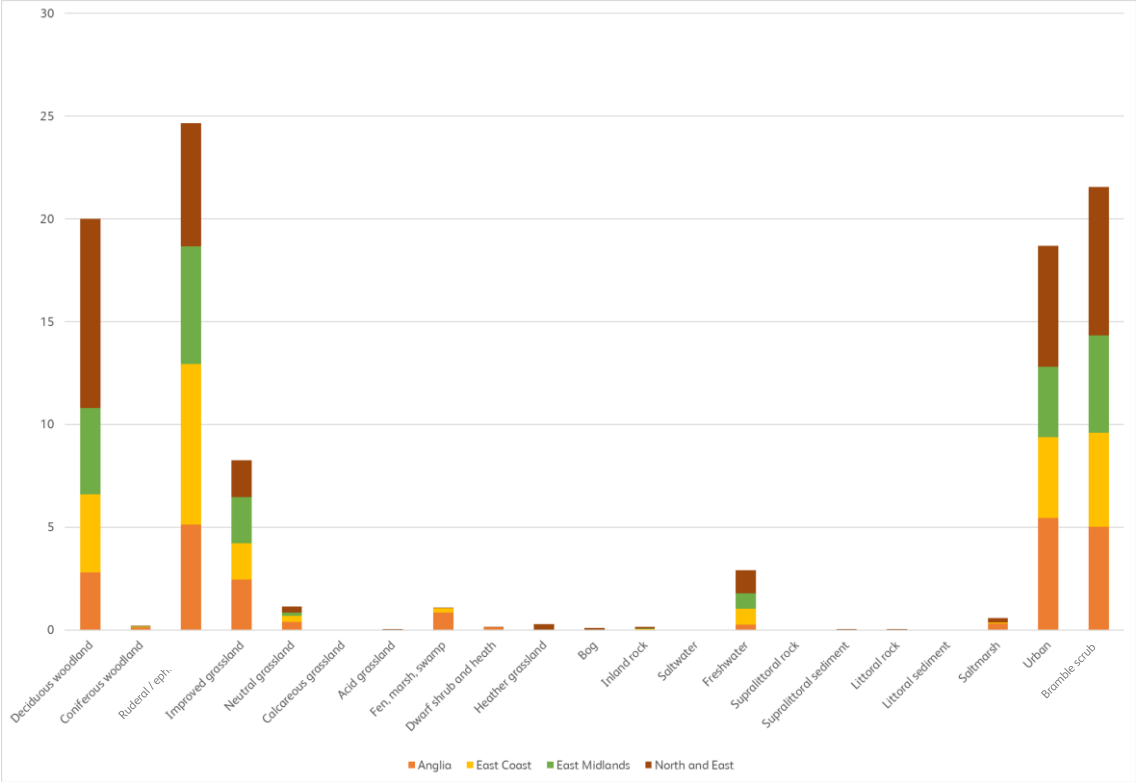

Figure 3: Proportion of habitats split by the four routes of Eastern region [Note: Coastal category expanded]

The spread of habitats is relatively even across the Eastern region with the notable, and expected exceptions:

- deciduous woodland; North and East – Kielder forest
- coniferous woodland; Anglia – Thetford forest
- fen, marsh and swamp; Anglia – Norfolk Broads

The East Coast has a slightly higher proportion of ruderal / ephemeral habitat which is likely to be as a result of the extensive electrification on that route and subsequent management regimes it has been subjected to.

4.3 Priority species/habitats on the region

Great Stukeley SSSI, found in East Coast route (front cover image), is a large grassland site that was classified as being in '*unfavourable*' condition by Natural England. Needing to comply with the Wildlife and Countryside Act as well as with our own statutory duties to conserve and enhance protected sites, plans needed to be drawn up to manage this

important site. A successful partnership with The Conservation Volunteers, and some goats (Figure 4), has meant that Natural England has already declared one-third of the site as being in '*favourable*' conservation status.

Figure 4: Network Rail volunteers being released to graze Great Stukeley SSSI

The success of this grazing initiative has helped introduce the technique into other designated locations across the network. It has also identified the potential for the use of grazing as a routine management technique; artificial rabbit warrens were built at Whitemoor recycling facility to maintain areas of translocated meadow.

4.4 Invasive species on the region

Challenges from lineside neighbours over the presence of Japanese knotweed on our estate, together with legal precedent set in high-profile court cases have meant we are investigating new ways of managing invasive species. This is together with the knowledge that successful management of the species can also assist with local increases in biodiversity.

Working together with our Legal colleagues, trials are about to take place for an agreement that can be drawn up with adjacent landowners to enable the effective and efficient management of non-native invasive species. This agreement also provides potential for other arrangements with landowners, such as hazardous tree management, for example.

4.5 Demonstration sites or projects

Ash dieback is a serious disease of the most common tree on the rail network in England. Some linear infrastructure operators are carrying out extensive tree removal of ash to reduce risk. However, this brings with it major implications for the removal of a very

important feature of many habitats. As a result, Eastern region lineside teams are working with expert input from The Tree Council to carry out trials of different management techniques. These techniques will enable the trees to be retained on the railway estate, but at a height that, should they fail, there will be no risk to safety or operations. This management involves crown reduction, pollarding and coppicing – traditional arboricultural methods that are being reintroduced to the railway.

Figure 5: Example of pollarding enabling tree retention near Leeds

These trials will demonstrate to other regions, and industries, the types of management that can be used to safely reduce the height of these trees and yet still retain them, and the habitats they support.

Internal guidance (example image in Figure 6) has been produced to guide colleagues through the decision-making process that comes in advance of works. Making the right decisions at the early stages of intervention can not only benefit the biodiversity, but also demonstrate to our lineside neighbours our intentions.

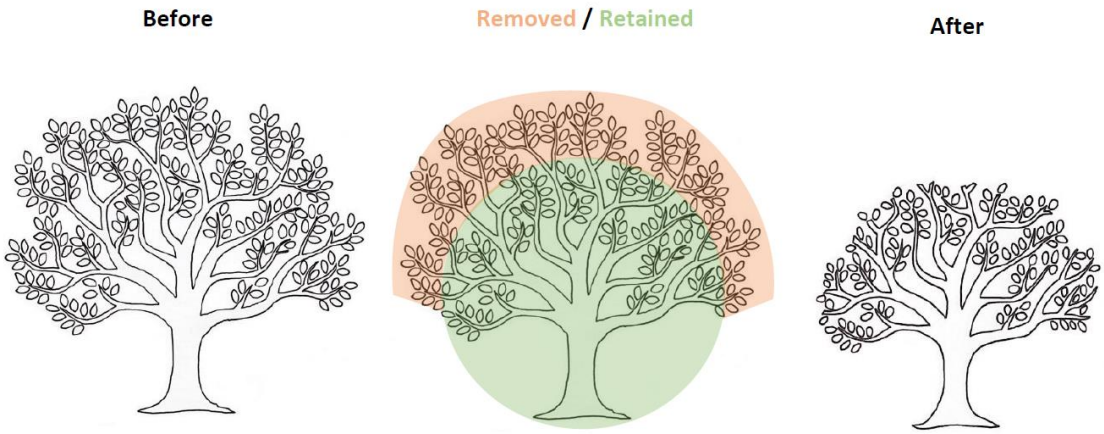

Figure 6: Example image from regional guidance material

5 Priorities for biodiversity management on this region

In 2020/21 Eastern region launched the Eastern Environmental Sustainability Strategy and adopted its Eastern Region Biodiversity plan. Both of these documents support the national, network-wide delivery of the Network Rail Environmental Sustainability Strategy 2020-2050.

To support ongoing commitment to be fitting and responsible custodians of the land we own, during the remainder of the current Control Period, we will focus on achieving the target of no net loss which will include the following:

- prioritisation of habitat and vegetation management plans
- compliance with standard NR/L2/ENV/122 Biodiversity
- completion of annual regional state of nature reports
- identify pilot areas on our network for in-depth ecological study to learn more about our habitats
- improve our management of lineside habitats by 2035 to promote biodiversity
- work with conservation partners to improve our expertise in habitat management
- provide suppliers with biodiversity data by 2024
- increase ecological capability by 2024 and be recognised as land management leaders by 2030

6 Case studies

6.1 Examples of partnership working

6.1.1 Greater Anglia and WildEast

The team in Anglia are working closely with train operator Greater Anglia and have joined the WildEast movement. Greater Anglia have been able to pledge over 6,400 square metres of rail station – the equivalent of five Olympic-sized swimming pools. This partnership will see all 56 station gardens across the rail network in East Anglia added to WildEast's 'map of dreams' which is tracking the amount of land pledged to help meet WildEast's target of giving 20 % of the region back to nature by 2050.

6.1.2 Buglife

Anglia has worked with charity Buglife to create natural habitats for pollinators in areas where vegetation has been removed for the safe running of rail services (Figure 7, below).

Figure 7: Vegetation to be removed for signal sighting

Techniques such as windrowing and raking have enabled meadow species to be seeded and planted (Figure 7). The plants will not only replace the lost vegetation but also provide a natural habitat that encourages bees. This collaboration aligns the Network Rail estate with the B-Lines initiative by Buglife, a network of insect pathways to be restored to create wildflower rich habitat.

Figure 8: Management techniques to establish wildflowers (highlighted structure is reference to same structure in Figure 7)

The meadow consists of a 7:3 ratio of perennials to annuals, sown throughout the site. The mixture of native British wildflowers will add colour, whilst providing an important source of nectar and pollen for bees and other pollinating insects. Planting a mixture will provide flowers that will change through the seasons and from year to year. This will not only attract many different invertebrate species but will also create an environment that will be managed yearly in a sustainable way.

7 Future plans

7.1 Biodiversity Baseline

The Ecology Team will liaise with the Technical Authority (TA) to establish access to baseline data. The Ecology Team will need to evaluate, improve and supplement baseline data provided by CEH.

7.2 Biodiversity Baseline Verifying and Validation

The Ecology Team will need to establish an ongoing process to verify baseline data. This will require: developing a survey and monitoring scheme of sample areas; scrutinising existing data collected through existing standards implemented by projects; standardise the production and presentation of biodiversity calculations and establish systems to store and interrogate data; and, explore viability of other technologies to validate baseline data (e.g. drones).

7.3 Stakeholder Mapping and Engagement

The Ecology Team will carry out a stakeholder process to identify and engage stakeholders, from government bodies to small-scale, community-led organisations. This is pivotal to help Network Rail achieve its biodiversity objectives. The team will liaise with Customer Relations teams to run a series of targeted workshops across the Region, within each route. This process will be on-going, throughout the lifespan of the programme, to engage stakeholders as they emerge and secure the best and most efficient outcomes.

7.4 Biodiversity Inventory and Offsets Areas

The Ecology Team will develop a system to store and access biodiversity data arising from the stakeholder process. Biodiversity offset areas will be created.

7.5 Route Biodiversity Action Plans (RBAPs)

The Ecology Team will create RBAPs and standardise production and delivery through RBAP templates. Stakeholder engagement outputs will be used to determine what biodiversity will be managed in each route and define what success will look in 2035. The RBAP will include Key Performance Indicators (KPIs) and milestones towards that success. Habitat Management Plan (HMP) Areas and Offset Areas will be defined, following stakeholder engagement and targeted surveys. RBAPs will be periodically reviewed.

7.6 Pilot Areas

The Ecology Team will explore opportunities within each Route to implement and assess lineside management practices, to inform the Region's approach.

7.7 Production of HMPs and Vegetation Management Plans (VMPs)

The Ecology Team will use existing baseline data for each Route and data captured by projects, Maintenance and stakeholder engagement to produce HMPs and VMPS and meet RBAP objectives. Monitoring will be implemented throughout the lifespan of the programme to track changes and progress towards KPIs and milestones outlined in each RBAP. The Ecology Team will need to work closely with internal stakeholders (Maintenance teams, Asset Management teams, Capital projects etc.) to align HMPs and VMPs with the requirements of an operational railway.

The Ecology Team will establish how data will be collected, managed, stored and accessed by stakeholders.

7.8 Periodic Reporting

The Ecology Team will create standard reporting templates for HMPs / VMPs and determine periodic reporting timeframes. Reports will track RBAP KPIs and milestones, allowing a yearly review and update of each RBAP. The outcome of RBAPs' yearly review will be reported in future publications of this document (Route State of Nature Report) that will summarise progress made in each route and present a Regional overview.

7.9 Funding, Management and training

The Ecology Team will: work with delivery teams and Asset Management teams to forecast costs associated with delivering no net loss and net gain and help inform and integrate adequate funding mechanisms; facilitate appropriate handover between offset delivery partners and Asset Management teams; work closely with delivery functions to help them implement the Region's Biodiversity Plan through the work they undertake; and, work with all internal stakeholders to identify and allocate risk where appropriate.

The Ecology Team will oversee the assurance process for offset proposals and will work the TA / SLUP to provide necessary training throughout the Region.

North West & Central Region State of Nature Report 2020/21

Contents

1 Personnel & Document Control

All ecologists should state their membership level of a recognised professional body (e.g. CIEEM, IEMA) alongside their name.

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Date	29/11/2021
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Date	15/12/2021

1.1 Document Control

Version number	Approved by Date	Description	Prepared by	Reviewed by	Authorised by
1.0	15/12/21	V1	AH	IR	IR

2 Foreword

This report, for NW&C region, covers the period April 2020 to March 2021.

It outlines the state of nature on the Region's estate and the ambitions and plans we have to protect and maintain its habitats and associated biodiversity. It also highlights key examples of the actions we have undertaken to improve these habitats, and where necessary control undesirable species.

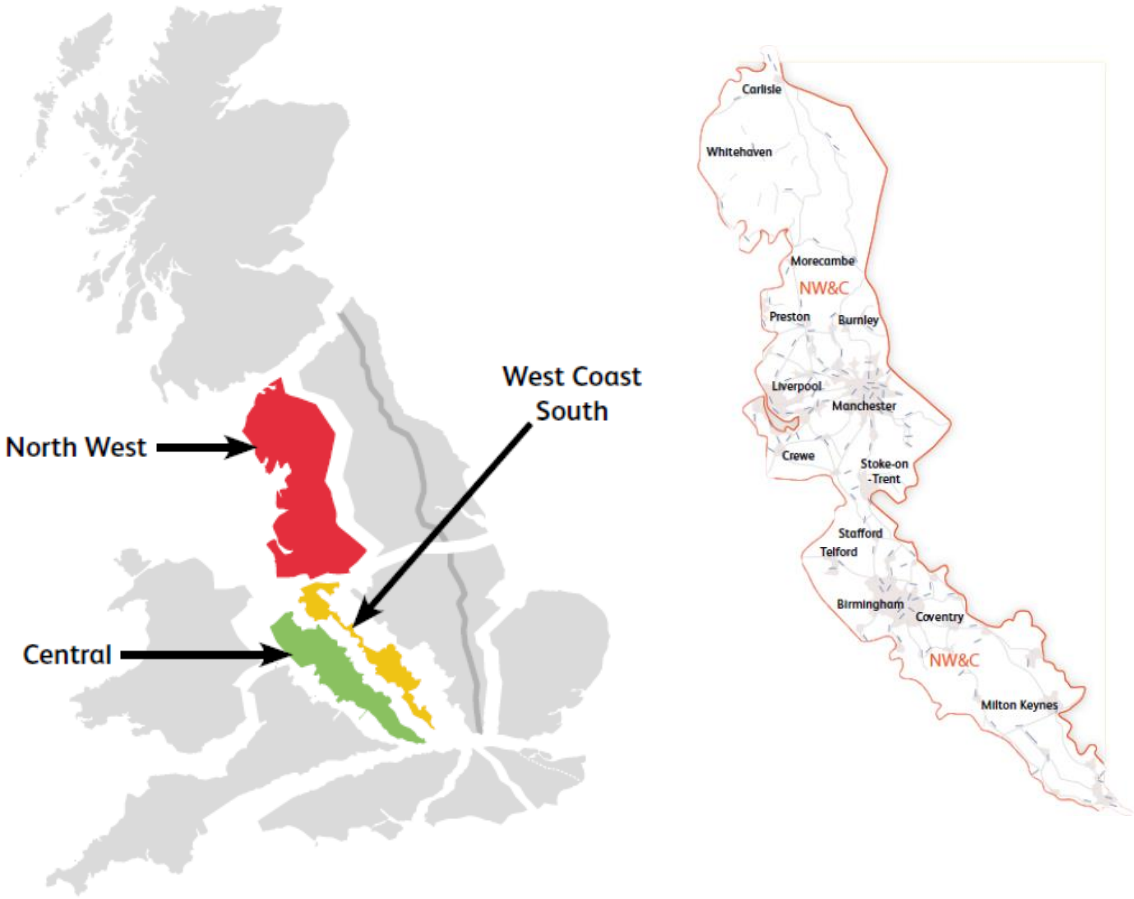

Figure 1: *NW&C Region showing the three routes.*

3 Executive Summary

3.1 Overview

NW&C is the Backbone of Britain, the low-carbon spine linking London, Birmingham, Manchester, Liverpool and Glasgow. Through our three devolved routes (North West, Central, West Coast South) supported by Capital Delivery we aim to increase our biodiversity alongside delivering a great service to our passengers, customers and neighbours.

A NW&C Region baseline has been captured for the current biodiversity units value of our lineside estate consisting of 43,474.9 biodiversity units. Priority habitats of deciduous woodland and improved grassland have been identified within our region. As a Region we will focus efforts to improve these habitats to increase the biodiversity value inline with the targets of delivering no net loss by 2024 and net gain across are region by 2035.

3.2 Summary of ambitions for biodiversity management

The NW&C Region covers 4,500 miles of track and provides the Backbone of Britain, the economic spine linking our main cities of London, Birmingham, Manchester and Liverpool.

This region carries over 246.5m passengers a year and is one of the busiest on the rail network. It passes through some of the most picturesque and biodiverse landscapes in Britain.

In 2021 we published our Regional Sustainability Delivery Plan which outlines our ambitions for a lineside managed sustainably for safety, performance, the environment, our customers and our neighbours.

To support the achievement of these ambitions, NW&C is committed to the Key Performance Indicators (KPIs) of:

- Achieving no net loss in biodiversity on our lineside estate by 2024, and achieve biodiversity net gain of 10 % in each Region by 2035
- Our natural green infrastructure is viewed as an asset not a hindrance managing our land equally considering operation needs, safety and biodiversity net gain.

In addition to the above we have developed an approach to delivering Habitat Management Plans (HMP) across the region by publishing the NW&C Habitat Management Plan detailing the strategic approach taken to deliver the HMP requirement

for the remaining Control Period 6 based on work bank and risk factors. This is currently under stakeholder review.

3.3 Summary of achievements for biodiversity management

There are a number of case studies and demonstration sites that have been undertaken showcasing positive biodiverse improvements that have been made within the Region. This has involved actions to conserve desirable species, habitat creation and restoration for biodiversity net gain and field trials of new management approaches.

We also have an example where works haven't always gone to plan. At a few locations where vegetation management has occurred this has been undertaken within close proximity to badger setts and thus causing disturbance. In this instance a detailed level 2 investigation was undertaken which has identified key recommendations and improvements that will be implemented to prevent this issue occurring again.

