

Nidderdale AONB State of Nature 2020



THE WILD
WATCH

Forward by Lindsey Chapman

I'm proud, as Patron of The Wild Watch, to introduce this *State of Nature* report.

Growing up, I spent a lot of time climbing trees, wading in streams and crawling through hedgerows. I loved the freedom, adventure and wonder that the natural world offered and those early experiences absolutely shaped who I am today.

As a TV presenter on shows like the BBC's *Springwatch Unsprung*, *Big Blue UK* and Channel 5's *Springtime on the Farm*, I'm passionate about connecting people with nature. The more we understand about the natural world, the more we create memories and connections, the more we'll want to protect it.

In an age of climate emergency, nature is our ally. Investing in and nurturing wild landscapes, wildlife and our own relationship with the wild is imperative.

This is why projects like The Wild Watch are so important.

By giving people of all ages the opportunities and tools to engage with and take action to conserve their local wildlife, The Wild Watch has undertaken the biggest survey of wildlife ever conducted in Nidderdale Area of Outstanding Beauty.

Only by getting people involved in creating these studies in large numbers do we get a proper understanding of what's happening in our natural world now. Thanks to the hundreds of people who took part, we now know more than ever before about the current state of Nidderdale AONB's habitats and wildlife. While there is distressing news, such as the catastrophic decline of water voles, there is also hope for the future when so many people come together to support their local wildlife.

This *State of Nature* report is just a start, the first step. The findings outlined within it will serve as a baseline to assess future habitat conservation work. It is a platform to plan and build future practical conservation and public engagement activities, which desperately need to happen.

More needs to be done. And the exciting thing is it can be achieved with a movement of people to be the custodians of our natural world. So get out there, get involved and help your local wildlife.



Lindsey Chapman
TV and Radio Presenter
The Wild Watch Patron

Contents

- 4 Headlines
- 5 Our commitments
- 6 Summary
- 8 Background to the Nidderdale AONB State of Nature report
- 14 Overview of Nidderdale AONB
- 17 Why is nature changing?
- 30 Local Action and people
- 43 Habitat coverage
- 46 Designated sites
- 53 Moorland
- 65 Grassland and farmland
- 76 Woodland and trees
- 90 Water and wetlands
- 105 Species
- 124 Natural capital, ecosystem services and economic benefits
- 129 Methods and data sources
- 135 Further data and monitoring
- 136 References
- 140 Glossary and acronyms
- 144 Acknowledgements
- 146 Annexes



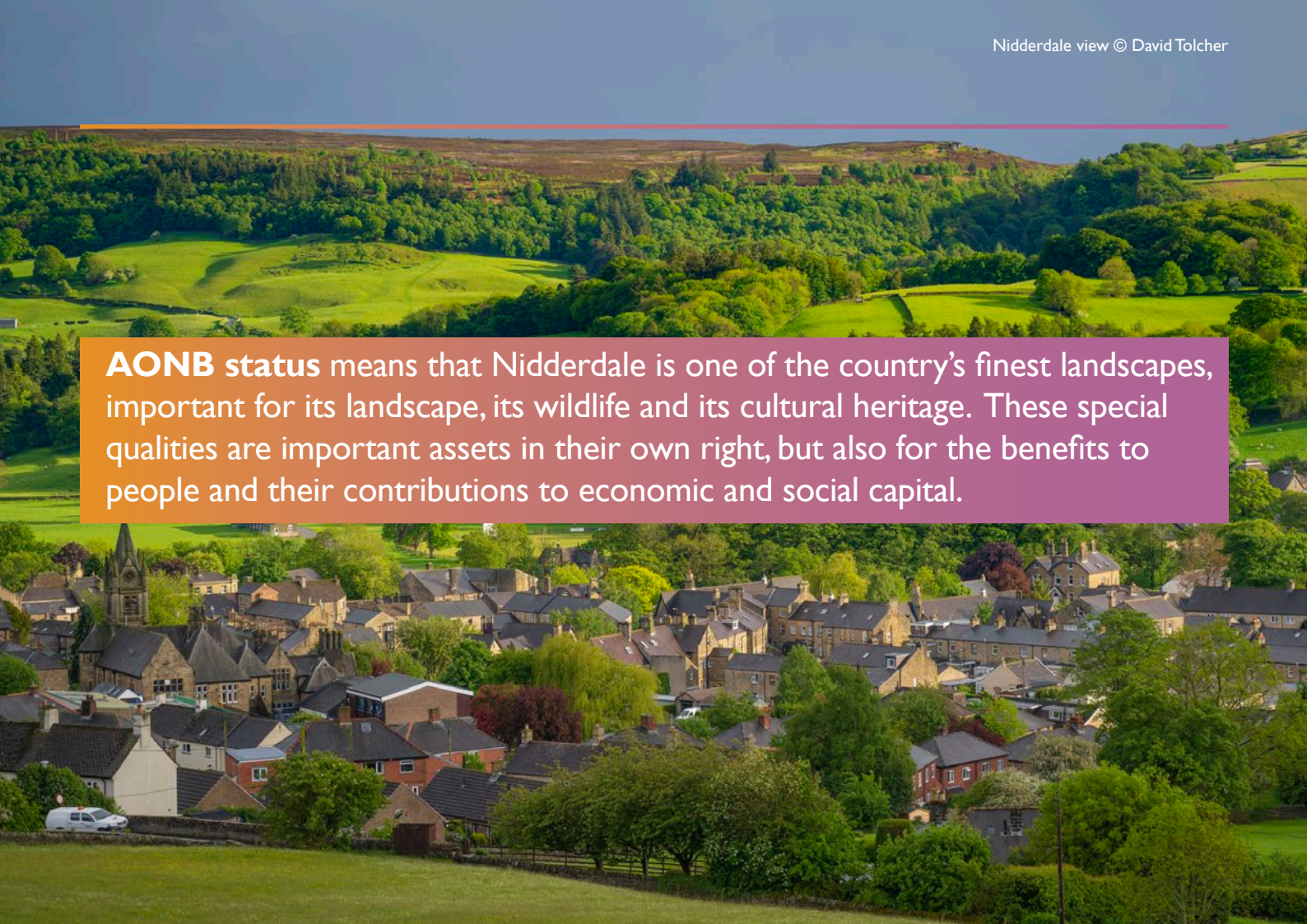
Headlines

This State of Nature report is an overview of the rich wildlife and habitats of Nidderdale Area of Outstanding Natural Beauty (AONB). It provides a baseline against which changes in nature can be monitored and assessed, and summarises the pressures on our nature and the actions that need to be taken to protect wildlife and strengthen the habitats they rely on. This report is a springboard for taking large scale action for nature, producing our new Nature Recovery Network Strategy, and working with others to realise our conservation aspirations.

- **Nidderdale AONB supports a rich variety of wildlife** through its wide range of habitats including moorland, grassland and farmland, woodland and trees, and water and wetlands.
- **Almost 35% of the AONB has additional legal protection for its nature**, designated as Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Special Areas for Conservation (SAC). These sites are our nature ‘jewels’ and offer valuable refuges to wildlife and are natural spaces for people.
- **Nidderdale AONB has a long history of active naturalist groups and people volunteering to do practical nature conservation.** The Wild Watch project has built on this foundation, raising awareness of the AONB’s nature and collecting large amounts of new survey data. More than 3,000 new surveys were carried out and 1,095 new citizen science records submitted. Over 6,400 people attended more than 140 events and volunteers gave over 4,500 hours.
- **Nationally nature is at risk**, wild places are becoming scarcer and many species are in decline. Threats to Nidderdale AONB’s nature mirror many of the national trends such as changing agricultural management, climate change, invasive non-native species, and how habitats are managed.
- **The creation of Nature Recovery Networks to make wildlife-rich sites ‘bigger, better and more joined up’ is seen as a key mechanism to address this decline.** Protected landscapes such as national parks and AONBs can act as large-scale nature recovery areas. At Nidderdale AONB we want to be at the forefront, using the vital new knowledge from The Wild Watch project to facilitate landscape-scale conservation work.