3.4 What further action will we take?

Future plans revolve around implementing Habitat Management Plans (HMP) to drive improved biodiversity across the Region following the NW&C strategic approach on this. In addition to there are five future workstreams being developed to pilot different management techniques, improve specific sites or improving how we manage our biodiversity risk.

4 State of nature on NW&C region

4.1 Biodiversity metric calculation for the region

Table 1 below shows the NW&C Regions habitat data and corresponding biodiversity unit calculations this provides. Within NW&C Region the habitat along the estate is 11,194 hectares in area and equates to 43,474.9 biodiversity units. Full details of how this was calculated can be found within the *'Network Rail Biodiversity Metric Calculations 2021 Report'*.

Table 1. North West & Central Region habitat types and biodiversity metric baseline measures 2020.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	2205.41	Medium	17643.28
Wet woodland	22.74	High	272.88
Upland oakwood	22.74	High	272.88
Upland mixed ashwoods	22.74	High	272.88
Other coniferous woodland	34.84	Low	139.36
Ruderal/Ephemeral	1781.29	Low	3562.58
Modified grassland	1094.96	Low	4379.84
Other neutral grassland	428.27	Medium	3426.16
Upland calcareous grassland	29.92	High	359.04
Upland acid grassland	116.7	Medium	933.6
Fens (upland and lowland)	1.57	V.High	25.12
Upland Heathland	35.66	High	427.92
Blanket bog	5.22	V.High	83.52
Inland rock outcrop and scree habitats	1.57	High	18.84
Other inland rock and scree	155.3	Medium	1242.4
Coastal lagoons	0	High	0
Ponds (Non- Priority Habitat)	101.22	Medium	809.76
Features of littoral rock	0.12	High	1.44
Features of littoral sediment	65.23	High	782.76
Features of littoral rock	5.39	High	64.68
Features of littoral sediment	0.47	High	5.64
Saltmarshes and saline reedbeds	108.67	High	1304.04
Built linear features	1794.07	V.Low	0
Vegetated garden	3047.84	Low	6095.68
Upland Heathland	112.55	High	1350.6
TOTAL	**11194.49**	**TOTAL**	**43474.9**

4.2 Region habitat types

For NW&C Region our target is to a achieve the no net loss across our entire estate within the region making sure any impacts to the habitats and subsequent biodiversity are appropriately managed so the impacts are balanced by habitat improvements; whether it is at the location of the impact or elsewhere within our estate within the regional boundary. Figure 3 shows the habitat types and percentages that make up the key habitats within the region. The built up areas and gardens and urban types are not a priority for NW&C as they are not habitats that we can improve on and provide low biodiversity units. Similarly, arable definition from the CEH mapping is any bare ground that is not concrete.

Therefore, our habitat priorities focus on deciduous woodland making up 20 % of the region and improved grassland making up 10 % of the region. These are the two key focus areas for the region to improve on these habitats present working towards a more species rich grassland and designing woodland to be in the right places. This will involve delivering a successional approach to the lineside estate containing species rich grassland and scrub close to the railway with hedgerows and trees further away from the track to remove the risks to the running of the operational railway but also increase the biodiversity with the variety of habitats present. This will help the region work towards the biodiversity net gain agenda increasing the biodiversity of our estate and improving this from the 2020 baseline.

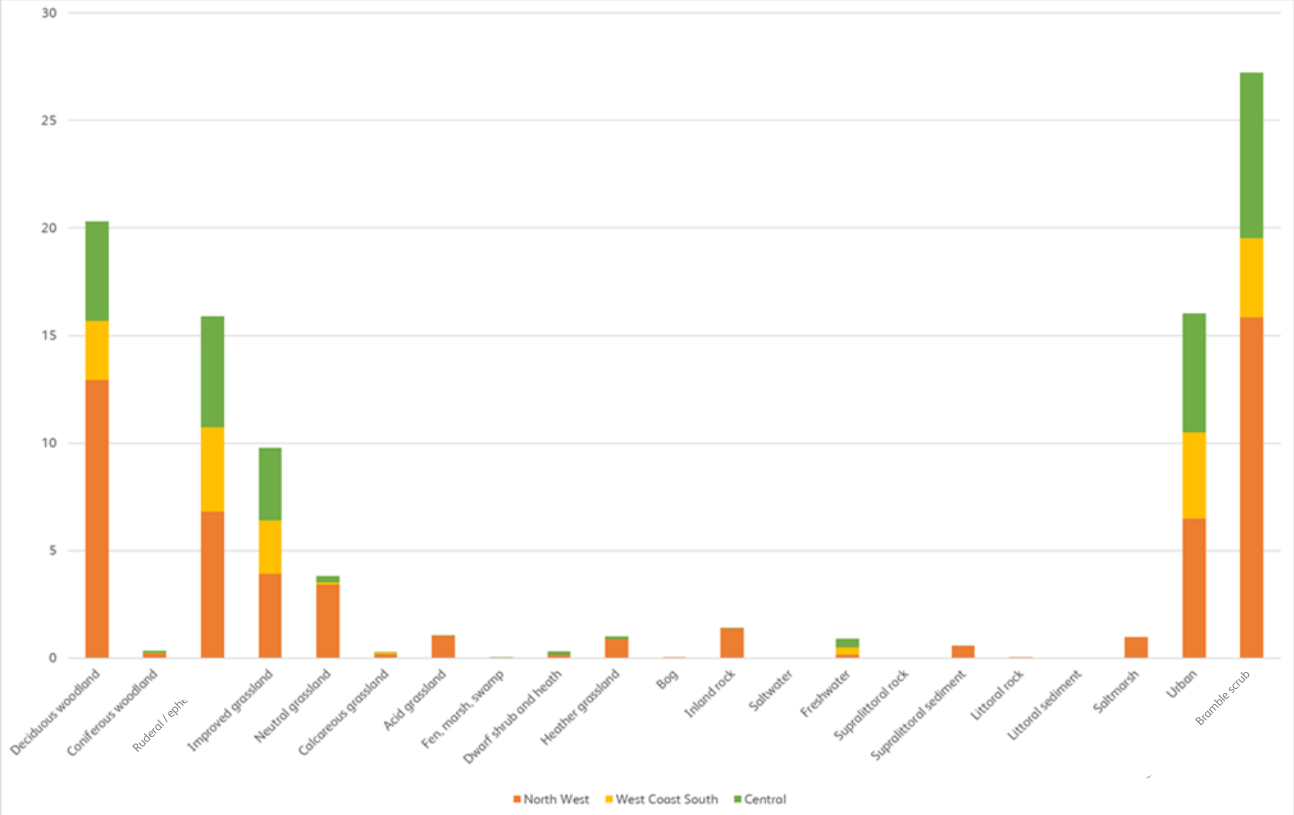

Figure 2: Graph showing the percentage break down of habitats within the NW&C Region estate.

4.3 Priority species/habitats on the region

There are a number of Sites of Special Scientific Interest (SSSI) within the region which provides some key priority habitats. Work will be undertaken in the future to identify the priority habitats and the condition of the SSSI's to improve where the condition is unsatisfactory. We have also identified during this years work two locations housing priority species; Sand Lizards and nationally restricted butterfly species at Harbury (see section 4.5).

4.4 Invasive species on the region

The region has numerous locations where the lineside is affected by undesirable species, such as Japanese knotweed and Himalayan Balsam. Future work is being looked into on improving management and treatment techniques to try and reduce the amount of invasive species rather than just maintaining the spread.

4.5 Demonstration sites or projects

A key pilot site that has been delivered by the region in addition to the case studies mentioned in section 7.1 below is a scheme called Harbury Railway Cutting. At this

location stabilisation work was required to remove the risk to the railway. The location before works started consisted of a steep embankment which contained large trees and scrub posing a risk to the operational railway. This pilot site is testing the successional planting approach that not only reduces the risk to the railway but increases the biodiversity of the site. This location falls under a Site of Special Scientific Interest (SSSI) so the habitat creation is also inline with bringing back the preferred condition of the SSSI and improving the habitat for the two nationally restricted butterfly species that are present in the area, wood white *Leptidia sinapis* and white-letter hairstreak *Strymonidia w-album*. The site is being monitored to ascertain the level of maintenance that it requires but also to track the ecology of the site and the increase in species this provides.

Figure 3 below shows the habitat that has been left here is a species rich grassland with hedgerows and trees towards the top of the embankment providing a successional approach of low-lying habitat close to the track stopping the issue of dense woodland developing overtime.

Figure 3. Photograph of Harbury Cutting following the works

5 Priorities for biodiversity management on this region

The priorities for managing biodiversity by the end of CP6 is to focus on delivering no net loss in biodiversity. Work will include:

- Assessing Sites of Scientific Interest and where needed working to restore them back to the acceptable condition as described by Natural England.
- Managing future workbanks to deliver biodiversity improvements and producing Habitat Management Plans to maintain the improvements once achieved and guide the Vegetation Management Plans.
- Where priority species are identified within our estate undertake work to improve the habitat for the species where it is currently falling short.
- Working with key local stakeholders to help identify opportunities and work together on delivery.

6 Report on Performance Indicators within reporting period

6.1 Summary

NW&C will set Performance Indicators (PI) in the coming year with a view to set a PI against tracking no net loss of projects. Currently we have collated data from the start of CP6 on biodiversity accounting however these were based on projects that were delivered before the target of delivering no net loss by 2024 was implemented. Therefore we need to track the current and future projects to show the improvements being undertaken to work towards the no net loss target.

A list of proposed PIs are shown below:

- Percentage of region covered by Habitat Management Plans
- No net loss in biodiversity on our region by 2024 as defined by the use of a habitat metric

To track the percentage of region covered by HMPs will require a piece of work to be able to identify the area of land covered by the future workbank. This can be undertaken during the next year when the regional strategic HMP approach will be implemented.

Currently 5 locations within the region are covered by Vegetation Management Specifications (VMS) which has been put together by Works Delivery which goes someway to achieving Habitat Management Plans. The next steps for the future year are to improve the VMS to cover all requirements of the HMPs.

7 Case studies

7.1 Examples of best practice habitat management approaches

There are a number of case studies that have been undertaken showcasing the following types of best practice management:

- actions to conserve desirable species (no net loss) and control undesirable species
- habitat creation and restoration for biodiversity net gain
- field trials of new management approaches, in partnership with research organisations.

Great Dry Close

in Daventry, the Great Dry Close embankment stabilisation was undertaken and work was designed to deliver improved habitat and biodiversity net gain. A low maintenance grassland and flower seed mixture was delivered achieving 4.2 biodiversity net gain units and replaced semi-improved grassland and scrubs.

Hilmorton

Emergency works undertaken due to embankment slip ceased the opportunity to seed the embankment with grassland species which was accepted as providing an improved visual look to the local community than the pre-existing scrub.

Dutton Viaduct

Slope reinstatement of earthwork embankment following collapse. The scheme imported a base layer of biotic soil allowing for the development of any depleted soil while minimising impact to the nearby ancient woodland. Wildflower seeding was delivered to improve the biodiversity and remove future risk to the railway by trees.

Vegetation Management Specifications

Works Delivery Off-track team have developed Vegetation Management Specifications (VMS) as a key documentation when undertaking vegetation management works along our estate. The VMS aims to preserve and maintain our natural assets in order to promote biodiversity. The VMS details the works instruction that must be followed to retain as much habitat as possible and preferential species and the methodology to do so. It also highlights what ecological features are present that need to be protected and works undertaken in a way to mitigate impacts or disturbance to such features. This approach is a first of its kind in Network Rail and helps achieve compliance against the Biodiversity Standard NR\L2\ENV\122. Within the region there are currently 5 VMSs in place each one covering large sections along the railway.

7.2 Examples of partnership working

During the year we have undertaken partnership working to increase the biodiversity on our estate. At Port Sunlight as part of the Merseyrail electricity supply upgrade project we worked in partnership with the local community and the Tree Council to plant trees along the railway embankment. This project has reconnected wildlife habitats, improved air quality and provided visual screening between the rail line and homes. The project demonstrates what can be achieved when we work together to improve the biodiversity and the visual amenity to the local community.

Photo: Planting undertaken at Port Sunlight

8 Future plans

8.1 Habitat management plans

Priorities for the next year within NW&C revolve around implementing Habitat Management Plans (HMP) to drive improved biodiversity. NW&C's staged approach to implementing HMPs will enable successful habitat management of the lineside which will contribute to safe and efficient rail operation and the increase of biodiversity value of the lineside. NW&C has devised a clear HMP approach to producing HMPs for the remaining work bank of CP6 following a risk based approach. This is detailed in the published NW&C Habitat Management Plan strategic document. As part of this work the VMS's mentioned in section 7.1 will be improved to cover all elements of the HMP requirements.

In addition to the above there are a number of future workstreams being developed to pilot different management techniques or improve specific sites as detailed below.

Tring

Tring is a location with very steep embankments which are very difficult to undertake maintenance on and over-time scrub encroachment can cause OLE issues. This pilot is considering alternative methods for managing steep cuttings for biodiversity net gain that reduces long term OLE issues and reduces costs over the longer term e.g. reducing the need for large scale veg clearance every 15 years.

Dutton Triangle

A triangle parcel of land situated within the junction between the WJL1 and CGJ1 lines. It consists of broadleaved woodland with a ground flora dominated by Himalayan balsam. There are occasional patches of native scrub, bluebells, and orchid species, which are being constrained and outcompeted by the dominant and invasive Himalayan balsam. The proposal is to undertake removal of the Himalayan balsam via mechanical and/or spraying means for 2 years. The site will be monitored for its effectiveness and monitor the progress of the recolonisation of the native ground flora. This will provide insight into effect balsam control we can utilise elsewhere on the estate.

Sefton Coast Sand Lizard Habitat Improvement

Sand Lizards are found exclusively in open sandy habitats such as coastal sand dunes or lowland sandy heaths just like areas immediately surrounding and parallel to track between HXS3 14m 200yards (Coastal Road Bridge) and HXS3 16m 500yards (Hillside

Station). An opportunity has been identified where we can undertake vegetation clearance and habitat improvement to enhance our estate here to further benefit Sand Lizards and increase the growth of the population of this priority species. Monitoring will occur to ascertain the success of the work.

East West Rail 2

As part of the East West Rail phase 2 project the project has committed to achieve 110% biodiversity net gain. This has led to a number of ecological compensation sites being designed and developed and also habitat improvements and creation to be delivered along the reinstated line. As part of this work we are looking at developing a strategic handback process on how the management and monitoring of such sites will be handed back to NR to deliver the specific and key requirements. Learning will also be taken from how the sites are developing over time and the success rate of the habitats.

Newt District Level Licence

As a Region we want to trial the use of Great Crested Newt District Level Licensing (DLL) across the region to enable works to proceed without the need for individual licence applications. This will provide benefits to NR and removing delays to any workbank but also provide an improvement to Great Crested Newt habitat on a landscape level. The proposal is to trial this approach on all track related work obtaining a DLL to cover the track workbank. This will then provide a guide to how we can roll this out across the whole region for wider work.

8.2 Stakeholder engagement plans for the next reporting period.

Consultation will occur with key stakeholders such as the Wildlife Trust, Tree Council and local communities to identify any opportunities of working in partnership to deliver improved biodiversity across the estate or linking up key habitats to create improved green corridors.

We have been active with the Tree Council, both in a proactive approach at Port Sunlight and in a reactive manner at Leighton Buzzard where we did not adequately consult with the local community ahead of vegetation works.

We have engaged multiple Nature Conservation Stakeholders within the region. In the North West we have engaged the Mersey Rivers Trust (MRT) on the new Headbolt Lane

Station due to the Stations' situation within a riparian environment. The MRT have been engaged to identify nearby sites which may be suitable for habitat creation or enhancement to enable the delivery of biodiversity net gain, but also operational benefits to the railway such as flood alleviation. We also engaged the Eden Rivers Trust to look how we may collaborate to deliver riparian habitat enhancements while simultaneously delivering operational benefits. We are currently sharing information and data to identify sites within the Eden Catchment where we can deliver a pilot project.

Scotland's Railway State of Nature Report 2020/21

Contents

1 Personnel & Document Control

All ecologists should state their membership level of a recognised professional body (e.g. CIEEM, IEMA) alongside their name.

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2 Foreword

Within the past year Network Rail published its Biodiversity Action Plan (BAP) which sets out its vision of '*a lineside managed sustainably for safety, performance, the environment, our customers, and our neighbours*'. This document outlines how we will turn this vision into practice, what our ambitions are for our biodiversity assets, and how we intend to protect, manage, and enhance their condition over the over the current five-year Network Rail Control Period and beyond.

This will require us to develop new skills and competencies in ecology and vegetation management and apply these to decision-making at all levels of our organisation. It will also involve forming and maintaining partnerships with our stakeholders and neighbours to maximise the benefits a well-managed transport infrastructure can bring for biodiversity. By achieving this we will ensure a positive environmental legacy for the future.

As part of the BAP, each region will produce an annual State of Nature Report. This is the first annual report for Scotland's Railway covering the period April 2020 to March 2021.

It outlines the state of nature on the region's estate and the future ambitions and plans to protect and maintain its habitats and associated biodiversity. It also highlights some of our achievements over the previous year in regard to protecting species and improving these habitats, and where necessary, control undesirable species.

3 Executive Summary

3.1 Overview

Scotland's Railway covers a large geographical area from the Borders to Thurso at the far tip of the North East of Scotland, accounting for almost 20 per cent of the UK rail network. We provide rapid access along busy commuter routes to our seven cities, servicing the varied needs of our business and leisure commuter services, including cross

border services and rural services. We have up to 50 freight services operating every day and we are steadily building capacity for this to grow.

Figure 1: *Scotland region*

Over 2,500 daily services support the needs of communities and business across Scotland and the border to England. We operate the largest suburban rail network outside London which meets the daily needs of customers into Glasgow, Scotland's largest city.

Scotland’s Railway covers over 7,340 hectares of lineside estate which incorporates a range of broad and priority habitats including deciduous woodland, arable and improved grasslands, as well as urban areas. Our railway network operates through a number of nationally and internationally designated sites which includes 91 Sites of Special Scientific Interest (SSSI), 32 Special Areas of Conservation (SAC), 25 Special Protected Areas (SPA), 21 Ramsar sites (see Appendix 8.1).

These habitat types and designated sites support a range of species from mammals and invertebrates to plant and fungi, including a number of notable and protected species such as beaver, bats, otter, numerous species of bird, and also a variety of wildflower species.

Like other regions across the network, Scotland’s Railway has the potential to act as a vital wildlife corridor by offering connectivity between habitats. We are therefore taking action to protect and enhance biodiversity within our lineside estate that could help reverse an alarming trend of biodiversity loss in the region.

3.2 Summary of ambitions for biodiversity management

To manage and improve habitats and biodiversity within this control period, the Scotland region is committed to:

- Achieving no net loss in biodiversity on our lineside estate by 2024.
- Working towards compliance with the Network Rail Biodiversity standard NR/L2/ENV/122 across all business units.
- Ensuring the Network Rail standard NR/L2/ENV/015 is embedded within all project design and construction activities across the region.
- Complete Biodiversity Net Gain calculations for all Capital Delivery projects.

3.3 Summary of achievements for biodiversity management

Through project and maintenance activities, and our partnerships with stakeholders across the region, there have been a number of achievements in 2020/21 with regards to the management of our lineside estate and improving biodiversity.

Some of our achievements over the past year have included:

- Delivery of the Winchburgh project in which high leaf fall species of tree were removed within a SSSI. The project led to the enhancement of the remaining woodland through the installation of bat and bird boxes and replanting of the cleared area with low height and/or slow growing, low leaf fall species.
- The safeguarding of nesting hen harriers during vegetation clearance activities through early engagement with in-house ecologists and key stakeholder groups.
- Construction of the region's first beaver tunnel underneath the railway to allow the safe passage of beavers along railway corridors and prevent operational disruption caused by beavers constructing dams within our culverts.
- Partnership with the Gone West organisation to plant community forests at two sites within the region.

3.4 What further action will we take?

Over the next year we aim to embed the use of vegetation and habitat management plans to effectively manage our existing lineside habitats to improve biodiversity and achieve compliance with the Network Rail Biodiversity standard NR/L2/ENV/122 across all business units by January 2022.

We will pursue our target of achieving no net loss by 2024 and net gain by 2035, which will include all Capital Delivery projects within the region undertaking Biodiversity Net Gain calculations.

To maximise our footprint both inside and outside of our lineside boundary to mitigate any unavoidable loss of biodiversity across the region and achieve no net loss through habitat creation and restoration, we will continue to partner with organisations, such as Gone West. Establishment of the Biodiversity Offsetting group within Scotland's Railway will also help to drive these ambitions forward.

4 State of nature on the Scotland region

4.1 Biodiversity metric calculation for the region

From late 2019 into early 2020, the UK Centre for Ecology and Hydrology (UKCEH), commissioned by Network Rail, undertook a remote sensing survey of the entire rail network. This survey produced a land cover map displaying the 21 different habitat types found within 1km either side of the rail network. Network Rail used the outputs from this survey to calculate a baseline for each region using the Biodiversity Metric tool, which utilises data on habitat type to calculate the biodiversity value of a particular area.

The results from the Biodiversity Metric tool for the region are provided in Table 1. The outputs from the survey and the subsequent calculation using the Biodiversity Metric tool have provided a baseline for the region. Datasets from future surveys will be compared against this baseline to determine and assess any changes in land use within the lineside estate and determine if there is a change in biodiversity value within the region and if there is progress towards achieving biodiversity net gain.

Table 1: *Scotland's Railway Biodiversity Metric baseline*

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	2196.75	Medium	17574.00
Upland Heathland	309.44	High	3713.28
Modified grassland	874.02	Low	3496.08
Blanket bog	217.47	V.High	3479.52
Vegetated garden	1555.48	Low	3110.96
Ruderal/Ephemeral	1050.25	Low	2100.50
Upland Heathland	115.55	High	1386.60
Other inland rock and scree	118.49	Medium	938.48
Upland acid grassland	98.91	Medium	791.28
Saltmarshes and saline reedbeds	49.89	High	598.68
Other coniferous woodland	71.33	Low	285.32
Other Scot's Pine woodland	35.66	Medium	285.28
Upland oakwood	22.88	High	274.56
Upland birchwoods	22.88	High	274.56
Upland mixed ashwoods	22.88	High	274.56
Wet woodland	22.88	High	274.56
Bracken	98.92	Low	197.84
Littoral mixed sediments	13.97	High	167.64

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Fens (upland and lowland)	6.74	V.High	107.84
Ponds (Non- Priority Habitat)	11.3	Medium	90.40
Features of littoral rock	4.98	High	59.76
Features of littoral rock	3.18	High	38.16
Coastal lagoons	1.55	High	18.60
Other neutral grassland	2.29	Medium	18.32
Inland rock and scree	1.18	High	14.16
Features of littoral sediment	0.52	High	6.24
Built linear features	651.6	V.Low	0.00
TOTAL	**7580.99**	**TOTAL**	**39577.18**

4.2 Region habitat types

Findings from a 2020 assessment of the areas of broad and priority habitats across the Network Rail (NR) regions are presented in Figure 2. The largest lineside habitat type within the region is deciduous woodland, which accounts for 30 per cent of the land cover. Compared with the other NR regions, Scotland records the highest proportion of deciduous woodland land cover.

Built up environments and gardens are the next most predominant land cover type within the region. Outside London, Scotland's Railway operates the largest suburban rail network and provides access along busy commuter routes to our seven cities. The large proportion of land cover attributed to built up environments and gardens reflects this.

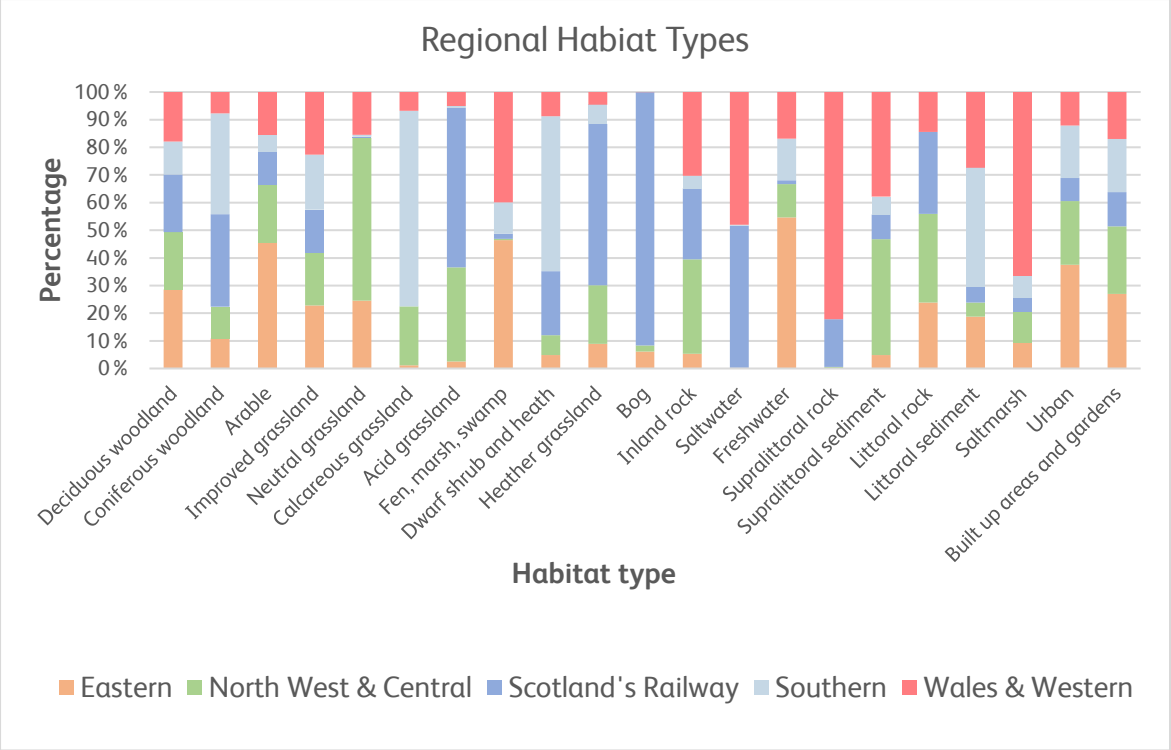


Figure 2: *Variation in habitat types between the Network Rail regions*

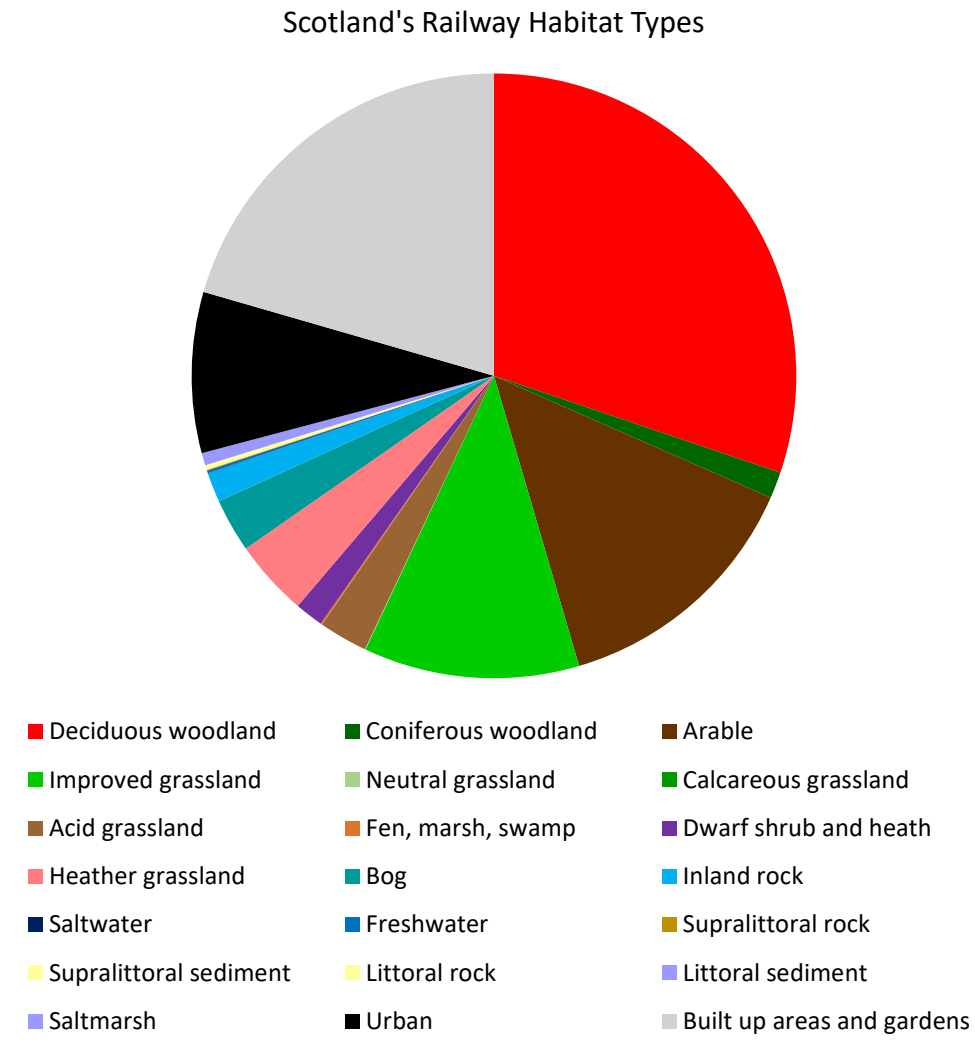


Figure 3: *Proportion of habitat types within Scotland's Railway*

Other prominent lineside habitat types recorded in the region include arable and improved grassland, heathland and bog. Both arable and improved grasslands can be found across the entire region however, these are less frequent along the route of the West Highland Line. Heathland and bog are characteristic of the Scottish uplands, and compared with other regions, Scotland records over 90 per cent of all bog lineside habitats. Both these habitat types support a range of important bird and invertebrate species.

Figure 4: *Scotland's railway*

The Scotland route also operates within a range of nationally and internationally significant sites important for biodiversity. This includes two National Parks (Loch Lomond and the Trossachs National Park and the Cairngorms National Park), 91 SSSI, 32 SAC, 25 SPA, and 21 Ramsar sites (see Appendix 8.1).

4.3 Priority species/habitats on the region

Regional priorities will shift in relation to where works are occurring at any given time, but some overarching priorities exist for CP6 and are not limited to the following:

- Beavers
    - The rapidly expanding Tayside beaver population overlaps with the network in both the east and west of the country. Their nature-based engineering practices exposing us to drainage, vegetation, and geotechnical risks.
    - We shall continue the approach of co-habiting with them and finding green solutions to co-exist with them.
    - We will continue working closely with Nature Scot to ensure a proactive approach to the above.

Pollinators

- Seek opportunities to contribute to pollinator conservation as per the rock rose planting at Dunbar Station to benefit native butterly species (see section 5)

- Priority habitats
  - Promoting broadleaf woodland cover with stakeholders
  - Improving scrub abundance and diversity within the boundary

4.4 Invasive species on the region

There are many invasive plants and injurious weeds on our land across the Scotland region and we have a legal obligation to prevent them from spreading or causing a nuisance.

From 1 April 2019 full control of invasive non-native species (INNS) management has been given to each of the four Delivery Units (DU): Glasgow, Motherwell, Edinburgh and Perth. This gives each DU responsibility for ensuring all INNS are managed effectively within their area. The management of INNS within each DU is currently reviewed twice a Control Period, with the last review in 2019 and the second expected to be completed during 2021/22.

Information collected on the occurrence of INNS indicates Japanese knotweed, giant hogweed and Himalayan balsam are the most prolific across the region, with all three species recorded in every DU.

4.4.1 Japanese knotweed

Japanese knotweed spreads underground by direct growth of rhizomes (roots) and above ground through the transfer of plant fragments to new locations. Above ground stems can grow rapidly, up to 2m in 30 days, and the plant is able to grow through substrates including tarmac and concrete, meaning it can pose safety and operational issues for the railway. The presence of Japanese knotweed can also impact our lineside neighbours due to issues when selling property within a certain distance of knotweed on Network Rail land.

4.4.2 Himalayan balsam

Himalayan balsam is often found growing along rivers, disused railway lines or in similar linear corridors where it dominates habitats, grows densely and shades out native plants. Plants are able to produce more than 500 seeds before it dies in the Autumn. When the

seed pods are ripe, the slightest touch causes them to burst open catapulting and dispersing the seeds up to 7m away.

4.4.3 Giant hogweed

Giant hogweed thrives in any habit, but particularly where soil has been disturbed such as riverbanks, derelict land or railway embankments. Its spread endangers the survival of native plants, and it can cause significant harm to grazing animal. This plant also poses a health risk, causing severe irritation, swelling and painful water blisters when skin comes into contact with the sap in sunlight.

4.5 Demonstration sites or projects

Scotland Region Lineside RAM are undertaking a biodiversity trial on the West Highland Line between 0 and 2 miles as part of the vegetation management programme. This will involve a bespoke vegetation management specification that is ELR specific, focuses management into each 1/8th of a mile with a focus on explaining and justifying what is being removed and how it can be minimised and compensated for/offset. Compensation on this project will focus on establishment of species rich scrub within the boundary. The goal of this work package is to fully comply with the NR/L2/ENV122 Biodiversity and NR/L2/OTK5201 Management of Lineside Vegetation Standards and accompanying modules.

The success of the planting scheme during a recent platform enhancement project at Dunbar Station is helping to inform future projects which involve similar replanting requirements.

The Environment Manager worked closely with the Butterfly Conservation Trust and Senior Lineside Engineer to identify a planting regime to help the recovery of the Northern brown argus and the small blue butterfly species. The Northern brown argus, in particular, has a symbiotic relationship with rock rose, which was included in the planting plans (Figure 5).

This approach to replanting, which will enhance biodiversity in lineside habitats and promote pollinator species, is expected to be adopted in current station renewal and enhancement projects.

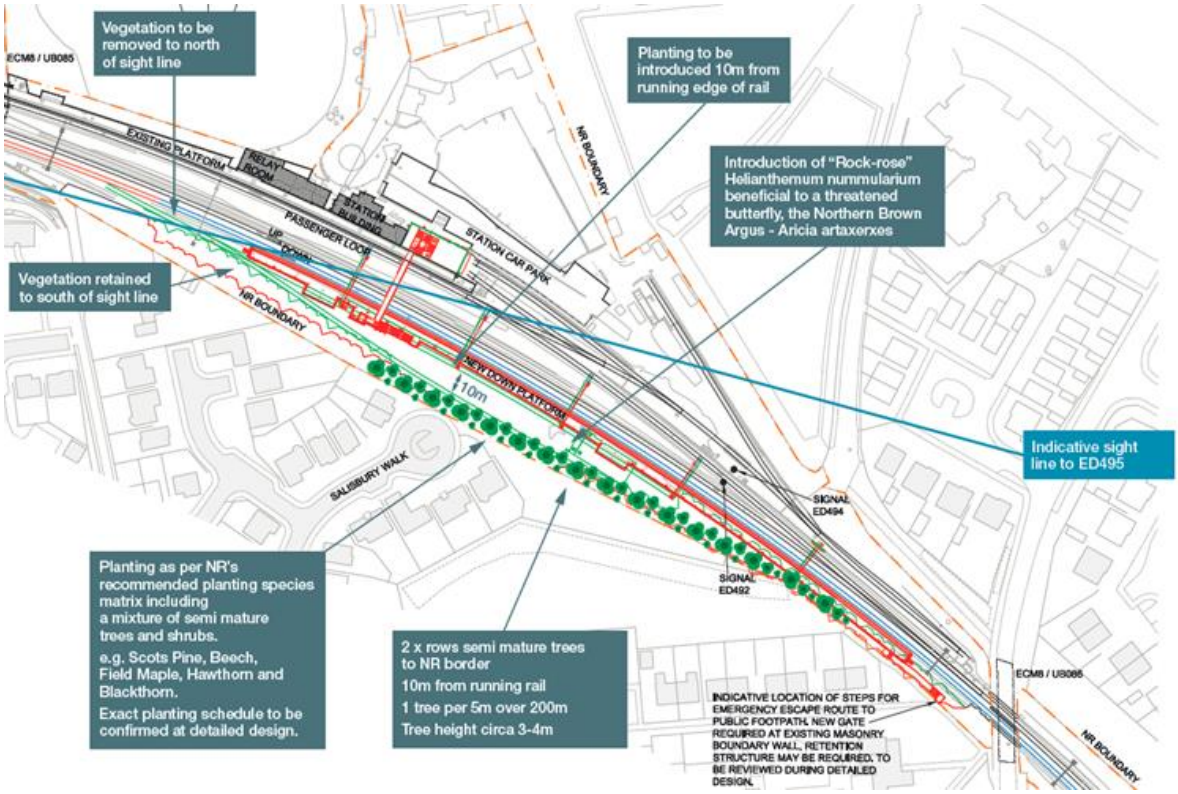


Figure 5: *Dunbar Station planting plan*

5 Priorities for biodiversity management on this region

In July 2021 the region launched Scotland's Sustainability Strategy which aligns with and supports the delivery of the national Network Rail Environmental Sustainability Strategy 2020-2050. Like the national Strategy, Biodiversity is one of the 10 priority areas of Scotland's Sustainability Strategy,

To support the delivery of the Strategy, the biodiversity working group has been established. This multi-disciplinary working group is responsible for devising and implementing a delivery plan which will outline the actions to be taken to achieve the targets set out within the Strategy.

During the remainder of the current Control Period, the delivery plan will focus on achieving the target of no net loss which will include the following:

- Promote national Biodiversity Standard NR/L2/ENV/122 and work towards compliance across all business units
- Increase the track miles with viable survey data by March 2023
- Establish a monitoring and recording system which makes data easy to share with stakeholders by March 2022
- Establish a process to undertake biodiversity calculations of all non-emergency work by March 2022
- Publish a biodiversity action plan for Scotland's Railway by March 2023
- Promote uptake of the biodiversity training material devised by the TA and assess additional training needs required to upskill relevant staff across the region
- Work with the Sustainable Land Use Programme (SLUP) to trial new, sustainable methods for managing the biodiversity of our lineside estate by March 2023
- Establish a long-term Scotland's Railway Sustainable lineside strategy by March 2024

6 Case studies

6.1 Examples of best practice habitat management approaches

6.1.1 Woodland retention and enhancement

Autumn poses operational challenges across the region due to leaf fall. As a result, along the Winchburgh cutting on the Edinburgh to Glasgow mainline, approximately 3 miles of third-party high leaf fall tree species trees were targeted for selective thinning.