Ragged robin © Kelly Harmar



AONB status means that Nidderdale is one of the country’s finest landscapes, important for its landscape, its wildlife and its cultural heritage. These special qualities are important assets in their own right, but also for the benefits to people and their contributions to economic and social capital.

Our commitments

We are strongly committed to:

- **Fostering a sustainable landscape, rich in wildlife:** During the next phase of The Wild Watch project we will produce a Nature Recovery Network Strategy built from the findings in this State of Nature report. This will guide us in improving, expanding and connecting habitats, and delivering landscape conservation actions in and beyond protected sites.
- **Working in partnership:** We will work with you, our stakeholders and partners, to respond to the threats identified in this report by protecting wildlife and strengthening the habitats that they rely on, promoting Nidderdale AONB’s biodiversity, supporting volunteers, and raising funds for nature conservation work.
- **Improving our designated sites:** We will nurture the recovery of our designated sites, ensuring they are managed to the highest standards. By 2024 we will ensure that at least 25% of our SSSI’s are in favourable condition and 50% of our local wildlife sites (Sites of Importance for Nature Conservation (SINCs)) have up-to-date management plans.
- **Protecting habitats:** We will improve the management of priority habitats which are not currently protected. We have produced a detailed habitat model of the AONB as part of The Wild Watch project, and will use this to underpin decision-making about future conservation action.

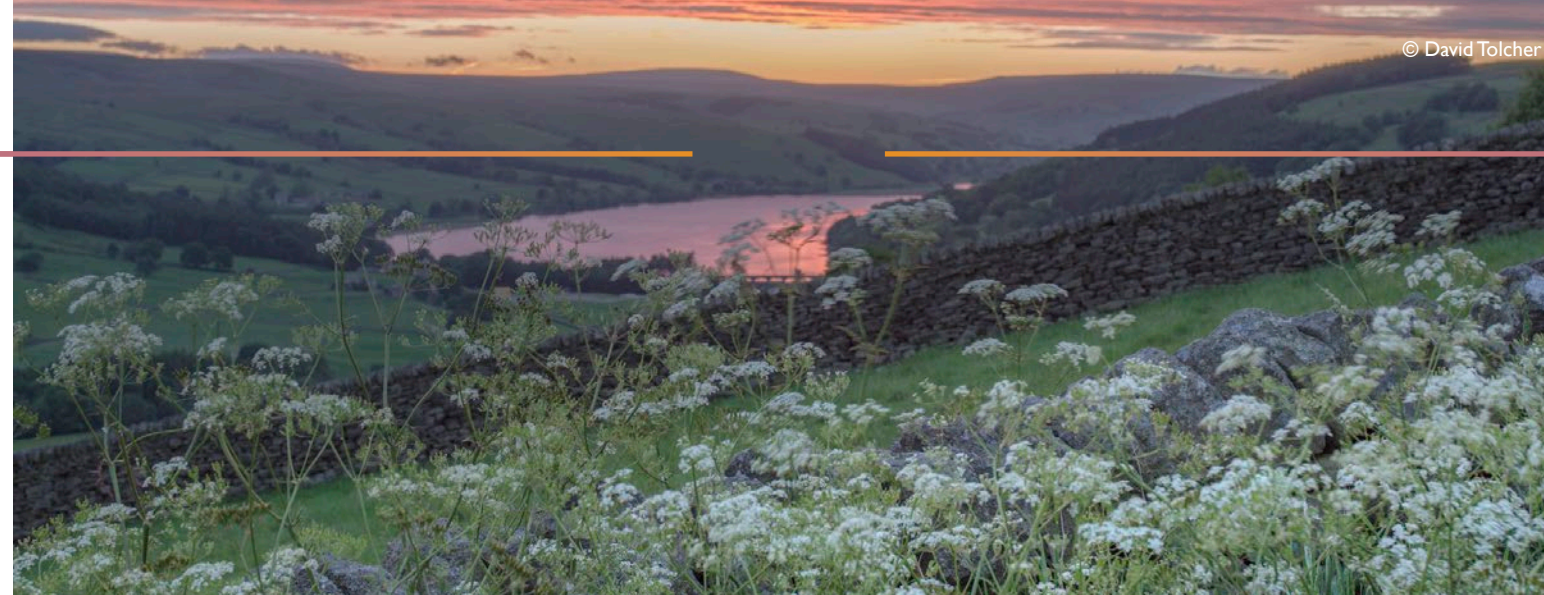
Summary

Nidderdale AONB is a landscape full of contrasts and rich in wildlife. The semi-natural habitats of the AONB and the wildlife they support are important in their own right but also provide benefits to people and to our economy. The aim of this report is to **bring together** and interpret the large amount of information concerning Nidderdale AONB's natural environment. It has been compiled by Nidderdale AONB with data from a wide variety of sources, and support from many people and organisations. We **thank** all of those who have contributed.

The State of Nature report provides a snapshot of Nidderdale AONB's natural environment in early 2020. It will act as a **baseline** against which changes can be monitored and assessed in the future, and a springboard for producing our **Nature Recovery Network Strategy**, which will contribute to our area's Local Nature Recovery Strategy to be produced under the Environment Bill, and implementing **future conservation actions** to create **Nidderdale's nature recovery network** and help deliver our Management Plan objectives. Our aspiration is to be a **leader in nature recovery**, sharing our experience, linking our high quality habitat into the surrounding landscape and contributing to the bold ambitions for nature recovery in the Government's 25 Year Environment Plan using the new biodiversity net gain and future environmental land management mechanisms.

We hope that this report will be of interest to all of our partners and stakeholders as well as those living and working in the AONB. We hope it will also inspire people and encourage future **partnership working** to conserve and enhance Nidderdale AONB's natural environment for both people and wildlife into the future.

Nidderdale AONB is home to a wide range of habitats – moorland, grassland and farmland, woodland and trees, water and wetlands – that support a rich variety of wildlife. Key priority habitats within the AONB are upland heathland (22% of the area) and blanket bog (almost 15% of the area).



© David Tolcher

Almost 35% of the AONB is covered by sites with European, national or local designations. These offer some level of protection to valuable wildlife habitats as well as providing natural spaces for people. 16,845ha (28%) of the AONB are designated moorland habitats (upland heaths and bogs). 2,050 ha (12%) of Nidderdale AONB's Sites of Special Scientific Interest (SSSIs) are in 'favourable' condition, compared to 39% of English SSSIs. Most of the rest of our SSSIs (15,300ha) are in 'unfavourable recovering' condition, compared to 55% of English SSSIs. This generally means they have been entered into a management scheme to improve their condition over the long-term. The AONB is also home to 86 local wildlife sites.

Nidderdale AONB has a long history of **active naturalist groups** collecting valuable biodiversity data, and people volunteering in practical nature conservation. The Wild Watch project sought to build on this by raising awareness of Nidderdale AONB's wildlife, habitats and landscape with wider audiences and collecting large amounts of survey data. Over 3,000 new surveys were carried out and over 1,000 new **citizen science** records submitted. Over 6,400 people attended over 140 events and volunteers gave 4,500 hours of their time to the project.

Over the last five years Nidderdale AONB has helped channel over £3.4 million of external grants into nature conservation and two local funds, the Greenhow Fund and the Friends of Nidderdale AONB Countryside Fund, have invested over £86,000 in local wildlife and cultural heritage conservation projects.

Threats to Nidderdale AONB's natural environment mirror many national trends such as changing agricultural management, climate change, invasive

non-native species, and inappropriate woodland management. We have looked at the current situation in Nidderdale AONB and some of the positive action that is being taken.