While the removal of trees would result in immediate improvements to Autumn operational performance, measures were also taken to ensure these vegetation management works did not lead to a biodiversity net loss.

To compensate for tree removal, the recommended planting species matrix was used for futureproof restocking by selecting slower growing, low leaf fall species. The coupes were restocked with a hedgerow mix in the first 6m that included blackthorn, hawthorn, hazel, rowan and holly. Silver birch, wild cherry and oak were also included in the 6-20m zone to ensure no long-term loss to the woodland biodiversity and canopy cover.

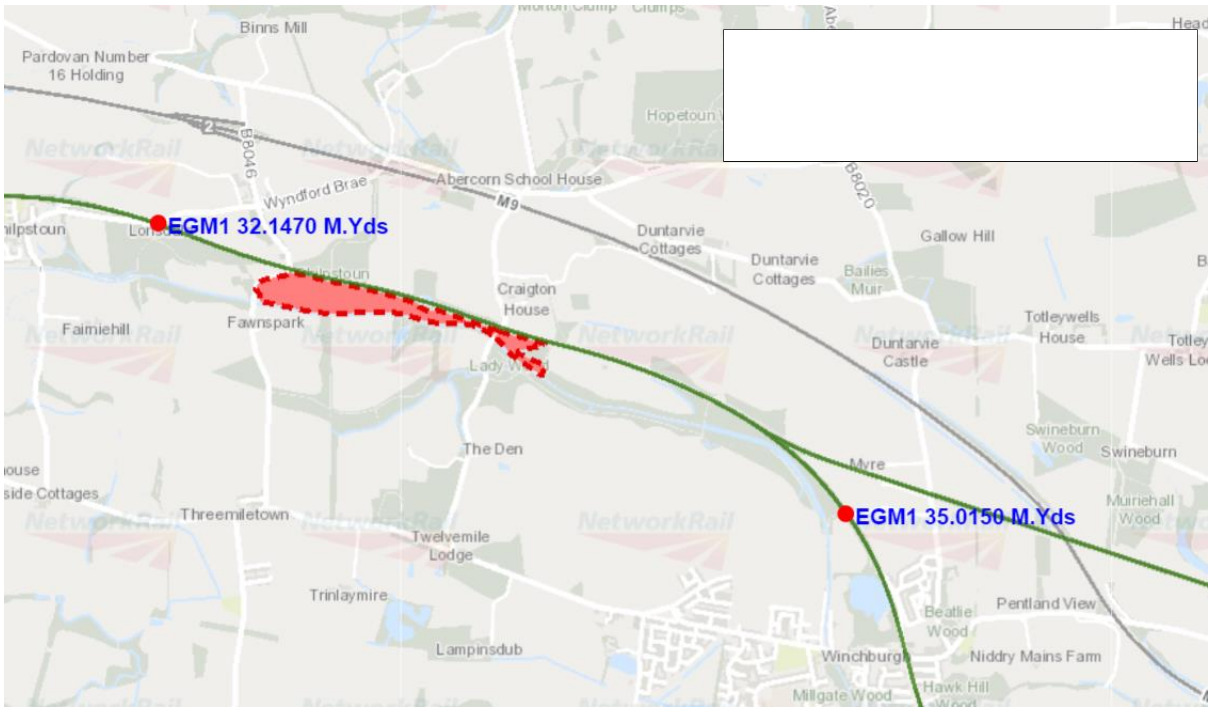


Figure 6: *Extents of the Winchburgh tree removal works*

The site footprint also included the Philipstoun Muir SSSI. Therefore, work was de-scoped in the SSSI to only prune/pollard/remove dead, dying and diseased trees with permissions from NatureScot. This ensured no adverse impacts on the SSSI features.

All trees identified with bat roost potential were retained and licences were in place to work around four badger setts in the site footprint to minimise disruption to protected species.

Woodland enhancement measures were also undertaken through the installation of 40 stonecrete bat boxes and 24 bird boxes at various locations along the mileage.

Figure 7: *Lineside after tree removal*

Figure 8: *Bat box installation*

6.2 Examples of partnership working

6.2.1 Safeguarding of bird nesting sites

Urgent tree and vegetation works required for the safe operation of the railway coincided with breeding season and were also located within the Strath Carnaig and Strath Fleet SSSI and SPA. Both of which are designated areas for supporting a population of breeding hen harrier, a European protected species which faces decline throughout the UK.

Network Rail's ecology team worked with the Highland Raptor Study Group to conduct surveys for hen harrier within the vicinity of the line, which identified breeding pairs.

Special working practices to minimise disruption for the birds. This included noise reduction measures and establishing a 'high-risk works area', including areas that offered suitable nesting and foraging habitat and where hen harrier activity was noted.

Figure 9: *Three successfully hatched hen harrier chicks*

No work was permitted in the area around the nests until all breeding attempts were concluded a further survey was undertaken prior to works to check any nesting hen harriers and confirm works were safe to proceed. A camera was also installed to monitor nesting locations throughout the work and ensure there were no signs of disturbance.

The measures put in place were successful in preventing disruption to the breeding harriers, and three hen harrier chicks successfully fledged from nests adjacent to the work site.

6.2.2 Tree Planting in partnership with Gone West

A number of Network Rail employees used their annual volunteer leave entitlement to work with the organisation, Gone West to plant 1500 native tree saplings. The tree planting took place over two days at sites across the region: West Heads Farm, North Ayrshire and Govan Docks, Glasgow.

Figure 10*: Volunteers from Network Rail and Gone West tree planting at West Heads Farm*

1020 birch, oak, holly, and wild cherry tree saplings were planted across the 40-acre site at West Heads Farm which comprises areas of existing broadleaved deciduous woodland. The site at Govan Docks, opposite the COP26 campus, forms part of the Govan Wetlands Project which will turn a 2-hectare site in the currently vacant Govan Docks into a thriving urban wetland, restoring value to under-utilized land.

The trees planted at both sites are covered by ‘Plant and Protect’ agreements, which ensures they will remain in place for at least 90 years.

Tree planting schemes and the creation of new habitats in partnership with organisation such as Gone West provides an opportunity to utilise land across the region that is outside of our lineside boundary to offset any biodiversity losses on our lineside.

7 Future plans

Over the next year our focus will remain on embedding the use of vegetation and habitat management plans to effectively manage our existing lineside habitats to improve biodiversity and achieve compliance with the Network Rail Biodiversity standard NR/L2/ENV/122. We will undertake training of and deliver briefings to Network Rail staff across the region to increase awareness on effective lineside management and the importance of the protection and enhancement of biodiversity.

To progress towards achieving our target of no net loss by 2024 and net gain by 2035, all Capital Delivery projects within the region will complete Biodiversity Net Gain calculations and each project will determine a percentage of net gain to be achieved.

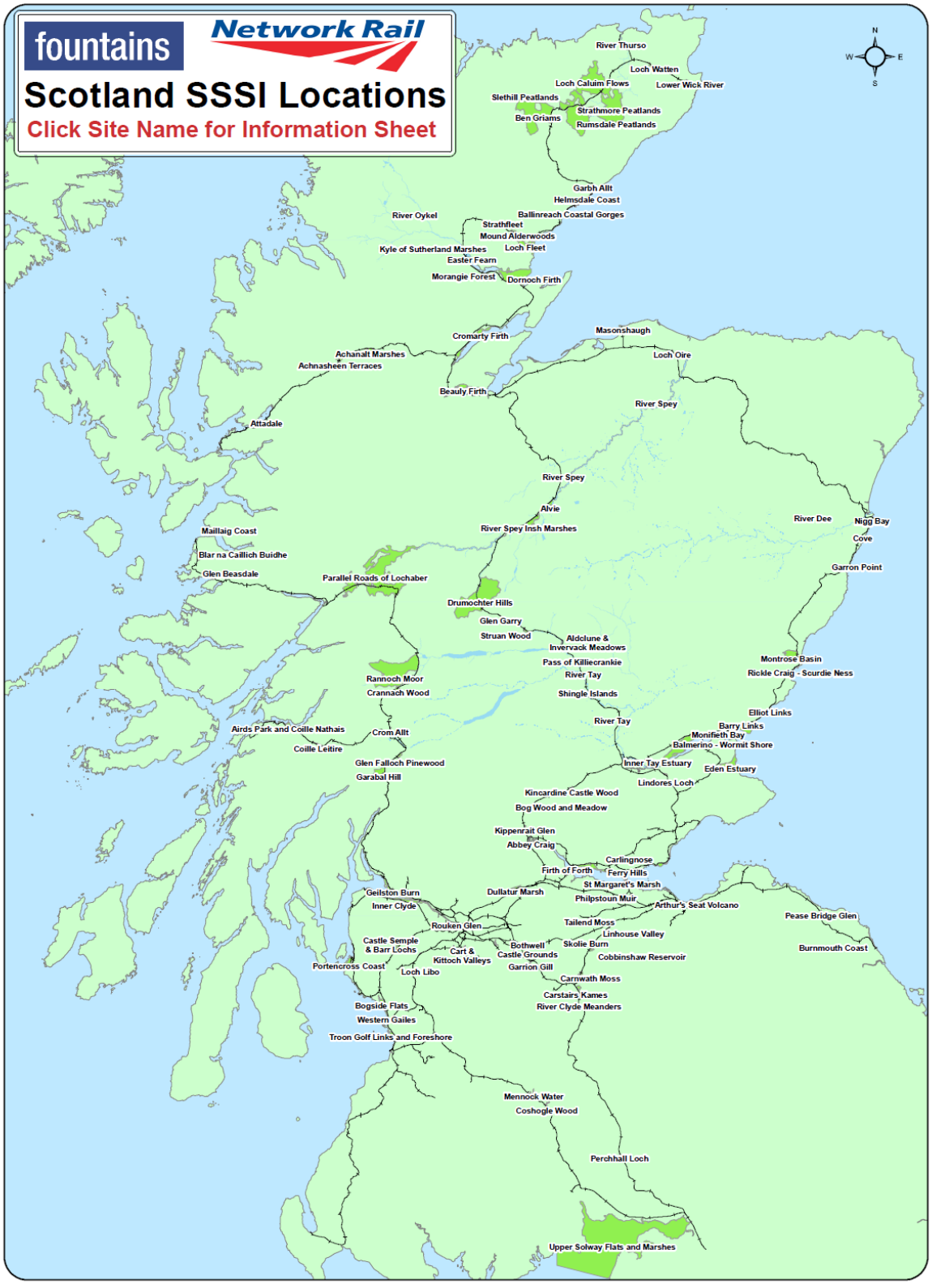
Where it is not safe or practical to mitigate biodiversity loss through, we will create appropriate habitats elsewhere on, or beyond, our estate to offset any impacts. We will do this by working collaboratively with stakeholders to identify land eligible for planting schemes either within our lineside boundary, or outside of our boundary through the utilisation of third party land.

We have already identified a number of key stakeholders and agencies, such as Gone West, Forth Rivers Trust, the Tree Council and Clyde Forest, who we currently working with and will continue to do so to help us offset any biodiversity loss and achieve our no net loss target by 2024.

Within the Scotland region, we have recently established a Biodiversity Offsetting Group, made up of representatives from delivery and strategic teams. The establishment of the Biodiversity Offsetting group will support the planning of offsetting activities, ensuring consistency across the region, enhancing synergies among route level plans and share best practice.

8 Appendix

8.1 Map of SSSI, SAC, SPA and Ramsar sites across the Scotland Region



Southern Region State of Nature Report 2020/21

Contents

1 Personnel & Document Control

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1.0	17/01/2022	V1	MOC	SB	SB

2 Foreword

This report, for Southern region, covers the period April 2020 to March 2021.

It outlines the state of nature on the region's estate and the ambitions and plans we have in place to protect and maintain its habitats and associated biodiversity. It also highlights key examples of the actions we have undertaken to improve these habitats, and where necessary control undesirable species.

Figure 1: *Southern Region*

3 Executive Summary

3.1 Overview

The south area of England served by the Southern Region network is a rich area for wildlife. This part of the country contains a landscape of contrasts and a diversity of habitats, and our Southern Sustainability Plan sets out how we will protect and enhance these habitats over the next three years and beyond.

The area of estate owned by Southern Region is approximately 7,685 hectares. Desktop assessments have identified 17 habitat asset classes as present on the Southern Region estate. More than 80 % of the habitat identified by this exercise is of four classes – Built up areas and gardens (31 %); Urban (20 %); Deciduous woodland (18 %) and Improved Grassland (14 %).

Each of our routes boasts particularly unique habitat types. The Wessex area supports a mosaic of ancient woods, wildflower meadows, heathlands, chalk downland, river valleys, coastal habitats, and the New Forest - the greatest area of 'semi-wilderness' left in lowland England.

The Sussex area is notable for chalk grasslands, pockets of vegetated shingle and heathlands, and the South Downs National Park with its iconic sheep-grazed downland supporting rare orchids and butterflies.

The Kent area is characterised by globally rare habitats such as the vegetated shingle of Dungeness, ancient chalk grasslands, and the marine chalk reef habitats of the Kent coastline. The High Speed 1 Route is situated in Kent but, as relatively new addition to the network, was specifically designed with ecological considerations in mind. The HS1 railscape provides extensive areas of low fertility soil that were sown with native mix wildflowers and non-competitive grasses, together with planting of extensive areas of new woodland, hedgerows and scrub composed of locally occurring native species, appropriate to soil type and underlying geology of the area.

The rich and diverse landscape of south England then supports an abundance of flora and fauna, a number of which are endangered or threatened. Flagship species for conservation in the Region include Adder, Bluebell, Dormouse, Great Crested Newt, Lizard Orchid, Marsh Mallow Moth, Nightingale, Sand Lizard, Shrill Carder Bee, Turtle Dove, and the White-letter Hairstreak butterfly.

3.2 Summary of ambitions for biodiversity management

In 2021 we published our Regional Sustainability Plan 2020-24 which outlines our ambitions for a lineside managed sustainably for safety, performance, the environment, our customers and our neighbours.

To support the achievement of these ambitions, Southern is committed to the following deliverables:

- Achieving no net loss in biodiversity on our lineside estate by 2024, and achieve biodiversity net gain of 10% in each Region by 2035
- Implementation of a Habitat Management Pilot in Kent to develop best practice management intervention guidelines in a railway context
- Recruitment of in-house ecologists to improve the management and assurance of our ecological risks and mitigation plans
- Creation of Habitat Management Plans covering the Region, with a focus on high value biodiversity sites including Sites of Special Scientific Interest (SSSIs) and Local Wildlife Sites (LWSs)
- Implementation of actions to enable the delivery of biodiversity net gain on major Capital Delivery projects
- Establishment of processes to measure the value, condition and benefits generated by wildlife and nature on our network, and improved reporting and communication of these benefits and value delivered/

3.3 Summary of achievements for biodiversity management

During 2021, the Southern ecology team has been created. The role of the team is to provide professional ecological guidance to our workforce and to implement and assure a programme of ecological surveys, including habitat, botanical and animal species surveys, complete works impact assessments, and manage proactive and corrective mitigation and compliance plans. The team comprises three Ecologists and an Arboriculturist.

Biodiversity partnership initiatives have also been launched with a variety of stakeholders, including a regional tree planting scheme with the Tree Council, and with Natural England in Wessex, Chichester District Council in Sussex, and the Royal Society for Protection of Birds and Zoological Society of London in Kent.

3.4 What further action will we take?

Our main focus for 2021/22 is to develop processes and systems through which the ecologists in our team will deliver a variety of services to the Region, including biological recording and mapping, net biodiversity gain calculation and assessment, and habitat management plan creation.

By April 2022, we will have completed the first phase of a partnership programme with the Tree Council whereby more than 10,000 trees have been planted in partnership with local communities.

We will also have identified and commenced work on establishing a series of 50 railway nature reserves around the region, high value sites for nature which will be ring-fenced and safeguarded for the benefit of the railway and the communities we serve.

4 State of nature on Southern region

4.1 Biodiversity metric calculation for the region

A baseline register of the habitat classes present on Southern Region network, and their spatial extent (area in hectares), has been created through the processing of satellite images taken in 2020 during a partnership project with the Centre for Ecology and Hydrology. Using these baseline habitat maps, calculations were applied based on the methodology of the Defra 3.0 biodiversity metric to generate an overall biodiversity unit score for the Region.

As of April 2021, Southern Region is estimated to own a total of **7,662** hectares of habitat with a value of **44,792** Baseline Biodiversity Units. The composition of the score is provided in the table below.

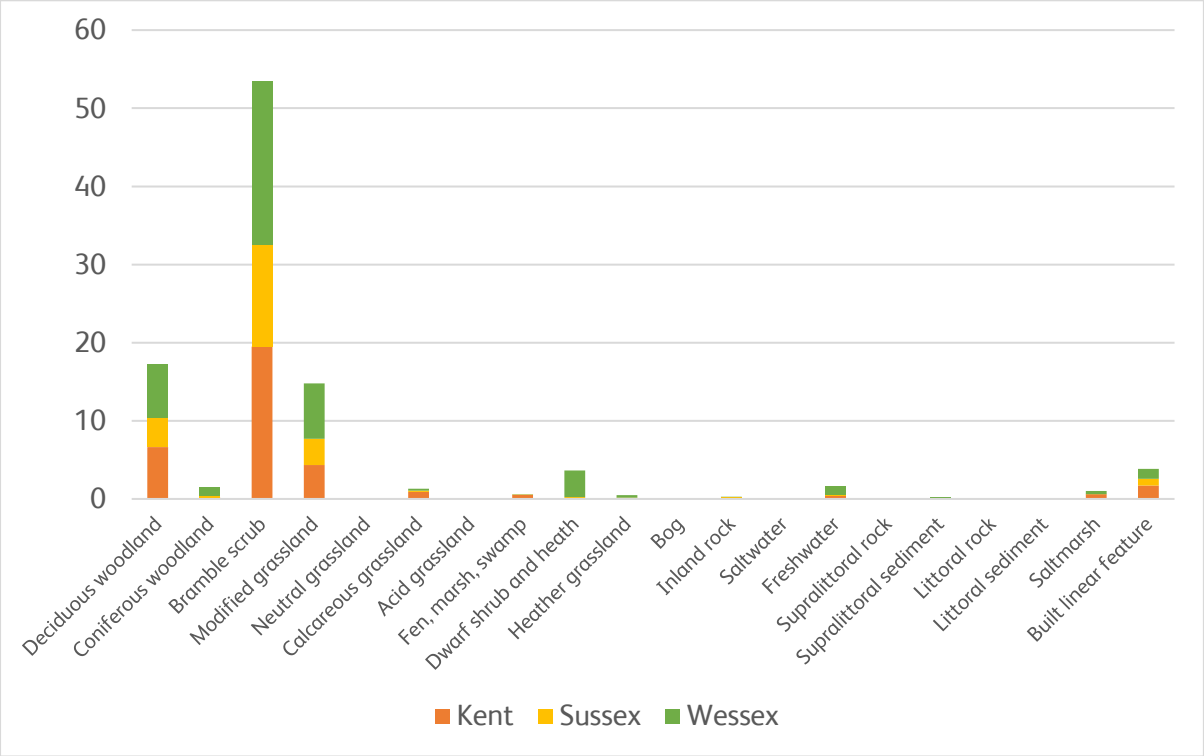
Southern Region Biodiversity (Habitat) Baseline Units determined by desktop analysis

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Lowland mixed deciduous woodland	1320.73	High	15848.76
Other coniferous woodland	116.86	Low	467.44
Modified grassland	1134.37	Low	4537.48
Other neutral grassland	5.25	Medium	42
Lowland calcareous grassland	99.56	High	1194.72
Other lowland acid grassland	2.33	Medium	18.64
Fens (upland and lowland)	41.86	V.High	669.76
Lowland Heathland	278.74	High	3344.88
Blanket bog	0	V.High	0
Other inland rock and scree	20.31	Medium	162.48
Coastal lagoons	0.01	High	0.12
Ponds (Non- Priority Habitat)	125.77	Medium	1006.16
Features of littoral rock	0	High	0
Features of littoral sediment	10.05	High	120.6
Features of littoral rock	0	High	0
Features of littoral sediment	3.98	High	47.76
Saltmarshes and saline reedbeds	77.73	High	932.76
Built linear features	398.05	V.Low	0
Bramble scrub	3989.79	Medium	15959.16
Lowland Heathland	36.61	High	439.32
TOTAL	**7662.00**	**TOTAL**	**44792.04**

4.2 Region habitat types

There are 18 habitat types present on the Southern region with the majority in 3 classes: Bramble scrub (52 %); Deciduous woodland (17 %) and Improved Grassland (15 %).

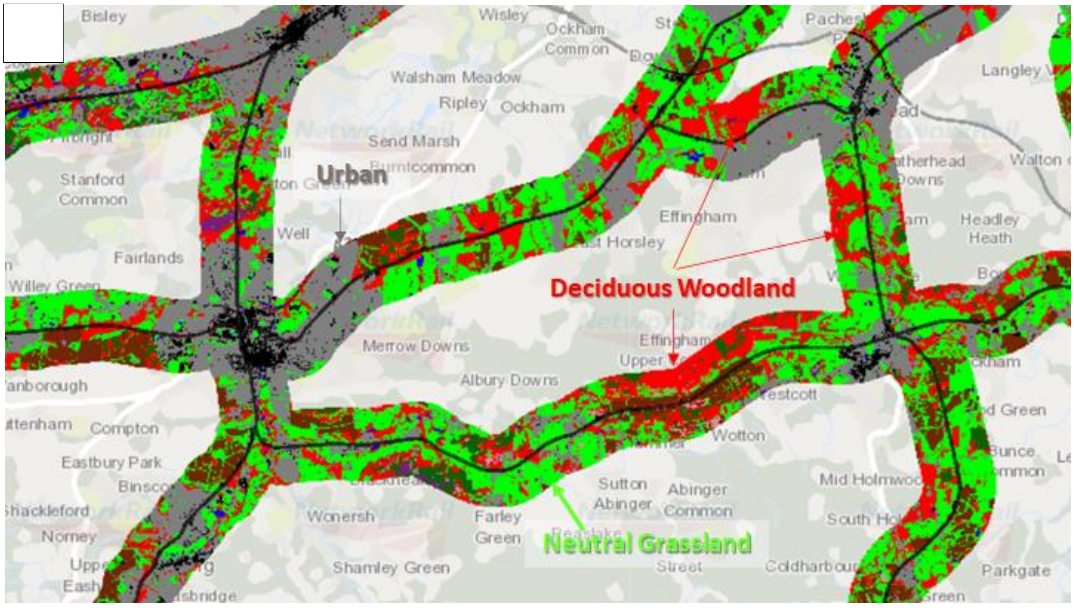
Habitat asset classes on Southern Region as identified by desktop assessment



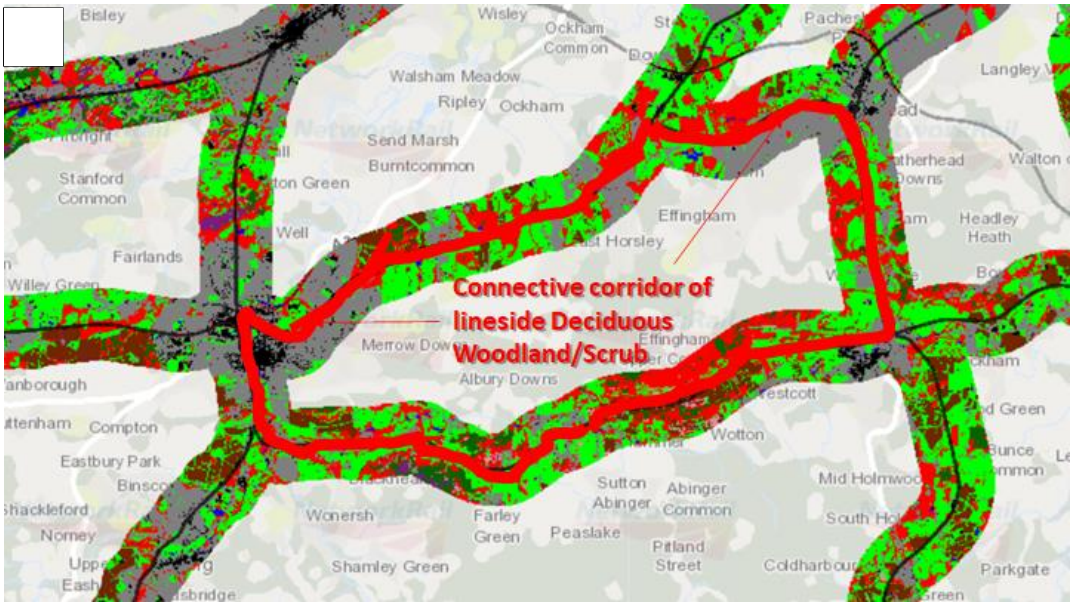
When mapped, the desktop assessments provided to the Region provide a useful high-level indication of habitat distribution that can assist in strategic planning for biodiversity management. For example, blocks of woodland that occur on or adjacent to our estate that might be linked to facilitate movement across the landscape of certain animal species, such as the Dormouse.

For the purposes of meeting net gain biodiversity commitments and the development of detailed Habitat Management Plans, ground truthing of desktop generated asset maps and a rolling programme of updating the baseline data is required. Our forward plan to develop a robust habitat asset register and refresh process for the Region includes:

- Creation of a remote-monitoring programme utilising state-of-the-art aerial imagery and implementation of a bespoke Artificial Intelligence analytical engine that automates the identification and classification of habitat parcels, at very fine spatial scales.
- Sample-based ‘ground truthing’, habitat asset mapping and condition inspection managed by the professional ecologists in our team.



Along this section of the network in Wessex, core blocks of woodland habitat (in red) exist and are loosely connected in the landscape by smaller fragmented patches. Certain species of animal, such as woodland Bats and the Dormouse, are more reliant on this habitat type and can be constrained as to where they can forage and make refuges due to limited connections between core woodland and by less hospitable habitat matrices acting as barrier to movement, such as urban habitat (in grey).



An excellent benefit of baseline habitat maps is the ability to identify and visualise biodiversity opportunities. By creating and maintaining woodland, hedgerow and allied scrub habitats along the rail network (solid red line), strategically or extensively, there is much potential to increase the number, movement and resilience of priority woodland species along the railway estate and within the wider landscape.

Southern Region baseline habitat maps - strategic opportunity identification

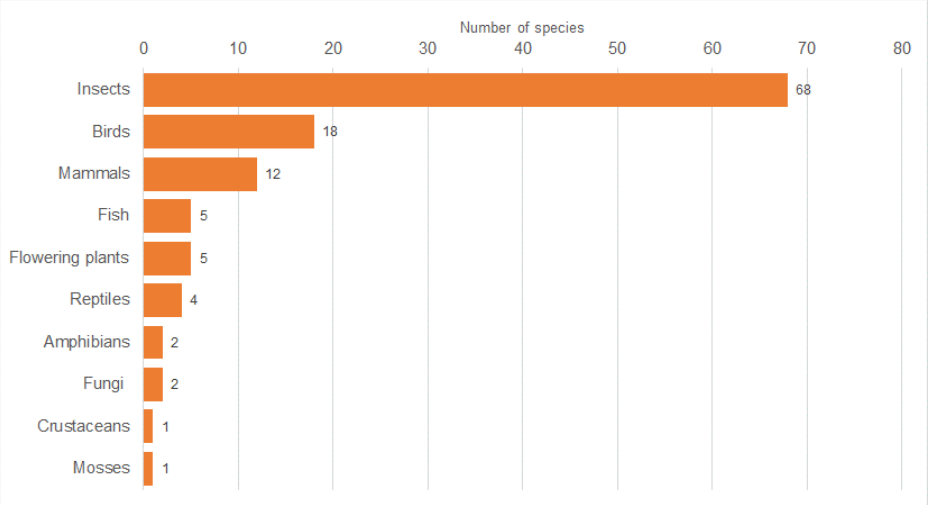
4.3 Priority species on the region

As an 'arm's length' public body of the Department for Transport, Network Rail is required, under the Natural Environment and Rural Communities (NERC) Act 2006, to have regard to the conservation of biodiversity in England, when carrying out its statutory functions of operating and maintaining the railway.

The NERC Act contains a list of 943 species which are of principal importance for the conservation of biodiversity in England, drawn up in consultation with Natural England.

Of the priority species listed in the NERC Act, 118 species (13 %) are currently known from biological records to utilise the estate of Southern Region.

Count of priority species, by group, recorded in Southern Region



We have commenced a number of partnership working conservation initiatives for a number of Priority Species on this list:

- Dormice
- Woodland Bats
- Water Voles
- Sand Lizard
- Barn Owls
- Nightingales
- Farmland Birds (Turtle Dove, Reed Warbler, Corn Bunting)
- Chalkhill Blue butterfly
- Long-tailed Blue butterfly
- Striped Lychnis moth
- Lizard Orchid

4.4 Invasive species on the region

Invasive non-native species of plants and animals are found throughout the region and represent a significant challenge to biodiversity management. We are legally required to not facilitate the spread of such species but the majority that are found on the railway

are widespread and it is unlikely that any can be completely eradicated from the Southern estate.

The principal plant species of concern are Japanese Knotweed, Giant Hogweed, Himalayan Balsam and Rhododendron.

We are developing a collaborative approach to tackle Giant Hogweed in our Kent Route with the Medway Valley Countryside Partnership. The Partnership is seeking to control the spread of the noxious invasive plant across some 200km of riparian habitat in a coordinated way. Our partnership involves sharing data on the occurrence of this invasive plant (and others) on our respective estates and providing each other with practical support so a coordinated approach is delivered - if one party treats the plants on its estate in a given area, but the other does not, then the entire area becomes re-colonised by the invasive plant very quickly and time and resource invested in control has been wasted.

In coming years, we will be seeking to extend this approach to deal with some riparian infestations of Japanese Knotweed, Floating Pennywort, and Azolla water fern.

The principal animal species of concern in the Region is the Oak Processionary Moth. We have undertaken control work across Kent, Sussex and Wessex during 2021 involving spraying of hundreds of infected oak trees. Our surveillance plan commences in January, which involves visual inspection of all oak trees in known areas of infestation, for signs of the previous seasons' caterpillar nests, and records of occurrence are fed into the next year control plan.

4.5 Demonstration sites or projects

Our flagship demonstration project is the Kent Habitat Management Pilot. In December 2020 we identified 70 x 200m sites alongside the operation railway to test a variety of vegetation and habitat management techniques. For each technique, we assessed the impact on cost, resource, maintenance plans and – most crucially – biodiversity with a view to understanding the best way to increase biodiversity on railway land in a way that is manageable and affordable for Network Rail.

By January 2022 we have delivered interventions at 37 sites, and we have taken the initial learning from these sites to develop the techniques and conditions needed for the remaining locations. A separate Kent Habitat Pilot report will be published on completion of the pilot in 2023, and Southern's lineside management strategy will be updated based on the learning from this flagship trial.

5 Priorities for biodiversity management on this region

Our strategic priority is to deliver against the objective of delivering no net loss in biodiversity by 2024 and achieving biodiversity net gain by 2035. Our delivery priorities are aligned to these outcomes and include:

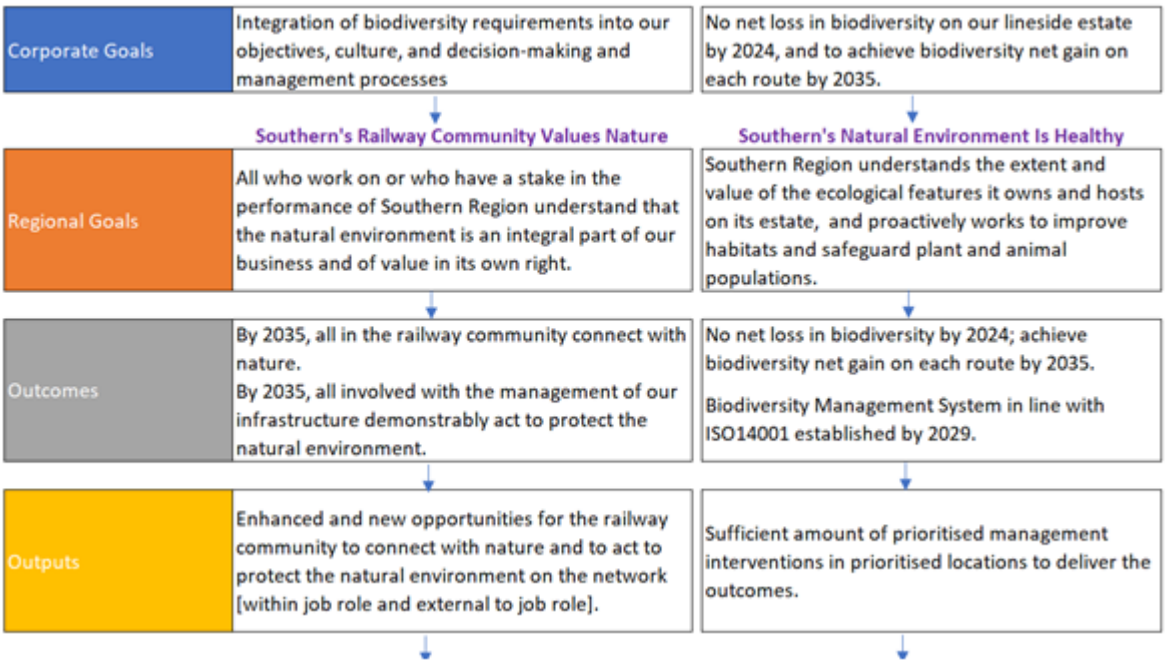
- Improving workforce capability and engagement in managing biodiversity as an asset.
- Providing our workforce with wildlife identification skills and knowledge required so that they can discharge duties to biodiversity competently, safely and efficiently.
- Sharing best and good practice, relevant analysis, and lessons learned in order for the workforce to benefit from the experience of others and apply best practice on a day-to-day basis.
- Developing Regional policy, procedures, and work instructions so that the consideration of biodiversity is appropriately captured and addressed within all the work that we do.
- Setting and monitoring a requirement for engineering projects and maintenance interventions to produce enhanced biodiversity assessments, proportionate to the size or scale of the project or intervention.
- Integration of biodiversity management in the business planning process through creation of Habitat Management Plans (HMPs). HMPs will set out objectives, priorities, and investment requirements over the short and longer terms. In order to see that the activities set out in HMPs are fully embedded within Route activities and receive the appropriate level of priority and funding, deliverables will be incorporated within Route Strategic Asset Management Plans and other Route Strategies. In this way, biodiversity management will become part of business as usual.
- Improved strategic planning for biodiversity management with external stakeholders. We will achieve this through providing and supporting platforms for discussion and information sharing between responsible and interested parties across the Region, and by engaging with external stakeholders and groups to support and enhance work in this area.

6 Report on Performance Indicators within reporting period

Southern Region has been evaluating a suite of Performance Indicators for biodiversity management. Our initial assessment is that the implementation and maintenance of indicators in this area presents significant technical and practical challenges.

Our draft suite of Performance Indicators and the logic diagram from which they were derived are presented below. Southern's ecology team is working through an assessment of the proposed suite of indicators, evaluating each for their relevance and usefulness, their validity and reliability, data availability, and ease and cost of implementation – with an objective to commence reporting during 2022.

Logic Diagram for development of Performance Indicators for biodiversity management - part 1



Logic Diagram for development of Performance Indicators for biodiversity management - part 2

Outputs	Enhanced and new opportunities for the railway community to connect with nature and to act to protect the natural environment on the network [within job role and external to job role].	Sufficient amount of prioritised management interventions in prioritised locations to deliver the outcomes.				
		Regional	*Ecology Management Services*	*Design/Sponsor process*	*Maintenance process*	*Construction process*
Performance measures	Stakeholder Opinion Survey Score	Biodiversity Metric Score [Route Lineside, Capital Delivery, Property] - Baseline / Planned / Actual Total Net Unit Change %	Volume of Biodiversity Metric Calculations		Route Lineside Biodiversity Metric Score Baseline / Planned / Actual	Project Biodiversity Metric Score Baseline / Planned / Actual
		Biodiversity Management Assessment Score	Volume of support/verification activitiy	Number of BMA coompleted	Number of BMA coompleted	Number of BMA coompleted
	Number of 'Engagement Events'	No. of Ecology Incidents	Customer Service Requests open/close		No. of Ecology Incidents	No. of Ecology Incidents
		No. of Ecology Close Calls			No. of Ecology Close Calls	No. of Ecology Close Calls
	Number of volunteers and number of hours volunteering on nature-related activities	% of estate in HMPs (five year plan to get to 100%)	Volume of Habitat Condition Assessments		Volume of Habitat Management Plans Updated	Volume of Project Habitat Management Plans Created/Updated
		Volume of Offset Created (Ha)	Volume of Habitat Management Plans Created/Updated		Volumes of Habitat Maintenance Planned/Actual	Volumes of Habitat Creation Planned/Actual
	Number of training courses	Volume of PEAs	Volume of PEAs		Volume of PEAs (Contractor)	Volume of PEAs (Contractor)
		Volume of Mitigation Actions Open/Closed	Volume of Mitigation Actions Open/Closed		Volume of Mitigation Actions Open/Closed	Volume of Mitigation Actions Open/Closed
			Volume of ECOW supervision		Volume of ECOW supervision (site forms)	Volume of ECOW supervision (site forms)
		Volume of License Applications Open/Closed	Volume of License Applications Open/Closed		License Applications	License Applications
					Assents Requested	Assents Requested
		Number of staff Capable or greater	Number of staff Capable		Number of staff Capable	Number of staff Capable
			Number of staff Accomplished		Number of staff Accomplished	Number of staff Accomplished
		Number of Survey Records	Number of record submissions		Number of record submissions	Number of record submissions
		Number of Species Records				
		Volume of Planned Ecological Inspections	Volume of Planned Ecological Inspections		Volume of Breeding Bird Surveys	Volume of Breeding Bird Surveys
			Volume of Audit Checks		% of Breeding Bird Surveys completed accurately	% of Breeding Bird Surveys completed accurately
		Volume of Invasive Species Interventions	Volume of verification activity		Volume of Invasive Species Interventions	Volume of Invasive Species Interventions
		Ecology Framework Contract Utilisation (COWD)	Ecology Framework Contract Utilisation (COWD)		Ecology Framework Contract Utilisation (COWD)	Ecology Framework Contract Utilisation (COWD)
				Number and type of projects that are engaged in considering their impacts on Regional natural capital (ENV/015?)		