Our **moorlands** are nationally significant for wading birds, including curlew, and birds of prey. Positive actions include working with moorland land managers and the Yorkshire Peat Partnership to restore peat habitats, a very significant store of carbon, and promoting best practice for moorland management, helping the general public understand the value of moorland habitats and their management, and working with others, including shooting estates, to safeguard birds of prey.

We have over 115ha of **grassland** priority habitats including calaminarian grassland, upland calcareous grassland, and upland hay meadows. Positive actions include working with landowners to provide land management advice, supporting Yorkshire Water's plans to expand its network of 'Beyond Nature' farms, and working with landowners to restore hay meadows. We are also raising awareness of the wealth of plants and wildlife of our meadows, and supporting volunteers to help with surveys and monitoring of meadows and verges.

The AONB is within the White Rose Forest, part of the wider Northern Forest. Approximately 8% of our area is **woodland**. Twenty-five percent of this (2% of the AONB area) is ancient semi-natural woodland or plantations on ancient woodland sites, 35% is planted conifer woodland, and 50% is broadleaved woodland. We have over 1,200 veteran and ancient trees and estimate that almost two million tonnes of carbon are locked up in our woodlands. Positive actions include a commitment to tree planting demonstrated by the new woodland opportunity plan, working with landowners

to increase the active management of existing woodland and to significantly increase the amount of new woodland within the AONB.

Water and wetlands are a key feature – including rivers, streams, ponds, and reservoirs. The current ecological status of our rivers is variable, with threats including pollution, physical modifications of water courses, and invasive non-native species. Gouthwaite Reservoir is nationally significant for many species of birds, and whilst otters are present throughout the AONB water voles appear to have suffered large declines. Nidderdale AONB has a high number of ponds. Positive actions include controlling non-native invasive plants, taking climate change adaptation measures by facilitating implementation of Natural Flood Management (NFM) measures, and improving water quality through positive riparian management.

Nidderdale AONB is home to important **species** populations. The Wild Watch project has helped us to collaborate with others and collect new information on a large number of species including, reptiles, owls, hedgehogs, invertebrates, and flowering plants. We are committed to continuing this work. Positive actions include raising awareness of the value of our wildlife species through events, working with others on actions for curlew and adder, collecting further data through citizen science initiatives and our wonderful volunteers, and collaborating with our local naturalist groups.

Nidderdale AONB has a very significant stock of **natural capital**, which delivers vital **ecosystem services** and provides **economic benefits**. Provisioning services such as drinking water and food production; regulating services such as carbon storage and natural flood management; and cultural services such as recreation opportunities. This report provides an initial assessment of our natural capital, the ecosystem services it provides and the economic benefits derived from these. We would like to analyse this further and better understand the link between our landscapes and Yorkshire's economy.

Background to the Nidderdale AONB State of Nature report

Headlines

- The Nidderdale AONB State of Nature report brings together the best available data on Nidderdale AONB's nature for the first time, providing a detailed assessment of its state in early 2020.
- The UK's nature is under serious threat.
- AONB's have a key responsibility for nature within their area.
- Nidderdale AONB's semi-natural habitats, and the species they support, are important in their own right whilst also providing benefits to people and to our economy. However we do not have a full understanding of our wildlife and some of it is under threat.
- Nidderdale AONB has a long history of delivering wildlife projects. The Wild Watch project aimed to build on this, and to raise people's awareness of and greatly improve our knowledge of Nidderdale AONB's nature to enable us to better plan and take action to safeguard its future.

Aims of the report

To bring together the large amount of information and data that exists about Nidderdale AONB's natural environment into one place for interpretation. It:

- Provides a 'snapshot' of how Nidderdale AONB's nature is fairing in early 2020 - showcasing key habitats and species, highlighting conservation success stories, setting Nidderdale in context with the rest of the UK, and demonstrating data gaps;
- Will act as a 'baseline' evidence base against which changes in Nidderdale AONB's nature can be monitored and assessed in the future. See the proposed key indicators in *Annex 7 on page 161*;
- Enables us to continue to raise awareness of the AONB's nature and actions needed to conserve and enhance it; and
- Will act as a springboard for planning conservation actions.

We hope that this report will inspire people and encourage future partnership working to conserve and enhance Nidderdale AONB's natural environment for both people and wildlife for the future.

National State of Nature

The initial UK State of Nature report and country summaries were published in 2013¹, with follow on reports in 2016² and 2019³. These reports pool the best available data from more than 70 partners (nature conservation NGOs, research institutes and governments) to give assessments of the state of UK wildlife, look at the pressures acting on it, and responses being made to recover nature. The trends are extremely worrying.

The 2013 report looked at changes to the population or distribution of species over the last 50 years and found that 60% of the 3,148 species assessed had declined, with 31% having declined strongly.

The 2016 report looked at changes to population or distribution of species over both the long-term (1970–2013) and the short-term (2002–2013). It found that over the long-term 56% of species had declined, with 40% showing strong or moderate declines. Over the short-term 53% of species had declined, with 41% showing strong or moderate declines.

The 2019 report found that the net loss of the UK's biodiversity is continuing and most of the

Convention on Biological Diversity's 2020 targets will not be met. Using new data and multi-species indicators the authors presented population trends for more species than in the previous studies and again measured change over two periods: the long-term (since 1970) and the short-term (the last 10 years). Key findings from the 2019 UK report are presented below.

National changes in species' abundance

- 13% decline in average species' abundance over the long-term.
- 41% of species have declined over the long-term, 44% over the short-term.
- Over the long-term 33% of species showed a strong change in abundance (increase or decrease) rising to 53% over the short-term.

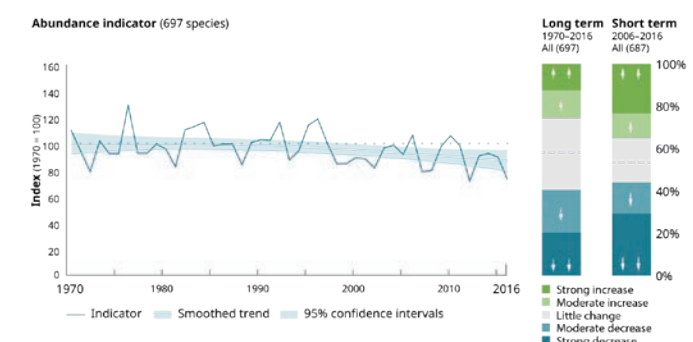


Fig. 1. National change in species' abundance⁴

National changes in species' distribution

- 5% decline in average species' distribution since 1970.
- 27% of species declined over the long-term, 37% over the short-term.
- Over the long-term 17% of species showed a strong change in distribution (increase or decrease) rising to 39% over the short-term.

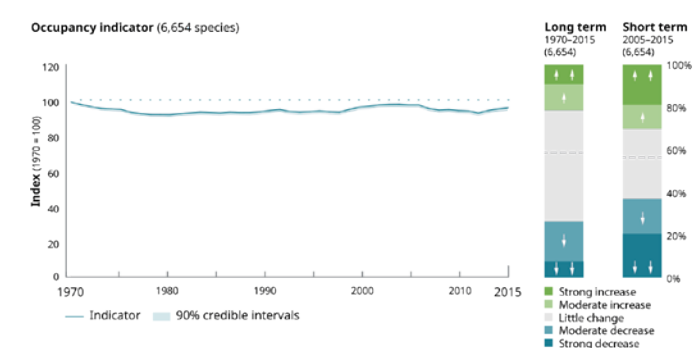


Fig. 2. National change in species' distribution⁵

Great Britain red list assessment

- 15% of species are threatened with extinction, 2% are already extinct.
- 18% of plant, 15% of fungi and lichens, 40% of vertebrates, and 12% of invertebrates are at risk of extinction.
- 32 plants, 33 fungi and lichens, 7 vertebrates, and 61 invertebrates are already extinct from Great Britain.