7 Case studies

7.1 Best practice habitat management approaches

7.2 Capital Project Works

Bug hotel on the Safer Isolation Project

The Safer Isolation Project aimed to remove the need for operatives to go on track to strap before taking a possession. This is achieved through the installation of Negative Short-Circuiting Devices (NSCD) equipment at Substations throughout the Kent and Sussex routes. As part of the contract, our contractor (Siemens) reused the timber from the welfare site for bug hotels.

Blackheath Station Wildflower Planting

Following signalling works at Blackheath Station a Grade II Listed Station, the Project Team (Network Rail, Balfour Beatty and SEVA Rail) carried out wildflower planting to improve the biodiversity and the overall landscape at the station. Native bulbs and shrubs were planted, and wildflowers sown on the area adjoining Platform 1.

The team also created a hibernaculum nearby to provide refuge to the hibernating insects, reptiles, and small mammals.

The Lewisham Officer commented that: *"This planting scheme will contribute to enhancing positive passenger experience derived from green railsides providing contact with nature and changing seasonal interest to benefit health and wellbeing. I am very sure the Blackheath Society and local residents will welcome this NR initiative."*

Gatwick Airport Project

To facilitate the expansion of Platform 7, four Sycamore trees required felling and a public right of way and fence needed to be removed as part of construction works.

- The trees were felled and sawn into manageable logs that were donated to Gatwick Airports 'biodiversity area' to be used as habitats and refugia for local wildlife.
- The fence posts were donated back to West Sussex Council (Parks department) to be re-used at nearby Buchan Country Park.

In addition to supporting biodiversity. This solution eliminated 30.3 tonnes of wood waste, saved £1,750 in skips cost and 1.1 tonnes of CO2 as well as avoiding the need for a chipper on site.

Faygate Hibernacula Building

In April 2020, the Southern Rail System Alliance (Network Rail and Colas Rail) delivered a track renewal project through Faygate Station, in the Horsham District of West Sussex. The presence of Great Crested Newts were identified as part of project assessments and a Natural England European Protected Species Mitigation Licence was obtained and an opportunity to compensate for any disturbance and enhance the existing GCN habitat was identified by creating two hibernacula.

Two specifically designed Great Crested Newt hibernacula were created as a terrestrial habitat mitigation measure. The majority of material required to build the hibernacula were sourced from site, having repurposed old sleepers by cutting them into smaller sizes and filling the pits, then covered with locally sourced brash and soil, and topped with pre-sown wildflower turf.

7.3 Examples of partnership working

White Cliffs Countryside Partnership

White Cliffs Countryside Partnership (WCCP) is working in partnership with Southern Region to provide a regular site presence on the areas of the Folkestone Warren in Kent in its ownership, conducting practical habitat management on the site, guided by conservation evidence, to enhance the Warren's biodiversity. This new partnership has enabled WCCP to manage the Local Nature Reserve in a more holistic way for the benefit of people and wildlife[1].

WCCP also conducts biological recording and monitoring of the site's wildlife, following standardised methodologies to ensure data collected can be used to evidence any required changes in site management.

Community engagement is paramount in our work on the Warren, educating the local community on the importance of the site for wildlife. This includes conservation volunteering and occasional events. In addition, the partnership is managing the public access routes through the site and conducting regular health and safety audits of countryside infrastructure to ensure the safety of visitors.

The funding provided to WCCP from Network Rail ensures that the Folkestone Warren has a full-time Ranger present and supports a Partnership Officer role to oversee the Ranger and their day to day works at Folkestone Warren.

Conservation Management Work Achieved in the Last Year

- During winter 2020-21, scrub clearance was undertaken on approximately 7300 m^2 of railway-side habitat, to restore a mosaic of chalk grassland and scrub which will deliver significant benefits for many of the Warren's special wildlife, including its wildflowers, butterflies, moths and reptiles. Herbs,

[1] WCCP has been working with Folkestone and Hythe District Council to manage its part of the Folkestone Warren for over 30 years.

such as horseshoe vetch and marjoram, are already noted to be flourishing in these areas, and the dingy skipper butterfly has also colonised this new ground.

- Work was undertaken along 1.2 km of footpath on the northern side of the railway-line at the Warren to create a series of glades that connect isolated patches of chalk grassland. This will benefit insects and reptiles and is already delivering positive results: a silver-washed fritillary was seen close to a patch of violets in one of the newly cut glades during August, suggesting a breeding colony may be starting to establish at the Warren.

- In November 2021, conservation work to cut back encroaching scrub and further extend areas of chalk grassland habitat started on the seaward side of the railway line towards the railway footbridge. This work will progress throughout winter 2021-22.

- A conservation project to restore a viable colony of juniper, after a few bushes were recently discovered at the Warren, started in 2020 and has continued throughout 2021. Cuttings were taken from a female juniper bush on Shakespeare Cliff and are being grown ex-situ (by volunteers) until they are large enough to plant out near some of the lone male juniper bushes at Folkestone Warren. Only 103 juniper bushes are known to survive in Kent, 37 of which are on the coast between Folkestone and Dover (mostly on Network Rail land). The undercliff at Folkestone Warren is thought to be the most suitable site in Kent to restore a healthy population of this native conifer. Further cuttings will be taken from local juniper bushes in 2021-22.


Juniper bush at the Warren

- Work commenced in August to start to eradicate an established patch of Japanese knotweed (approximately 750 m^2 in extent) in the centre of the Warren. A third of the knotweed was treated by stem injection and subsequently died back. Further stem injection treatment will be undertaken in forthcoming years to eradicate this patch.

Wildlife Surveys and Significant Wildlife Records


Green hairstreak butterfly

- A butterfly transect was set up to monitor the abundance and diversity of butterflies found at Folkestone Warren. This was possible as a direct result of the additional staff funding provided by Network Rail. The survey was undertaken on eight occasions between April and September. A total of 419 butterflies were recorded belonging to 25 species. Notable species recorded included the Adonis blue, chalk hill blue, small blue, green hairstreak, dingy skipper and wall brown.

- The first ever recording for Folkestone of a silver-washed fritillary butterfly was spotted by the site Ranger on the northern side of railway line at Folkestone Warren in August.

- Folkestone Warren is one of the best sites in the UK for rare moths. WCCP recorded 320 species of moth on the site this year. Surveys confirmed the continued presence of many of the site's rarities including the ornate knot-horn, straw belle, chalk carpet, fiery clearwing and lace border.

- Funding from Network Rail also supported the first breeding bird survey to be conducted on Folkestone Warren since 1981. This survey will be used as a baseline to ensure that future site works to re-open up chalk grassland habitat, are not detrimental to bird populations currently present on the site. Thirty-three species of bird were recorded during the surveys including breeding colonies of peregrine falcon, lesser whitethroat and bullfinch.


Clove-scented broomrape

- 2021 was an excellent year for broomrapes at Folkestone Warren – unusual parasitic plants that do not produce any chlorophyll. The Schedule 8[2]

[2] Schedule 8 of the Wildlife and Countryside Act 1981 lists plant species that are protected under Section 13 of the WCA. Section 13 protects plants from picking and sale of plants or parts of plants listed in Schedule 8.

clove-scented broomrape appeared for the second time in three years, close to the Martello Tunnel Portal, and sea carrot broomrape was discovered close to the sea wall. New colonies of Nottingham catchfly and sea heath were also recorded.

Community Outputs

- Twenty-eight conservation volunteer tasks have taken place on the site (a total of 560 volunteer hours). Coronavirus prevented any tasks from occurring prior to April of this year.
- Volunteer tasks conducted have included cutting vegetation along footpaths, repairing infrastructure, clearing litter, undertaking wildlife surveys and restoring chalk grassland habitat.
- Corporate volunteering has proved popular this year, with teams from SAGA, Folkestone and Hythe District Council and Network Rail joining the WCCP ranger for task days to assist in conducting habitat management works at Folkestone Warren.
- New site Ranger Matt, hosted Canterbury College students in a conservation volunteering task on the site in November for their Community Week.
- A further 5k of funding was secured to run additional volunteer tasks at the Warren from KCC this year, to help engage individuals from Folkestone who may have felt less able to re-engage with their local community due to the pandemic.

Key Aspirations for Next Year

- Conduct a feasibility study to determine where future grazing areas could be added onto the site to support the Ranger-led chalk grassland restoration works.
- Start to connect up existing chalk grassland habitats with a network of rides and glades, thus increasing the resilience of the habitat.
- The sighting of a chalk-grassland indicator species in one of the new areas of grassland improved as a direct result of the Network Rail funding.
- Working with Butterfly Conservation's 'Kent's Magnificent Moths' project to improve habitat for the fiery clearwing and straw belle.

Long-term Aspirations

- Facilitate additional grazing areas across the site, to further increase the long-term sustainability of chalk grassland habitats and the species this supports at Folkestone Warren.
- Aim to have flourishing/larger meta-populations of key rare species including adder, Adonis blue, fiery clearwing, straw belle, ornate knot-horn, juniper and clove-scented broomrape. Some of these species are currently recorded in one or two specific locations at the Warren, as a consequence, any spread could be attributed to be directly as a result of habitat restoration.
- The development of a more accessible network of footpaths and associated infrastructure across the Warren.
- Return Folkestone Warren SSSI to favourable condition.

8 Future plans

8.1 Habitat management plans

Habitat Management Plans (HMPs) document the works strategy to be applied, to specified areas of the Southern estate, in order to maintain or enhance the existing habitat features present.

HMPs contain a description and evaluation of the habitat to be managed, aims and objectives of management, appropriate habitat management techniques and options for achieving aims and objectives, and a programme of management intervention.

Given the extent and complexity of the habitat asset, and more than 3,000 miles of rail corridor to consider, Southern's ecology team is taking a phased approach to HMP production.

In the initial phase, due for completion by April 2022, a suite of generic HMPs aligned to the habitat classes found on Southern Region will be developed. Subsequent phases will be tied to our vegetation compliance programme, which is a rolling programme of lineside management whereby sections of the network are assessed for safety risks caused by trees and vegetation.

Going forward, as well as assessing safety risk, visits to sections of the lineside will include a suite of biodiversity assessments that include mapping existing habitats and establishing priorities for management intervention.

In addition to this rolling programme of HMP production, we are developing plans for sections of our estate designed to benefit target species of plant or animal, typically in partnership with conservation organisations or neighbouring landowners. These Southern Region Species Recovery Plans (SRPs) work in a similar way to HMPs but set out information on enhancement measures required in relation to the specific species of fauna or flora.

SRPs will often require habitat creation, or transformation of existing habitat to new habitat of potential value to the target species for recovery.

Southern's ecology team is exploring both ad-hoc and strategic opportunities to developing the workbank for SRPs. Our current pipeline includes Plans for the Priority Species listed in section 4.3.

8.2 Stakeholder engagement plans for the next reporting period.

Southern Region recognises that engagement and partnership with a wide range of stakeholders on all significant biodiversity-related matters is central to the successful implementation of our Regional biodiversity plan and achievement of our key net gain objective.

Opportunities to work with stakeholders throughout the next reporting period include:

- Meeting formally with strategic Biodiversity Partnerships, Local Authorities, key landowners (farming estates), and nature conservation groups to consult on inclusion of perspectives, knowledge and needs from beyond those held within the railway corridor.
- Meeting less formally with other stakeholder and community groups, and sharing of knowledge, actions and achievements through our communications channels to keep our key stakeholders updated, engaged and informed.
- Educating lineside neighbours and our customers about biodiversity management practices, and values, on and near the railway, and how they can support and inform our work.
- Expanding volunteer opportunities for our workforce and stakeholders such as ‘Friends of’ groups, and at community events such as tree planting days.
- Implementing interpretive signage at high biodiversity value railway sites and stations (in partnership with our Train Operator colleagues).
- Hosting engagement and educational activities on biodiversity management.

Wales & Western Region State of Nature Report 2020/21

Contents

1 Personnel & Document Control

Main report author	Angharad Owen, PIEMA
Position	Environment Manager (Ecology & Biodiversity Lead)
Date	16/12/2021
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Position	HEAM
Date	
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Position	Head of Sustainability and Social Value
Date	

1.1 Document Control

Version number	Approved by Date	Description	Prepared by	Reviewed by	Authorised by
1		Compilation of habitat and Species section of the report	James Darke	Angharad Owen	
1		DRAFT State of Nature report for review	Angharad Owen	Steve Pearson	Felix Chamberlain
2		Summary State of nature	Angharad Owen		

2 Foreword

As a response to the Varley Review in 2018, Network Rail responded with a commitment to meeting the recommendation for each route to produce annual state of nature reports. This commitment was captured in the Network Rail Environment and Sustainability Strategy.

The following report outlines the State of Nature for the Wales & Western region between the period April 2020 to March 2021. It aims to outline the State of Nature of the region's estate, the ambitions and plans we have to protect, maintain and enhance its habitats and associated biodiversity. The report also highlights key examples of the actions we have undertaken to improve these habitats, and where necessary control undesirable species.

This is the first of the annual state of nature reports to be produced for the Wales & Western Region, however in December 2019 the Wales Route were required to produce a summary report[1] to fulfil the Section 6 Duty under the Environment (Wales) Act 2016. Network Rail are committed to enhancing and maintaining the biodiversity value of its land where possible and reasonably practicable. Therefore, for the Wales Route we have provided an update on progress of our commitments to fulfilling the requirements under the Section 6 Duty.

Figure 1: ***Extent of the Wales & Western Region. Network Rail image.***

[1] Network Rail, Wales Route Environment (Wales) Act 2016: Section 6 duty summary report (December 2019) - Network Rail

3 Executive Summary

3.1 Overview of current habitat

The Wales & Western Region are in the process of commissioning targeted baseline ecology surveys of our lineside estate, with an objective to have recorded a baseline for the Wales Route (450 miles of lineside) by the end of the Control Period. Western are also completing targeted baseline ecology surveys ahead of the vegetation management works and will also aim to complete the baseline survey for the entire Route in CP7. An Ecology database solution is being progressed to capture all the Ecology and Biodiversity information collected across the Region. According to the habitat mapping data produced by the Centre for Ecology & Hydrology (CEH) on behalf of Network Rail, a quarter of our lineside is 'built up areas and gardens' and approximately 20 % of our land is covered by deciduous woodland. Improved grassland and arable also have significant coverage.

Species of Principal Importance recorded across the Region include 7 plant species (including Deptford Pink, Bristol Whitebeam and Round-leaved Whitebeam), 21 invertebrate species (including Dingy Skipper, Small Blue, Sprawler), 5 Amphibians (Common Toad, Common Frog and Great Crested Newt), 4 Reptiles (Slow-worm, Adder, Common Lizard), 13 Birds (including Spotted Flycatcher, Cuckoo, Lesser redpoll) and 18 Mammals (including Greater Horseshoe Bat, Hazel Dormouse, Red Squirrel).

3.2 Summary of ambitions for biodiversity management

The Region will begin the process of completing Habitat Management Plans, focusing on areas where there are protected sites within and adjacent to Network Rail's boundary, and against those areas where the baseline ecology surveys are completed.

The Region will actively engage with key external and internal stakeholders in relation to Biodiversity.

- Aim to have sufficient Ecology resource in order to be compliant with the ENV122 standard.
- Continue to look at finding innovative solutions to lower the impact of our engineering works on the environment.
- Improve the knowledge base internally at Network Rail to allow staff to recognise opportunities to enhance biodiversity when programming or project management.
- Retention of a corridor of vegetation wherever it is practicable to do so.

- ‘Maintain and enhance’ so far as is consistent with the proper exercise of our functions to be compliant with our ‘Biodiversity Duty’ in Wales; and achieving ‘no net loss’ in biodiversity on our lineside estate in England by 2024.

3.3 Summary of achievements for biodiversity management

- The RAM Ecology team has completed preliminary assessments of 30 locations to identity locations for demonstration projects (or pilot sites) across the Region. These sites will inform future biodiversity and habitat management works.
- In order to inform the vegetation management works, Wales are procuring and undertaking ecology surveys of ELRs ahead of works. These surveys will also provide data to inform other projects delivered in those areas and whether permissions are required in order for works to proceed.
- Across the Region we have several European Protected Species (EPS) mitigation licences which enable works to proceed. These are mainly to allow vegetation management works, but also Geotechnical aspects such as at Little Hagloe located along the Severn Estuary.
- In Wales we have built constructive working relationships with key stakeholders including NRW and WG.
- Across the Region we are working towards promoting to external stakeholders that Network Rail are working towards managing biodiversity and ecology as an Asset and to improve our compliance with wildlife legislation.

3.4 What further action will we take?

The focus for the coming financial year is to deliver the demonstration projects to inform future biodiversity and habitat management across the Region. Progressing with delivering the ELR ecology surveys in Wales to inform future vegetation management works, and future works. Embedding requirements to positively manage our assets to ‘maintain and enhance’ biodiversity and be complaint with external legislation with regard to ecology. We are also focusing on the Cultural Change around embedding requirements for positive management for biodiversity and ecology, which includes educating our internal staff. Developing our plans for CP7 in line with funding appetite is prioritised. Through consultation with NRW and WG, we will work towards resolving the question around using the Biodiversity Metric 3.0 for calculating Biodiversity in Wales.

4 State of Nature on the Wales & Western (period between April 2020 – March 2021)

There is a distinct difference between environmental legislation and policy across the devolved nations, and therefore the way in which Ecology and Biodiversity are managed. The devolved nations have separate statutory and governing bodies, with permissions (including licensing and consenting) being processed differently.

Figure 1 illustrates that the majority of the Wales Route is adjacent to coastal habitats, and this has resulted in liaison with NRW and WG in relation to permitting works to maintain our infrastructure. The centre of Wales Route is a rural area, and the ELR which runs along the border is mostly rural but passes through major border towns.

4.1 Biodiversity Metric calculation for the Region

Table 1 provides habitat descriptions and corresponding biodiversity metric calculations provided in the report 'Network Rail Biodiversity Metric Calculations 2021' which used data from the remotely sensed data.

In Wales, neither the WG nor NRW acknowledge the Biodiversity Metric tool as a way to calculate a value for biodiversity. Regional staff will continue to liaise with external stakeholders to resolve this issue in Wales.

Table 1 Wales & Western Region habitat types and biodiversity metric calculation for 2020, provided in the report 'Network Rail Biodiversity Metric Calculations 2021'.