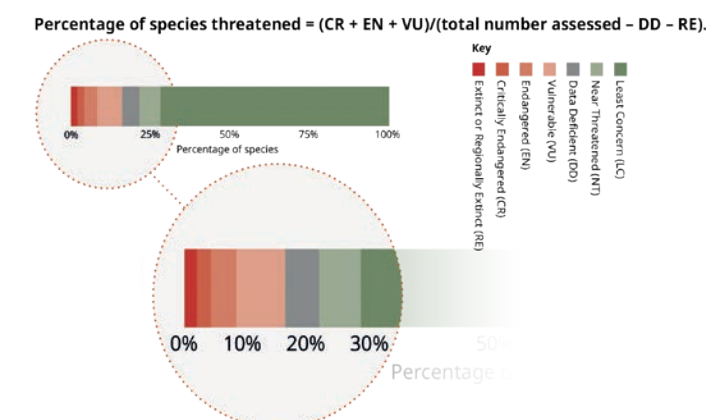


Fig. 3. Percentage of species threatened⁶

Status of UK priority species

The UK priority species (species listed in Section 41 of the Natural Environment and Rural Communities Act 2006) are the species of greatest conservation concern. Two of the official UK Biodiversity Indicators assess their status⁷.

Changes in abundance of UK priority species:

- 60% decline of abundance indicator over the long-term (since 1970), 22% decline over the short-term (2011–2016).
- Over the long-term 63% of species decreased, over the short-term 46% decreased.

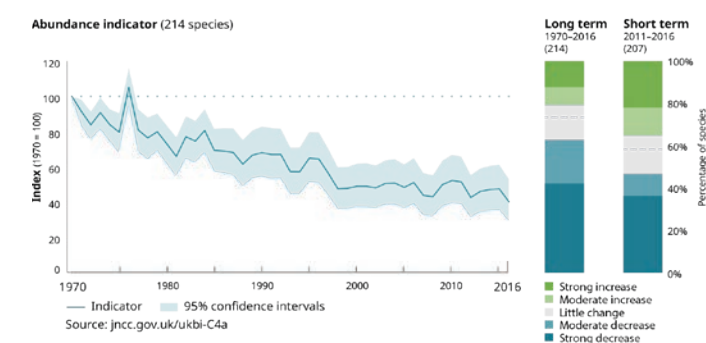


Fig. 4. Change in relative abundance of UK priority species 1970 to 2016⁸

Changes in distribution of UK priority species:

- 27% decline of indicator over the long-term (since 1970), 3% decline over the short-term (the 5 years 2011–2016).
- Over the long-term 37% of species decreased, over the short-term 50% decreased.

UK Biodiversity Indicator: Change in the distribution of UK priority species, 1970 to 2016

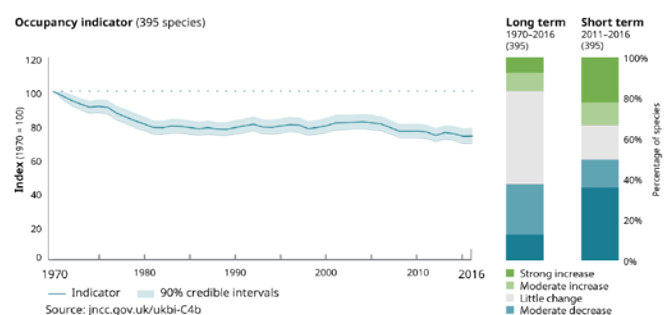


Fig. 5. Change in distribution of UK priority species 1970 to 2016⁶

Context

Policy context

It is now recognised that biodiversity is in crisis and that urgent action is needed to recover and enhance nature and enhance people's connections to nature. The Lawton Review¹⁰ (2010) investigated measures needed to enhance the resilience and coherence of England's ecological network and concluded that it needs to be bigger, better and more joined up. It also recognised that, with a very large share of biodiversity assets (50% of England's SSSIs), protected landscapes, including Nidderdale AONB, are uniquely placed to play a crucial role.

One of the key strategic ambitions of the Government's 25 Year Environment Plan¹¹ launched in January 2018 is to protect and recover nature, and to enhance the beauty of landscapes, with creation of Nature Recovery Networks (NRNs) as a key mechanism. Natural England and Defra have provided more detail on NRN principles and objectives¹², which specifically mentions the potential for protected landscapes (national parks and AONBs) to act as large scale nature recovery areas.

The 25 Year Environment Plan also outlined a commitment to consult on strengthening the requirement for the planning system to provide biodiversity net gains. Following a consultation¹³ the Government also stated its intention to introduce a mandatory biodiversity net gain requirement¹⁴ through the Environment Bill¹⁵ which was introduced to parliament in January 2020. The Bill also introduces a new statutory requirement for Local Nature Recovery Strategies. These will underpin NRNs and help guide key policies like net gain, planning, and the future Environmental Land Management system (see below).

In tandem to the Environment Bill, the Government introduced the Agriculture Bill¹⁶ which provides the framework for agricultural support schemes as the UK leaves the EU's Common Agricultural Policy (CAP). Under the proposed Environmental Land Management system in England, farmers will be paid to produce 'public goods' such as environmental or animal welfare improvements.

In July 2019 the National Association of AONB's (NAAONB) adopted the Colchester Declaration¹⁷ confirming the AONB family's readiness to act to redress declines in species and habitats, and setting out commitments up to 2030. It included initial commitments to increase connections to nature and prepare nature recovery plans within each AONB.

The final report of the Glover review into designated landscapes published in September 2019, is wide reaching and makes a series of proposals under a number of themes including 'Landscapes Alive for Nature and Beauty', 'Landscapes for Everyone' and 'Living in Landscapes'¹⁸. In relation to nature, proposals include:

- A renewed mission for protected landscapes (AONB's and National Parks) 'to recover and enhance nature' underpinned by regular and robust assessments of the state of nature and natural capital.
- A call for protected landscapes to become leaders in NRNs, a proposal strongly supported by Natural England.¹⁹

Nidderdale AONB Management Plan 2019–2024

Nidderdale AONB's Management Plan²⁰ is a high-level strategy document that provides the framework for action designed to protect the AONB's special qualities. The Plan is for everyone with an interest in the AONB.

The plan sets out a long-term vision for Nidderdale AONB to be:

- A vibrant working landscape where rural communities, land managers and other rural businesses are working collaboratively together to protect natural beauty.
- A place where environmental limits are widely respected and concerted effort is being made to reduce carbon emissions while seeking opportunities to increase carbon storage.
- Made up of a resilient landscape renowned for its high windswept moors, ancient woodlands, livestock-grazed pasture, flower-rich meadows, historic country houses and parkland filled with veteran trees.
- Home to a greater abundance and diversity of wildlife compared to this State of Nature report.
- A welcoming destination for people seeking opportunities for recreation.
- A place where people can experience tranquillity and improve their health and wellbeing.

It also sets out the focus for 2019–2024 to make significant progress towards the vision.

For wildlife, key areas will be:

- Working with land managers and partner organisations including Natural England on designated sites and improving or maintaining the condition of priority habitats outside of these designations;
- Targeting future conservation work based on comprehensive and accurate wildlife data;
- Collaborating with partners including the Northern Upland Chain Local Nature Partnership to try and reverse the decline in populations of characteristic upland species like curlew and adder;
- Continuing The Wild Watch project; and
- Ensuring that robust wildlife data is made widely available.

This State of Nature Report will contribute to delivery of these key wildlife objectives, which themselves underpin delivery of our other Management Plan objectives. It will ensure robust wildlife data is widely available. It will also support delivery of the other wildlife objectives – targeting and delivering future conservation work ourselves and with partners. The baseline information in this report will be used to develop our Nature Recovery Network Strategy which will set the framework for recovery of nature in Nidderdale AONB. Implementation of our Strategy will establish our nature network on the ground using a range of delivery mechanisms including the new biodiversity net gain policy and future Environmental Land Management scheme.