Habitat type	Area (hectares)	Distinctiveness	Total habitat units
Other woodland; broadleaved	1884.16	Medium	15073.28
Saltmarshes and saline reedbeds	642.43	High	7709.16
Modified grassland	1285.58	Low	5142.32
Bramble scrub	2127.56	Medium	8510.24
Ruderal/Ephemeral	1324.23	Low	2648.46
Fens (upland and lowland)	146.95	V.High	2351.2
Ponds (Non- Priority Habitat)	140.74	Medium	1125.92
Other inland rock and scree	138.14	Medium	1105.12
Other neutral grassland	112.43	Medium	899.44
Features of littoral sediment	58.59	High	703.08
Upland Heathland	46.57	High	558.84
Lowland Heathland	24.43	High	293.16
Lowland mixed deciduous woodland	19.63	High	235.56
Lowland beech and yew woodland	19.63	High	235.56
Wet woodland	19.62	High	235.44
Upland oakwood	19.62	High	235.44
Features of littoral rock	15.17	High	182.04
Upland acid grassland	17.41	Medium	139.28
Lowland calcareous grassland	9.64	High	115.68
Other Scot's Pine woodland	12.36	Medium	98.88
Other coniferous woodland	12.36	Low	49.44
Features of littoral sediment	2.54	High	30.48
Features of littoral rock	2.42	High	29.04
Coastal lagoons	1.45	High	17.4
Inland rock outcrop and scree habitats	1.39	High	16.68
Lowland raised bog	0.29	V.High	4.64
Built linear features	950.17	V.Low	0
TOTAL	**9035.51**	**TOTAL**	**47745.78**

4.2 Wales Route and Section 6 duty overview

With reference to the Section 6 Environment (Wales) Act 2016 Summary report produced in December 2019, the Wales Route has progressed with commitments which would enable the Wales & Borders Route to fulfil their Section 6 duty. Key progress includes:

- Increase in internal capability to support the Maintenance team in Wales.
- Sharing our lineside with Wildlife
- Dealing with the threat of Ash Dieback through procuring surveys to inform strategic management. The Tree Council prepared an Ash Dieback Toolkit on behalf of Network Rail in June 2020.
- Actively engage with adjacent landowners and key external stakeholders, including representatives from Welsh Government and Natural Resources Wales.
- Management of Invasive Non-Native Species, including a project lead by the RAM team to use Artificial Intelligence to identify Japanese Knotweed on our estate.
- Procurement of Ecology surveys to cover strategic areas and inform future vegetation management work (see Section 8.1).
- Service Level Agreement (SLA) extended with the Welsh Local Records Centre (i.e. Aderyn).

4.3 Western Route overview of State of Nature

The following provides example of work undertaken in Western where Ecology and Biodiversity have been actively considered by the project teams:

- Exploring adaptation of redundant railway assets to benefit bats. As part of sea defence works between Lostwithiel and Fowey a preliminary ecological appraisal was commissioned. During the walkout faecal signs for bats were found within a redundant PWay building on the lineside. Capital Delivery Western is current working internally to explore conversion options for this and other redundant building assets into bat houses
- Community engagement with lineside neighbours in Truro to address concerns with local residents of our vegetation management works in the area. The local resident who is also Green Party candidate for Camborne and Redruth was very satisfied and pleased with Network Rail's changing environmental and sustainability policies. Understanding that the safety of travelling public and lineside workers is essential we are still working towards a greener environment for the future.

- Capital Delivery Western worked with ground contractors completing vegetation management works near Coombe to protect valuable areas of heathland habitat. Heathland is a biodiversity action plan habitat. By removing small trees, the condition of the heather habitat has been enhanced whilst retaining accessibility to the safe walking route.
- Implementing best practise for bat conservation during vegetation management. Capital Delivery Western have implemented new processes with support from the supply chain for recording potential roost features following advice from the Bat tree habitat key published by AEcol and the British Standard for Surveying for Bats in Trees and Woodland. In addition, ground personnel within Network Rail's vegetation management supply chain have been undertaking bat ecology training to improve the ability of the workforce to recognise trees with potential for holding roosts of these protected species. A similar requirement was previously recommended by the Wales Route Ecologist on the new Vegetation Framework in July 2019, which was for the Contractors to attend the LANTRA course[2].
- Network Rail in collaboration with GWR installed bat boxes at the rear of new transformer buildings in Exeter New Depot although no bats were found rousting in Exeter Depot. Exeter Depot is near the river Exe which is wooded on the signal box and depot side and it was seen as the right thing to do for the local Biodiversity.
- A new lighting scheme was installed at Okehampton Station Lighting and the Project Team (including Project Engineer, lighting Contractor and Asset Management) have worked with a Contract Ecologist to ensure the new lighting scheme at the station will not adversely affect the flightpath and habits of 3 types of Bat which roost in the Station roof. This has been achieved through discussion to ensure the design and equipment selection not only achieves the mandated lighting levels for a railway station but does so in such a way as to take due consideration of the needs of the local flying furry creatures. This joined up and flexible approach by NR should result in the endorsement of the local ecology officer of our proposals for lighting Okehampton, where little or no lighting currently exists.

[2] Bats and Arboriculture – Scoping surveys for arborists - Training for people working with trees - Bat Conservation Trust

4.4 Region habitat types

The Wales & Borders Route are in the process of commissioning targeted baseline ecology surveys of our lineside estate, with an objective to have recorded a baseline for the entire Route (450 miles of lineside) by the end of the Control Period (see Case Study 1). In Western, the Ecology surveys are being managed through Capital Delivery targeting areas where works are planned. The Region requires an Ecology database solution which integrates with Ellipse to highlight where there are ecological constraints and opportunities for work to continue without the need for permissions prior to work commencing.

In addition to this ongoing programme of baseline walkover surveys, the Technical Authority have procured modelling of the entire Network Rail owned land to understand the requirements of wildlife in the present and under future climate change events. The CEH Habitat mapping is based on Lidar data and open access species data and does not replace the need for ground truthing in the form of Ecology surveys. Figure 2 illustrates habitat types according to the CEH mapping data.

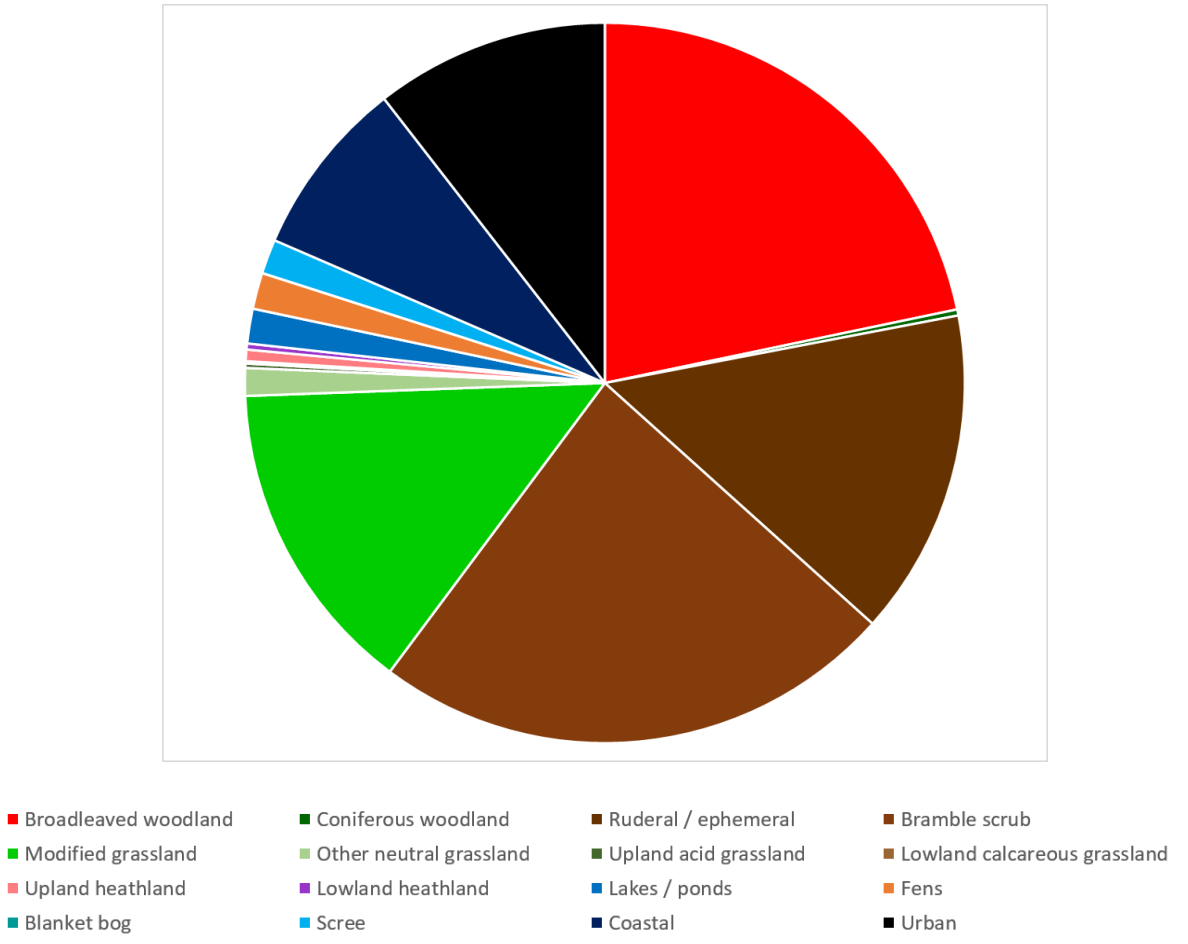

Figure 2 Pie chart illustrating habitat types as % in Wales & Western according to the CEH habitat data

The Ecology survey reports commissioned by Network Rail have collated records of species of principal importance and also protected species under the Wildlife and Countryside Act 1981.

4.5 Connectivity

The local and landscape scale connectivity tools within the UKCEH layer in GeoRINM can be used to prioritise areas to increase or maintain connectivity through habitat creation, restoration or protection. The connectivity tool has focussed on four groups of habitats which are Heathland, Semi-natural grassland, Wetland and Woodland. There are high levels of opportunities for connectivity of all four habitats across the region.

4.6 Designated sites

According to the National Database of Sites of Special Scientific Interest (SSSIs) on Network Rail Land (2013), the Wales & Western Region's lines run through or adjacent to 129 geological and biological SSSIs, 11 Special Protection Areas (SPAs) 11 Ramsar sites and 29 Special Areas of Conservation) SACs. Condition assessment is assessed by the Statutory Authority (i.e. NRW and Natural England) by unit and does not provide an overall condition assessment for the entire site.

4.7 Species recorded in the Wales & Western Region along the Network

There are several examples of Species of Principal Importance under the NERC and Environment (Wales) Acts, and species listed under Schedules 1, 5, 8 or 9 of the Wildlife and Countryside Act (1981) (W&CA) which have been recorded on and around the lineside in the region. The following text provides examples of such species and a description of where they have been recorded within the Region. Species which have been recorded on or near Network Rail land holdings include:

- The Eurasian Beavers (*Castor fiber*) which are present in the Dyfi area of Wales.
- The rare Meadow Clary *Salvia pratensis,* a plant that occurs on the OWW lineside in Western.
- Osprey (*Pandion haliaetus*) also known to be present near Machynlleth and Network Rail have provided practical support to the Wildlife Trust who monitor the nest, including electricity to power the security camera.
- Badger setts have been found across the region, and several project teams have constructed artificial setts and worked with Ecologists to close setts to enable works to proceed.

Photo 2 Meadow Clary

Photo 1 Footage of a Badger caught on a Bushnell camera trap at Sudbrook, Wales.

4.8 Invasive species on the region

In Wales & Western there is a targeted strategic approach to treating Japanese Knotweed, Himalayan Balsam and other Introduced Non-Native Species (INNS). The Maintenance teams have cyclical plans to target specific areas.

- **Ash Dieback**

In June 2020, the Tree Council produced the Ash Dieback Toolkit for Network Rail. In Wales Dead Dying or Dangerous (DDD) tree surveys are undertaken in addition to the Ecology surveys which then inform the vegetation management works. This DDD survey report is undertaken by a suitably qualified individual and includes Ash Dieback. The Wales & Borders Route are in the process of producing 'Network Rail Wales Route Ash Dieback Action Plan' as it is acknowledged that in Wales there is a significant number of Ash trees across the Network.

- **Japanese Knotweed**

The RAM GDL team are working with Mott MacDonald to develop an approach to automatically locate Japanese Knotweed using machine learning algorithms, in conjunction with Network Rail's existing resources of aerial imagery and associated data. The current accuracy from the model reported on in the project report dated March 2020 correctly identified 88.6 % of the Japanese Knotweed by area. The model performs best in urban or inter-urban areas and less so in the rural areas on the Network. This algorithm is

being refined and this project team will continue to work towards a final model. The output of this project will inform the future targeted management of this INNS.

4.9 Demonstration sites or projects

The Biodiversity Implementation Programme (BIP) is the regional tool for the implementation of the SLU programme. In May 2020, the Region received funding from the TA through the SLU to undertake trial sites for habitat management works for biodiversity enhancement. This will inform CP7 financial planning. The pilot sites will also provide practical examples of the steps required to undertake and plan the habitat management work following best practice guidance. The aim is to complete 21 pilot sites on the lineside estate, each site will be at least 1/8th of a mile long.

The RAM Ecology team undertook initial site walkovers of 30 sites which included an ecology survey and an assessment of whether to progress with the site as a pilot site. The following is a list of sites which we have progressed with during the reporting period April 2020 – March 2021. The Friog Corner Pilot Site is presented as a case study in section 7.2.

Photo 3 Hedgerow planting at Rhinog Park

Habitat management techniques which will be utilised in these demonstration projects include:

- Clearance of scrub to enhance habitat for invertebrate species (see Figure 3).
- Coppice regimes or scalloping of the vegetation to increase the light levels allow light to enter into the canopy and regrowth, create more structural diversity and micro-habitats which will result in biodiversity enhancement (see Figure 4).
- Planting of hedgerow to improve connectivity across the landscape and provide a natural boundary measure (see Photo 3).
- Removal of established trees from calcareous grassland which provides habitat for the rare Large Blue butterfly at East Polden in Western.
- Habitat Management Plans to cover strategic areas with high biodiversity interest and complex ecological constraints.
- Removal of Dead Diseased and Dangerous (DDD) trees.

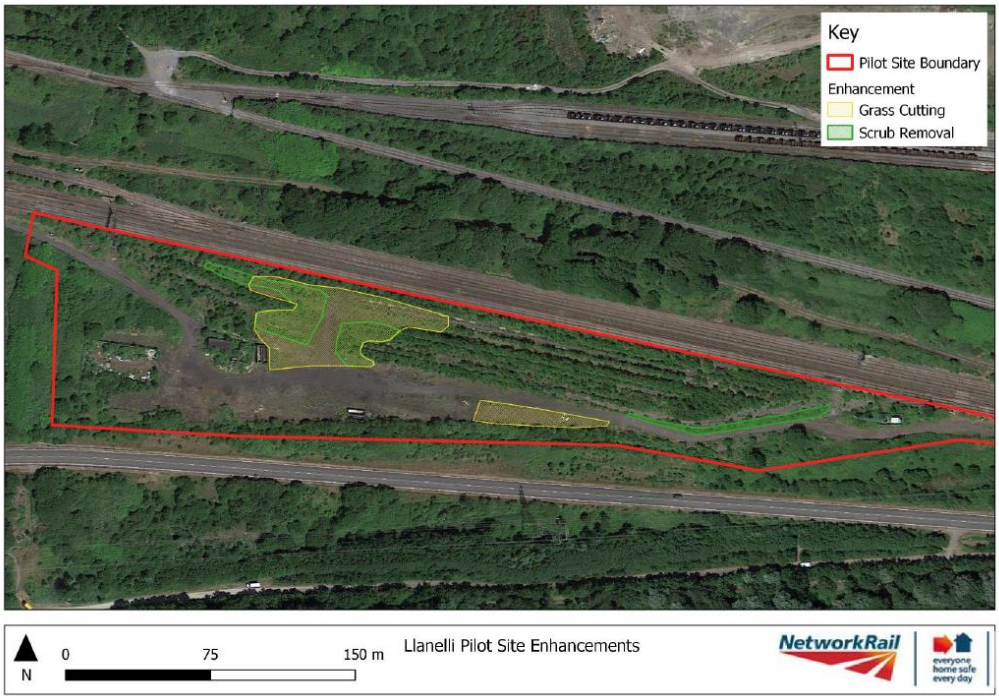

Figure 3 Map illustrating the Llanelli Sidings enhancement scheme and locations of scrub removal and grass cutting required (Map data ©Google Satellite contributors 2020)

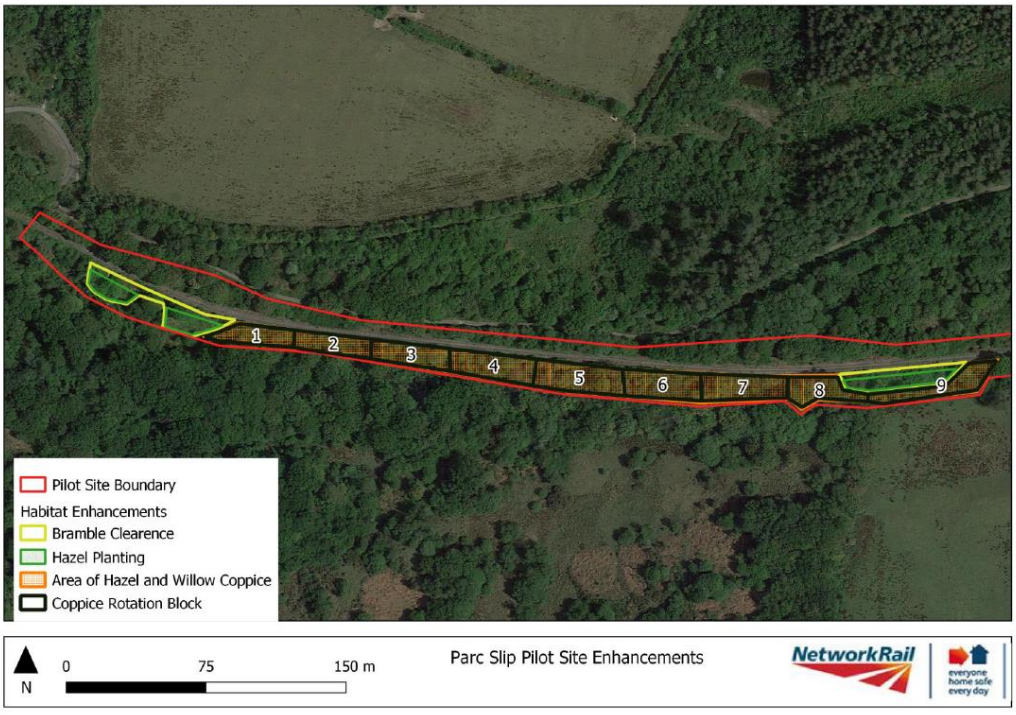

Figure 4 Aerial map illustrating enhancement scheme layout (Map data ©Google Satellite contributors 2020)

5 Priorities for biodiversity management on this region

- Expanding our internal Ecological technical resource to provide support across the teams and functions.
- Production of Habitat Management Plans (HMP) which will inform the Vegetation Management Plans (VMP) which are requirements under Standard 5201 and ENV_122. This will be an ongoing programme of works past CP7, and these plans will require revision when major schemes change the estate or new constraints, or opportunities are identified.
- Completion of baseline surveys across the Wales & Borders Route by the end of the Control Period which will inform the HMP.
- Provision of an Ecology database which will communicate with Ellipse and provide a record of Ecological Constraints, locations of existing permissions / licences, and the requirements under the HMP per 1/8th of a mile.
- DEAM Ecology team to continue to work on habitat enhancement for biodiversity.
- Continue to build on external relationships with key stakeholders and seek opportunities to work with for instance Nature Partnerships.
- Push forward with the Cultural Change which is led by the Biodiversity Implementation Programme which is the regional tool for implementation of the Sustainable Land Use Programme.
- Completion of the 'Pilot Site' projects funded by the Technical Authority since May 2020, with funding ending in March 2022.
- Ecologists to continue to work with the C&P team on new supplier Frameworks to ensure that the minimum requirements set by the Wales Route Ecologist in 2019 for Ecological resource is delivered by the Contractors (see Appendix 10.4).