Northern Upland Chain Local Nature Partnership

Nidderdale AONB works for nature at a landscape scale as part of the Northern Upland Chain Local Nature Partnership (NUCLNP)²¹. The LNP's territory covers five protected landscapes including Nidderdale, the Forest of Bowland and North Pennines AONBs, and the Yorkshire Dales and Northumberland National Parks. The LNP is working to improve collaboration and joint-working at a landscape scale between AONBs, National Parks, RSPB, Rivers Trusts, water companies, farming and landowning organisations, and representatives of Government bodies including the Environment Agency, Forestry Commission and Natural England.

The Northern Upland Chain LNP aims to:

- Help to create a place where our special natural qualities, including breeding wading birds, blanket bogs, hay meadows, tumbling rivers, and upland woodlands, are valued for their beauty, and for their contribution to the nation's economic, physical and spiritual well-being.
- Support a living and working upland landscape. A place where an environment-based economy thrives and where development and growth take place in balance with the conservation of the natural world on which they are reliant.

Currently, LNP partners are working together on a joint curlew project.

The Wild Watch project

For the last three years Nidderdale AONB has been running The Wild Watch²². This project has carried out the AONB's biggest ever systematic survey of wildlife. It has helped people learn about and enjoy Nidderdale's natural heritage and acquire the natural history skills needed to collect data concerning the threatened species of Nidderdale.

We cannot look after Nidderdale's wildlife if we do not know its current status: whether species are common or rare, where they live, and what habitats they require to flourish. Hence a major part of The Wild Watch has been surveying species to find out exactly where they live. The project had a list of 76 target species (see *Annex 1 on page 147*) and included bird surveys (undertaken by volunteers, professional ecologists and gamekeepers), river surveys (for otter, water vole, birds – kingfisher and dipper) and selected invasive non-native species (INNS)), invertebrate surveys, botany surveys, reptile surveys, e-DNA testing for great crested newt, and citizen science records for owls and hedgehogs.

Ecological modelling of the data, in the form of Habitat Suitability Models, identified priority areas where habitats could be improved and potentially creating new habitat for some of our most important species potentially created in the future. See *Methods and data sources section starting on page 129* for more information about this modelling technique.

The project activities have provided a wealth of new data, including:

- A new habitat map of the AONB;
- Habitat Suitability Models for 10 species;
- Hundreds of species records (birds, invertebrates, reptiles, mammals, etc.) from over 650 surveys; and
- Over 1000 citizen science records for owls and hedgehogs.

It has also created an army of trained surveyors who will continue collecting new data into the future, enabling us to see how the status of our key species are changing.

Compiling the report

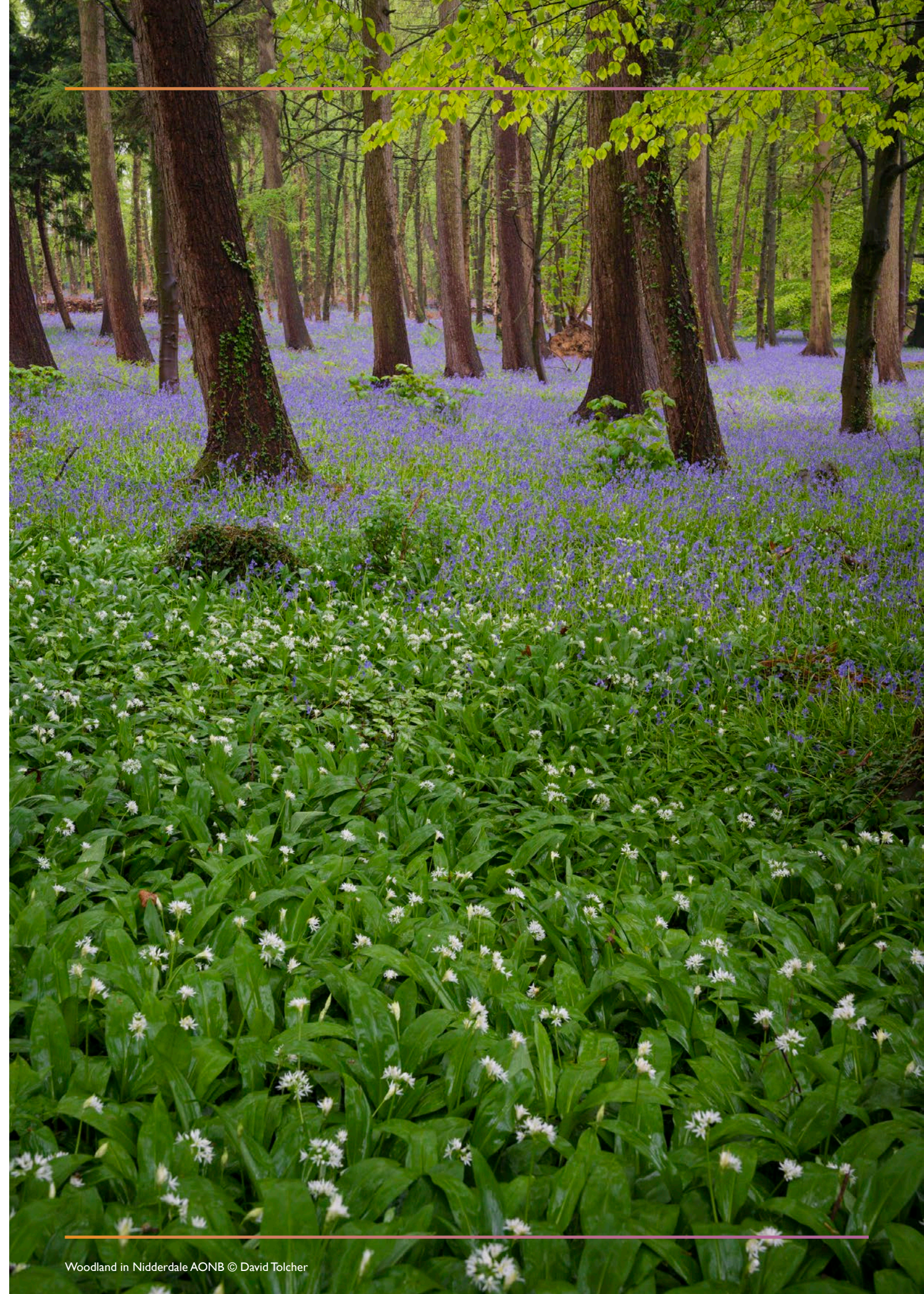
This report has been compiled by Nidderdale AONB under the guidance of a steering group. It has the support of many local and national organisations and individuals who have provided data and written content. Data has been compiled from a variety of sources including the National Biodiversity Network, North and East Yorkshire Ecological Data Centre (NEYEDC), Natural England, national species organisations, local naturalist groups, and The Wild Watch (see *Methods and data sources section starting on page 129*). We would like to thank all of those who have contributed and made this report possible (see *Acknowledgements on page 144*).

Key caveats

Whilst there is a wealth of species records for Nidderdale AONB, the varied methods of collection mean that it is hard to make estimates of populations of particular species or produce detailed trends of changes in abundance or distribution. Therefore the species data presented is not of a comparable detail to the UK State of Nature reports and instead concentrates principally on presenting information about current species' distribution (based on data collected since 2010). In addition it provides commentaries on trends in the AONB where historic data is available, and on the status of species compared to the national context.

There are different methods available for defining and mapping habitats. The UK Priority Habitat Inventory (PHI) is produced at a national scale, which means fine-scale or local areas of habitat may have been missed or excluded. Hence these figures should be viewed as a minimum estimate and additional UK PHI may be present in Nidderdale AONB.

Whilst an attempt has been made to provide fair coverage of all taxonomic groups and habitats, not all species can be represented equally due to differences in recording effort and certain species are harder to study. It is not possible to discuss all the habitats and species present in the AONB in this report, hence we have focused on the most locally relevant and important species.