6 Report on Performance Indicators within reporting period

Performance indicators specifically in relation to Ecology and Biodiversity have not been finalised for the Region against the scorecard. Reporting as part of the Change programme under 'business change initiatives' is regularly updated by the Environment Manager (Ecology) in the DEAM organisation through communication with the Change team project manager.

7 Case studies

7.1 Case Study 1 – Baseline Ecology surveys on the Wales & Borders Route

The Wales & Borders Route are in the process of commissioning targeted baseline ecology surveys of our lineside estate, with an objective to have recorded a baseline for the entire Route by the end of the Control Period (see Case Study 1). Prior to these surveys being instructed by the RAM team in 2019 using a dedicated Contract Ecologist to work on this project, surveys were mainly targeted to inform specific projects and did not always include a survey up to the boundary of the lineside estate. These baseline surveys aim to provide data and information related to species and habitats, including habitat suitability assessments, which will inform planning of work and requirements for permissions to enable works to proceed. The objective is to have output reporting that can be utilised across the teams at Network Rail, and not tailored specifically to an individual project. Additional and updated surveys maybe required, however having this baseline information will help with planning and also highlight where additional Phase 2 protected species (e.g. dormouse) surveys are required. There are significant cost efficiencies and also benefits in having the information available at the planning stage of a project for instance.

These targeted surveys are currently planned against the future 'work-bank' of vegetation management works that the Maintenance delivery teams are undertaking in order to become compliant with Standard 5201. These surveys are planned providing enough time to complete Phase 2 surveys for protected species which have strict timescales, for instance because the animals might be hibernating or breeding at specific times of year[3].

These surveys provide a baseline information resource which the regional staff can use to plan their work and enable planning of work and compliance with wildlife legislation and policy. The output from these baseline surveys is held on a Microsoft Teams channel, with folders per ELR mileage, with access provided to staff across the Route. This is a temporary measure until the new ecology database has been finalised and delivered. GIS Shapefiles are provided to Network Rail to be saved on GeoRINM when that functionality

[3] Protected species and development: advice for local planning authorities - GOV.UK (www.gov.uk)

has been set up by the TA. We continue to undertake project-based surveys where the overarching ELR survey has not been completed.

The internal Ecologists have worked with the Maintenance teams (including Track Maintenance Engineers (TME) and Assistant Track Maintenance Engineer (ATME) together with the Contracts and Procurement (C&P) team to prioritise and procure surveys. This has included regular revision of the wording in the Statement of Works provided to the Consultant, arranging update meetings with the Contractor Ecologists, and ensuring that those meetings involve key individuals (such as the Ecologist, TME and C&P for example).

Along with a standard PEA report following the CIEEM guidelines for report writing, the reports include:

- An Ecological Constraints and Opportunities table and Plan (ECOP), which highlights for instance habitat types and potential / presence of protected and priority species. See Figure 5 for an example of an ECOP.
- Excel sheet with rag rating highlighting constraints against the 1/8th of a mile (see Figure 6). This data should be in a format which can be transferred across to the Ecology database and Ellipse so that we can manage the lineside estate as an Asset.
- Biodiversity Unit Calculation using the existing Metric from Defra / Natural England.
- Summary highlighting constraints, further survey work required, potential enhancement and mitigation.

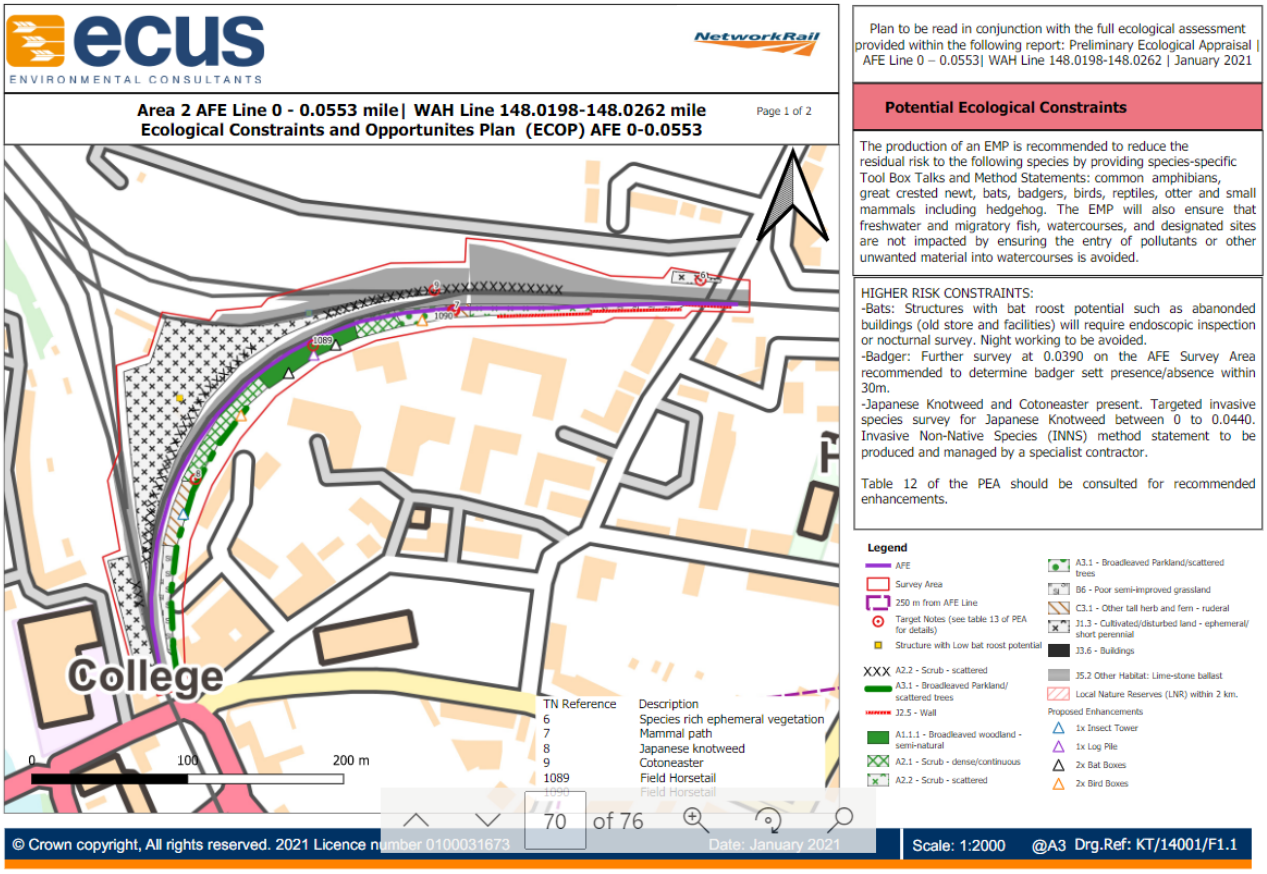

Figure 5 Example of an Ecological Constraints and Opportunities Plan produced by ECUS on behalf of Network Rail in January 2020.

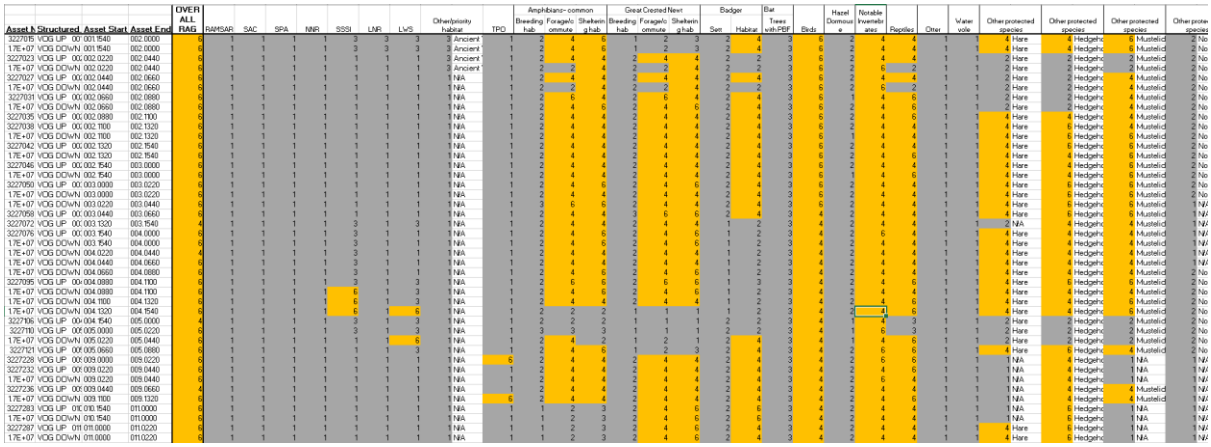

Figure 6 Screenshot illustrating example of the Excel sheet which accompanies the ELR survey reports which provides a rag rating of red, amber, green against ecological constraints identified during the baseline ecology surveys and desk study.

7.2 Case study 2: Marshbrook bat house

An excellent example of best practice in relation to consideration of Ecological constraints and mitigating for planned works is the demolition of the old Station House at Marshbrook.

The Wales Asset Management team (lead by Malcolm Peters, RAM) worked with Works Delivery (Dean Jones, Construction Manager and Julie Jones, Project Manager) on a project to renew and improve a level crossing adjacent to the railway line at Marshbrook. In order to provide a safe access and parking area for the Singaller a residential station house needed to be demolished. This building was located at Marshbrook next to the level crossing at Church Stretton, Shropshire (Grid Reference: SO 44211 89852). At an early stage of project development the project team procured a bat survey through an external Contractor which confirmed the presence of bats including brown long-eared bats (see Photo 4) in 2019. The advice from the external Ecologists was to apply for a European Protected Species Licence (EPSL) in order to lawfully proceed with the proposed demolition works in 2019. The licence conditions and mitigation included building a new compensatory bat house constructed prior to the works commencing on site, and for three bat boxes to be installed on a tree along the Marsh Brook on the periphery of the site.

Following a site meeting in October 2019 the Network Rail Wales Route Ecologist (Angharad Owen) also identified the potential for reptiles and otter within and adjacent to the site. The project team commissioned additional surveys (including an otter survey of the brook and installation of camera traps), additional mitigation for the works to protect the adjacent habitats (including pollution prevention measures and silt

Photo 4 Brown long-eared bat found in roof void of Station House, Marshbrook. Photo taken by Thomson during works undertaken on behalf of Network Rail.

fencing) and also for the precautionary method statement to include other species in addition to bats. The Wales Route Ecologist also had input into the design of the bat house. The project team consulted with the local council representatives and Natural England during all stages of the project. Monitoring of the mitigation on site was monitored by the Consultant Ecologists as stipulated in the EPSL licence conditions which was arranged by the Project Manager in Works Delivery.

See Figure 7 for the location of the bat house in relation to the site boundary where the existing house will be demolished. The demolition and vegetation clearance work were undertaken between December 2019 and March 2020, and ongoing monitoring of the site for bats will be undertaken in August 2020 and 2021 as stipulated in the EPSL. INNS were also identified on site and biosecurity measures were utilised during the works.

All works on site, including site preparation, vegetation clearance and demolition of the house were supervised by an external Ecologist. The mitigation for protected species on site will have taken in total over 2 years to plan and complete surveys and mitigation for these works.

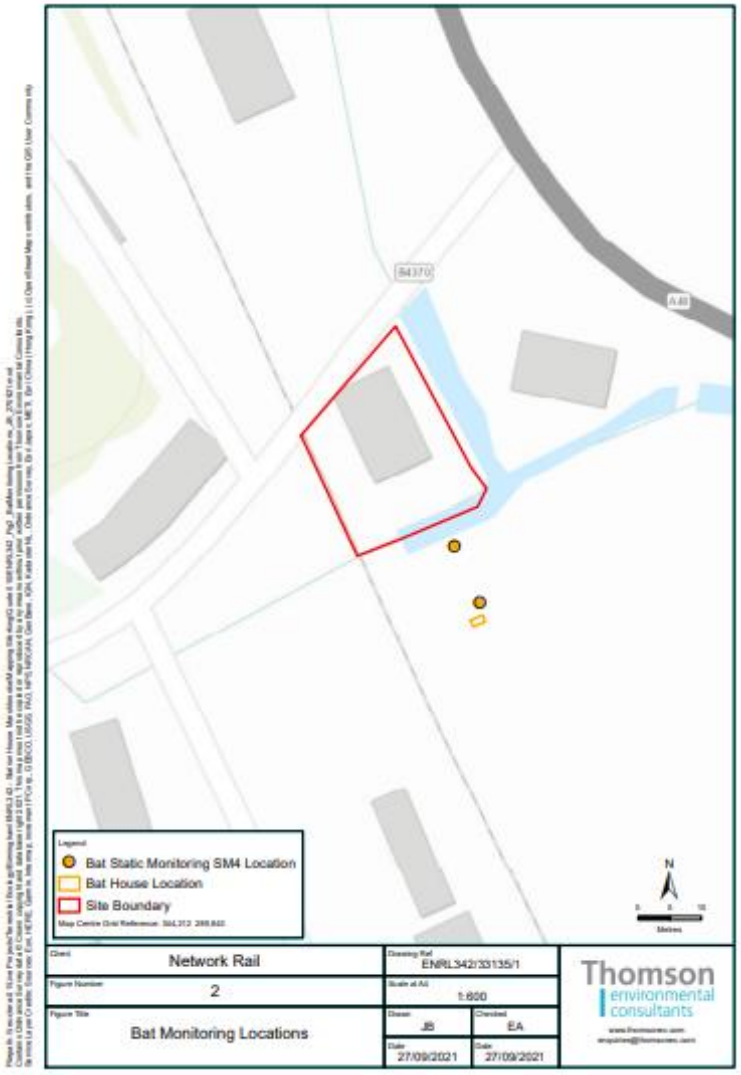

Figure 7 Drawing produced by the Consultants Thomson Environmental Consultants illustrating location of new bat house.

Figure 8 Photographs of the site produced by Thomson Environmental Consultants.

7.3 Examples of partnership working

An excellent example of partnership working is the collaboration with the Snowdonia National Park is the Pilot Site project known as 'Friog Corner'. The site is located on the Gwynedd coast between Fairbourne in the north and Llwyngwril in the south, on the DJP 97.0513 - DJP 95.0172 Miles / Yards (Grid Reference SH 58802 09527 and SH 61189 12033). The site comprises a sea cliff with pastureland to the east and the Irish Sea to the west, which provides difficult terrain to access and work within. The adjacent coastline forms part of the Pen Llŷn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC and SSSI.

In October 2019, the SNPA approached Network Rail for access permission to undertake a drone survey of our lineside to map locations of the invasive non-native 'alien' species *Rhododendron ponticum*. At this location, known as Friog Corner, it is one of the last remaining areas of this invasive non-native species in the southern area of the Snowdonia National Park. These works contribute to a wider project funded by EU's LIFE Programme to remove *R.ponticum* for the long-term future of the Celtic Rainforests[4].

The SNPA are working as a partner with the Celtic Rainforests Wales programme. The term Celtic Rainforests refers to the Atlantic oak woodlands which run along the western coast of the British Isles. Within with tackling and removal of *R.ponticum* being one of the main objectives of the Celtic Rainforests LIFE project. The Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC is located 3.7km to the north-east of the pilot site. The work to remove the *R.ponticum* will positively contribute towards the conservation management of the SAC, with a direct benefit as invasive species (namely *R.ponticum)* control will contribute toward the objectives of the SAC.

The Wales Route ASPRO team arranged the initial site walkover in March 2020. Due to the difficult steep coastal cliffs providing difficulty in accessing the area, the SNPA completed a drone survey in the summer months of 2020 which was the optimal time due the peak flowering period for *R.ponticum*. Network Rail have committed to removing the *R.ponticum* from their lineside at this location and this will be a programme of works over the coming years.

[4] https://celticrainforests.wales/

Photo 5 Image taken during drone surveys by the SNPA, illustrating proximity to the Railway line.

8 Future plans

8.1 Habitat management plans

The regional strategy for completing habitat management plans is to base around the areas where there are protected sites within and adjacent to Network Rail's boundary, and against those areas where the baseline ELR surveys are completed. The output of the habitat management plans will aim to inform the management per 1/8th of a mile to compliment and overlap with management of other assets in Ellipse. Due to the extent of information that this will generate, actions and data will need to be held in an effective ecology database so as to filter the information so that it can be understood by individuals across the business functions.

8.2 Stakeholder engagement plans for the next reporting period.

The Region will actively engage with key external and internal stakeholders in relation to Biodiversity. This will include continued engagement with Welsh Government, Transport for Wales, NRW and charities including the RSPB and Wildlife Trusts. Due to limited internal Ecological resource this engagement will continue to be based on business needs. Once we have additional Ecologists in post who can have meaningful discussions with external stakeholders and can strategize effectively to identify opportunities which a non-technical expert might not recognise, then stakeholder engagement will be stepped up.

8.3 Increasing internal Ecologist resource

The overarching strategy and biodiversity work is managed by the DEAM Ecology team which are a regional resource working across Wales & Western. The Ecologists in this team are recruited and mentored to provide specialist technical expertise in relation to biodiversity and habitat management. The RAM Ecologists also undertake site survey, reporting, support the project managers and also work on solutions to mitigate for delivery of works to proceed.

In Wales, the Maintenance team have recruited four new internal Ecologists to work with the Offtrack teams in the Summer of 2020, and they will be based in the depots to allow visibility and easy access to advice in relation to Ecology when delivering works. This has not been replicated in Western, but there are plans to recruit in the near future.

The Capital Delivery teams have three Ecologist roles, with two of these currently vacant due to secondments.

The Region are reviewing the need for additional ecological resource to enable compliance with both the new internal Standard ENV_122 and also compliance with external legislation and policy. Additional ecological resource will enable active engagement with external stakeholders and also the technical knowledge to recognise opportunities, but also risks to the business, which a non-technical expert in ecology and biodiversity might not recognise.

8.4 Completion of Pilot Sites across the Region

The DEAM Ecology team have identified opportunities for demonstration projects across the region, but there have been delays due to several significant reasons, one being the COVID-19 pandemic which has had an impact on resourcing across the business. We aim to continue to complete the demonstration projects and also to look at opportunities to develop this programme of work over the future control periods. This work will inform future business cases in relation to biodiversity and ecology and both vegetation and habitat management across the Region.