Overview of Nidderdale Area of Outstanding Natural Beauty

Headlines

- Area of Outstanding Natural Beauty (AONB) status means that Nidderdale is one of the country's finest landscapes – important for its landscape, wildlife and cultural heritage.
- These special qualities are important assets in their own right, but also provide benefits to people and contribute to economic and social capital.

Context

Nidderdale AONB covers 601km² in the foothills of the Pennines in North Yorkshire (Figure 6). Local authorities act as accountable bodies for AONBs. North Yorkshire County Council covers the whole of the designated area and the majority (95%) of the AONB is part of Harrogate District. Harrogate Borough Council is lead authority for

Nidderdale AONB. A smaller area of land (5%) to the north is within Richmondshire and Hambleton Districts. Figure 7 sets the AONB in the context of local and regional administrative boundaries, including the Northern Upland Chain Local Nature Partnership (NUCLNP) boundary.

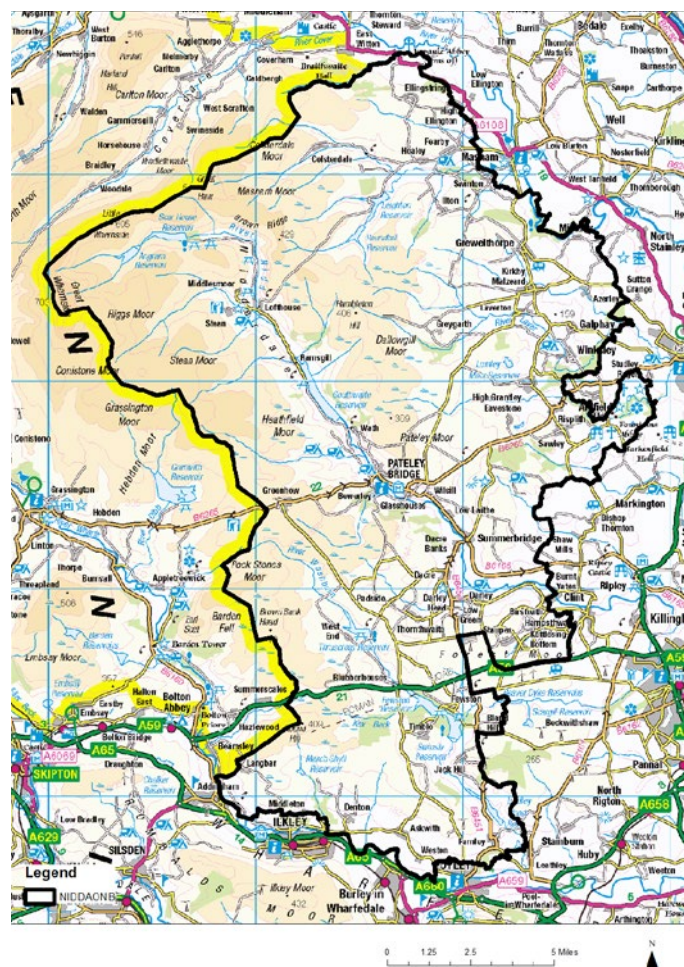


Fig. 6. Map showing the boundary of Nidderdale AONB bordering the Yorkshire Dales National Park to the west¹

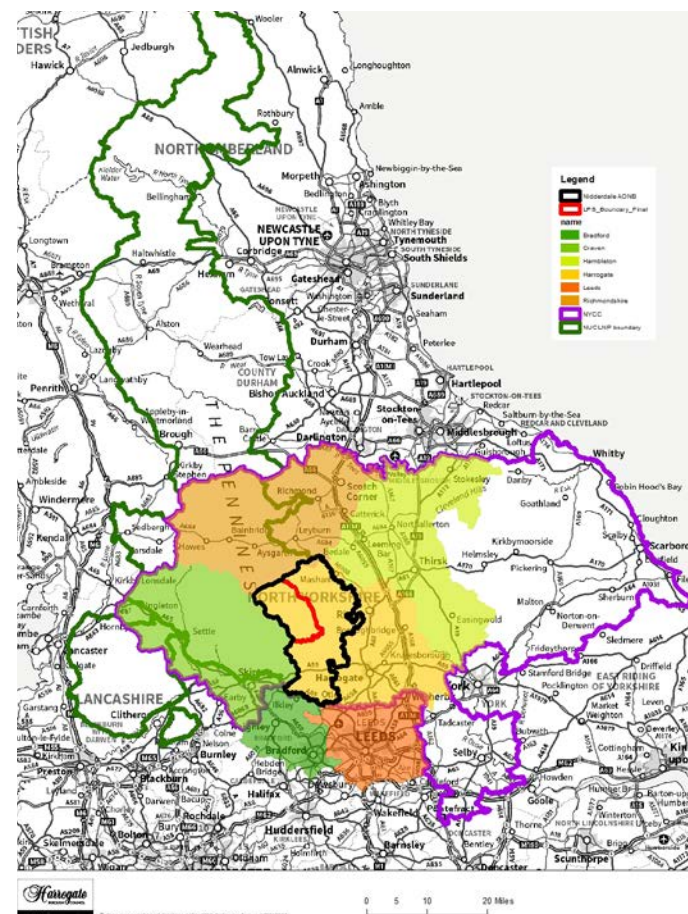


Fig. 7. Local and regional administrative boundaries²

Landscape and topography

Nidderdale AONB covers four National Character Areas (NCAs; Figure 8). Approximately two thirds of the AONB is within the Yorkshire Dales NCA, most of the rest of the AONB to the east is in the Dales Pennine Fringe NCA, with small areas to the north-east and south in the Southern Magnesium Limestone and South Pennines NCAs respectively. At a more local level the AONB has been characterised into 47 Local Character Areas. The terrain of Nidderdale AONB is varied, the highest point is Great Whernside at just over 600m above sea level, upland areas range from 300–600m, with the majority of land below 500m (Figure 9).

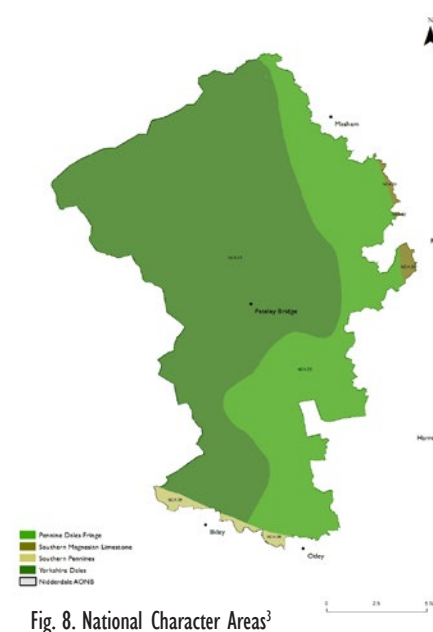


Fig. 8. National Character Areas³



Fig. 9. Terrain⁴

The landscape to the west is dominated by high moorlands managed for grouse shooting, much of which has internationally important conservation status. The moorland plateau landscape is characterised by an exhilarating feeling of openness, elevation and exposure. This landscape is accessible to walkers under Open Access provisions, and is widely enjoyed. The gritstone geology that underlies the AONB's moorland plateau outcrops in places to form crags that overlook river valleys. Elsewhere, millstone grit has formed striking weathered tors at Brimham Rocks, which is nationally important for its geological significance. Millstone grit was widely used locally as a building material, creating an appearance of unity and harmony in the landscape.

To the east, as the landscape broadens and flattens, is a softer, more pastoral landscape with historic parks and gardens and great country houses like Swinton Castle and the Fountains Abbey and Studley Royal World Heritage Site. The AONB's special qualities have been strongly influenced by farming, moorland management and industry. The remains of 19th century mines and quarries, and the dams and reservoirs constructed by the water industry are still prominent markers in the landscape. Earlier settlement, farming and industry define the form of villages and towns, transport routes, and field patterns.

Farmland is the dominant feature of the grassland plateau to the east of the moorland line. Farmsteads, often associated with small broadleaved woodlands, are distributed across a landscape that is dominated by the strong and regular grid pattern formed by drystone walls.

The transition between the upland plateau and the gently rolling landscapes that merge with the Vale of York, as well as the difference between the moorland plateau and the enclosed valleys, creates a landscape that is full of distinction. The dale and valley landscapes are enclosed and pastoral with arable and mixed farms, meadows, woodlands, stone villages, and parklands.

Soils and geology

The superficial geology of the AONB is mixed, with areas of glacial till and peat with poor drainage (Figure 10). The bedrock geology is principally mudstone, siltstone and sandstones of the Millstone Grit Group (Figure 11). Generally Nidderdale AONB has acidic rocks and soils of low permeability with small pockets of more alkaline rocks and soils with higher pH. This geology is significantly different to the predominantly limestone geology of the adjacent Yorkshire Dales National Park. As a result the AONB has quite different habitats – acid grasslands, acid woodland, different river ecology and significantly more ponds.

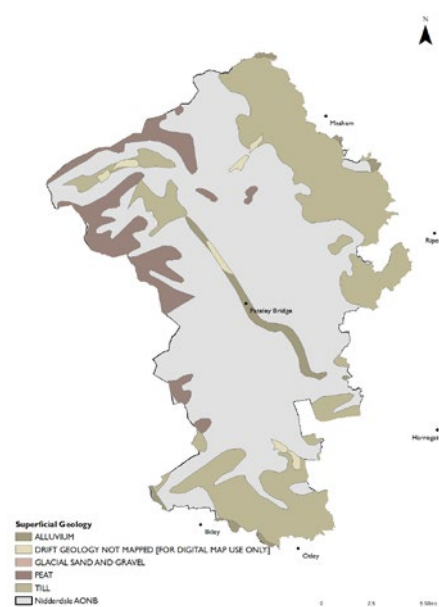


Fig. 10. Superficial Geology⁵

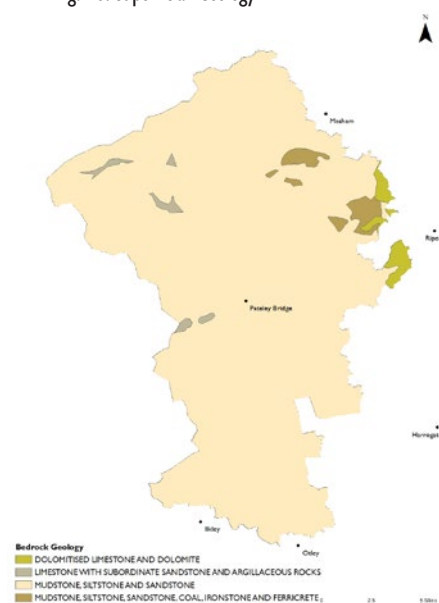


Fig. 11. Bedrock Geology⁶

Why is nature changing?

Headlines

- The national State of Nature reports ^{1,2} examined the most significant drivers of change that have acted on the UK's wildlife since 1970, both positive and negative.
- Changing agricultural management was found to have the biggest impact on nature with the great majority of the impact acting to drive down species populations.
- The second most significant driver is climate change which is causing range and population change in sensitive species alongside landscape-scale alteration to vulnerable habitats.
- Other important impacts include hydrological change, urbanisation, invasive non-native species, and how woodlands are managed. Positive impacts include wildlife-friendly farming, habitat management, and the creation of new wildlife habitats.
- This chapter looks at some of these threats in more detail, paying attention to the situation in Nidderdale AONB, including some of the positive action being taken.

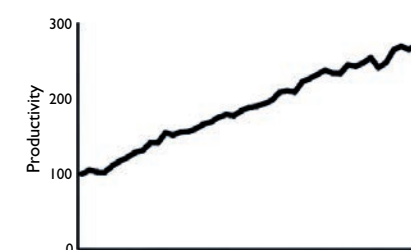
Agricultural management

There have been wide-ranging changes in agricultural management in the UK over recent decades, including increased use of pesticides and fertilisers, increased stocking rates, changes in crops and cropping patterns, farm specialisation, greater mechanisation and increase in farm size, and loss of nature-friendly features such as field margins and farm ponds. These have led to greater food production but have also had a dramatic impact on farmland biodiversity despite a long term commitment by many farmers and other land

managers to halt the decline. For example, populations of UK farmland birds have halved since 1970. Targeted wildlife-friendly farming supported by government funded agri-environment schemes (AES) can halt and reverse these trends. With the UK leaving the EU Common Agricultural Policy, new agricultural support schemes are being introduced. While the details are not yet settled, the new Environmental Land Management schemes propose that in England farmers will be paid to produce 'public goods' such as environmental or animal welfare improvements.

PRESSURE

Agricultural productivity has increased by over 150% since 1973.



STATE

Farmland bird indicator has fallen by 54% since 1970.



RESPONSE

Area under agri-environment increased to around 3 million ha.

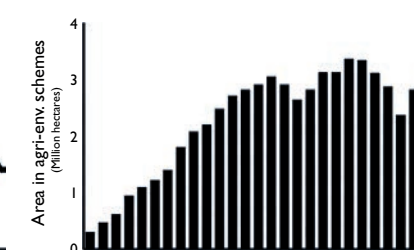


Fig. 12. National pressure, state, response statistics³

WHY IS NATURE CHANGING?

In Nidderdale AONB the use of pesticides and fertilisers has reduced over the last 20 years, as have stocking rates. Take up of AES has been relatively good, with around 80 current agreements covering an area of almost 25,000ha (about 40% of the AONB) and having a total value of £1.6 million (see distribution and coverage in Figures 13 and 14). However, as can be seen in Figure 14 the trend is a declining number of agreements over time as existing Environmental Stewardship Scheme agreements (Entry Level Scheme (ELS) and Higher Level Scheme (HLS)) come to an end and are not converted into new agri-environment schemes, the Countryside Stewardship Schemes (CSS). This rapidly declining scheme coverage of the AONB is mirrored in other protected landscapes. The key reasons for this decline is the reduction of local level Natural England adviser capacity and the increase in the complexity of the schemes.

Nidderdale AONB has a high number of recent CSS agreements compared to the total area/cost of AES in many other AONBs, however these are relatively modest in comparison to North Pennines and Forest of Bowland AONBs, largely due to the size of landholdings within the AONB. The proposed new Environmental Land Management schemes (ELMS) which will pay farmers to produce 'public goods' such as environmental improvements, sound positive for Nidderdale AONB, and a key opportunity to address the decline in uptake of agri-environment schemes. Whilst final details of ELMS are still to be agreed they could be a key mechanism for delivering our nature recovery strategy and establishing our nature recovery network on the ground.

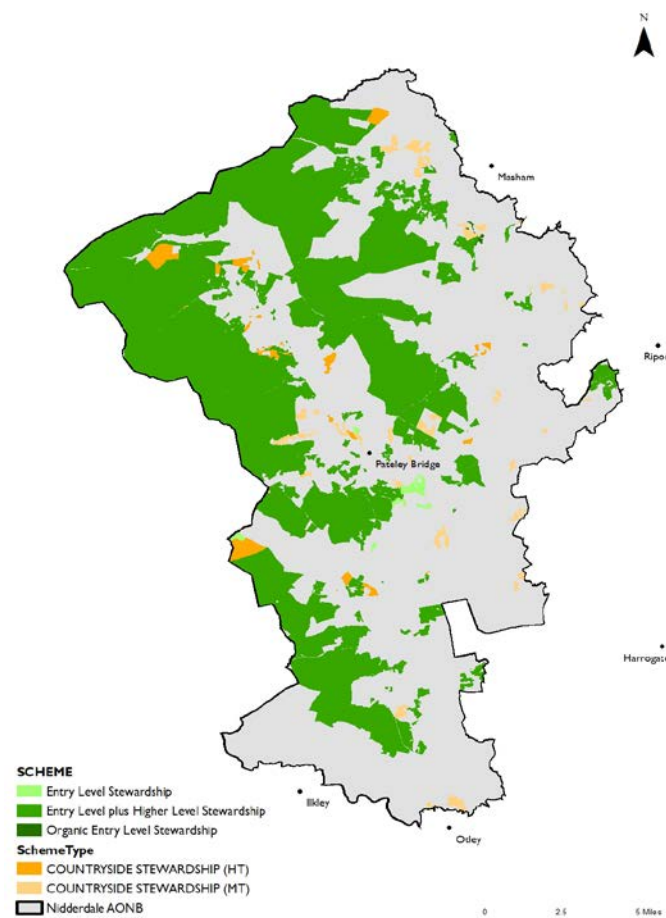


Fig. 13. Current Agri-Environment Coverage (ESS and CSS) in Nidderdale AONB⁴



Fig. 14. Agri-Environment Coverage (ESS and CSS) over time in Nidderdale AONB⁵



Case Study Nidderdale AONB land advice work

Marian Wilby, Land Management Team Leader, Nidderdale AONB

Conservation advice for AONB farmers and landowners, and supporting submission of Agri-Environment Scheme applications, is a vital part of the AONB team's work. Since 2006, it is estimated that the AONB has helped local farmers apply for grants worth over £10 million. This has enabled significant actions to support Nidderdale's nature to be implemented on a large proportion of the AONB's land. The AONB's close relationship with farmers and landowners is crucial to our work to support nature and is based on trust established through long-term working relationships and Marian's wealth of knowledge and expertise. Based on our extensive experience, the AONB has also made various contributions to calls for evidence and national consultations on new AES design therefore seeking to ensure future schemes help support Nidderdale's nature, as well as upland farmers' livelihoods.

- 2019: Successful application for three higher tier and 21 mid-tier grants plus 12 boundary grants.
- 2018: Successful application for five higher tier and 25 mid-tier grants plus 15 boundary grants.
- 2017: Successful application for one higher tier and 24 mid-tier grants plus 15 boundary grants.
- 2016: Successful application for one higher tier and eight mid-tier scheme grants⁶.
- 2015: Conservation advice to 136 farmers. Successful application for four higher tier grants⁷.
- 2014: Negotiated 33 grants covering more than 2,500ha of the AONB and worth almost £1.8 million for AONB farmers⁸.
- 2013: Negotiated 11 HLS farmland conservation grants covering more than 3000ha of the AONB and worth nearly £2 million for AONB farmers⁹.

Case Study High Nature Value Farming in the North Upland Chain¹⁰

Marian Wilby, Land Management Team Leader, Nidderdale AONB

High Nature Value (HNV) farming describes low intensity farming systems in the uplands, where farming is limited by topography, altitude and climate that are particularly valuable for wildlife, the environment and people – for example, flower-rich meadows and moors with curlew. We collaborate with other Northern Upland Chain (NUC) partners to promote HNV farming.

Much of the stunningly beautiful hills and dales in Nidderdale, and the wider NUC area, may look wild but have been managed by generations of farmers. Local farming systems use traditional livestock breeds like Swaledale sheep that have adapted to cope with the harsh conditions and form the backbone of the national sheep industry. Farming in these uplands also helps regulate the flow of many rivers minimising flood peaks, maintains large areas of land that is accessible by the public for recreation, and manages the beautiful landscapes that support a multi-million pound tourist industry.

But farming in these uplands is tough, with long, cold winters, high rainfall, and a short growing season. The systems that make best use of the land are relatively labour intensive with low productivity yield, so farming here costs more and produces less. Many of the benefits that HNV provides are not rewarded by the market therefore without support from public money most of these farmers would disappear.

HNV farming remains the best and only realistic way of maintaining some of this country's most valuable habitats and landscapes, including Nidderdale. The NUC Local Nature Partnership (LNP) has been collaborating with groups of local farmers to explore ways of securing a more robust economic future and delivering more environmental benefits. It is calling on Government, Local Enterprise Partnerships, environmental agencies and the farming

community to work together to support HNV farming, including taking action to:

- ensure the new Environmental Land Management scheme (ELMS) targets support to HNV farmers;
- provide a stronger voice for HNV farmers in developing policy;
- raise awareness of HNV farming and the fantastic food it produces;
- develop tailored programmes of support, advice, and capital investment that are more easily accessible to upland farm businesses;
- introduce a more collaborative approach to the delivery of schemes, using the skills and knowledge of HNV farmers to deliver environmental outcomes; and
- develop new payment mechanisms to enable the market to reward HNV farmers for the many public benefits they provide.

Climate change

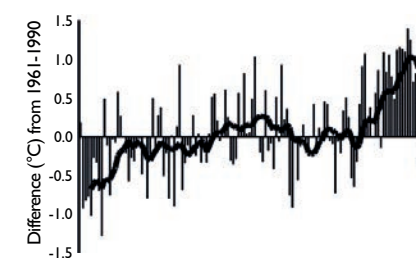
Increasing annual average temperatures, and rainfall and rising sea levels are just two of the symptoms of the complex climatic changes experienced in the UK over recent decades. There is growing evidence that climate change is driving widespread and rapid changes in the abundance, distribution, and ecology of the UK's wildlife and will continue to do so into the future. Many species, including birds, butterflies and moths, have shifted their ranges north over the last four decades and the onset of seasonal events is earlier for a wide range of species.

A UK-wide study of the impacts of climate change on species looked at 402 species, suggesting that 35% are at risk of range loss, particularly amongst bryophytes and vascular plants, while 42% may expand their range. Worryingly three-quarters of the upland species considered are predicted to be at risk from climate change¹¹. Many of the UK's upland species are already at the southern edge of their ranges and may be forced to move northwards in response to climate change. The climate some of these species favour may also move to higher

elevations. The result will be smaller UK ranges for many species and for some species it could mean UK-wide extinction.

PRESSURE

All the top 10 warmest years since records began have occurred post-1990.



STATE

Climate change has already impacted population trends of moths (explaining 40% of the decline) and aphids (explaining 60% of the increase).

RESPONSE

Protecting nature-rich areas secures carbon, benefits species and provides vital ecosystem services – providing benefits all round.

Fig. 15. National pressure, state, response statistics¹²

Case Study Climate change and Nidderdale AONB's species

Species distributions could change within Nidderdale AONB resulting in the loss of some of our species. For example, woolly willow found at Greenhow is at the southern-most edge of its range and may be lost from the AONB if temperatures rise. Bats currently use caves in the Yorkshire Dales, including in Nidderdale, as roosts, but if temperatures rise these caves may no longer be suitable roosts. It has also been observed that barn owls appear to be moving to higher areas within the AONB.

Case Study Making Nidderdale AONB's nature areas more resilient

There is strong evidence that protected areas, such as SSSIs, remain a vital conservation tool despite shifting species' distributions. For example, protecting important areas of semi-natural habitat will be important in providing areas for species to move into as they shift northwards. However if species are to move, habitat connectivity is vital, especially for less mobile species. To make our biodiversity more resilient to climate change, Nidderdale AONB will be looking to link up fragmented areas of habitats, and create ecological stepping stones and corridors¹³. Over the next year we will be using this State of Nature report as part of the baseline for identifying key areas to target for habitat restoration or creation to help our nature adapt.

Case Study A Natural Capital Investment Plan for peatland in the Northern Upland Chain¹⁴

Peat is our best natural store of carbon – there is more carbon stored in the peatlands of the UK than in the forests of the UK, France and Germany combined. Damaged peatlands do not have the same capacity for carbon storage and can even actively contribute to climate change by releasing stored carbon back into the atmosphere.

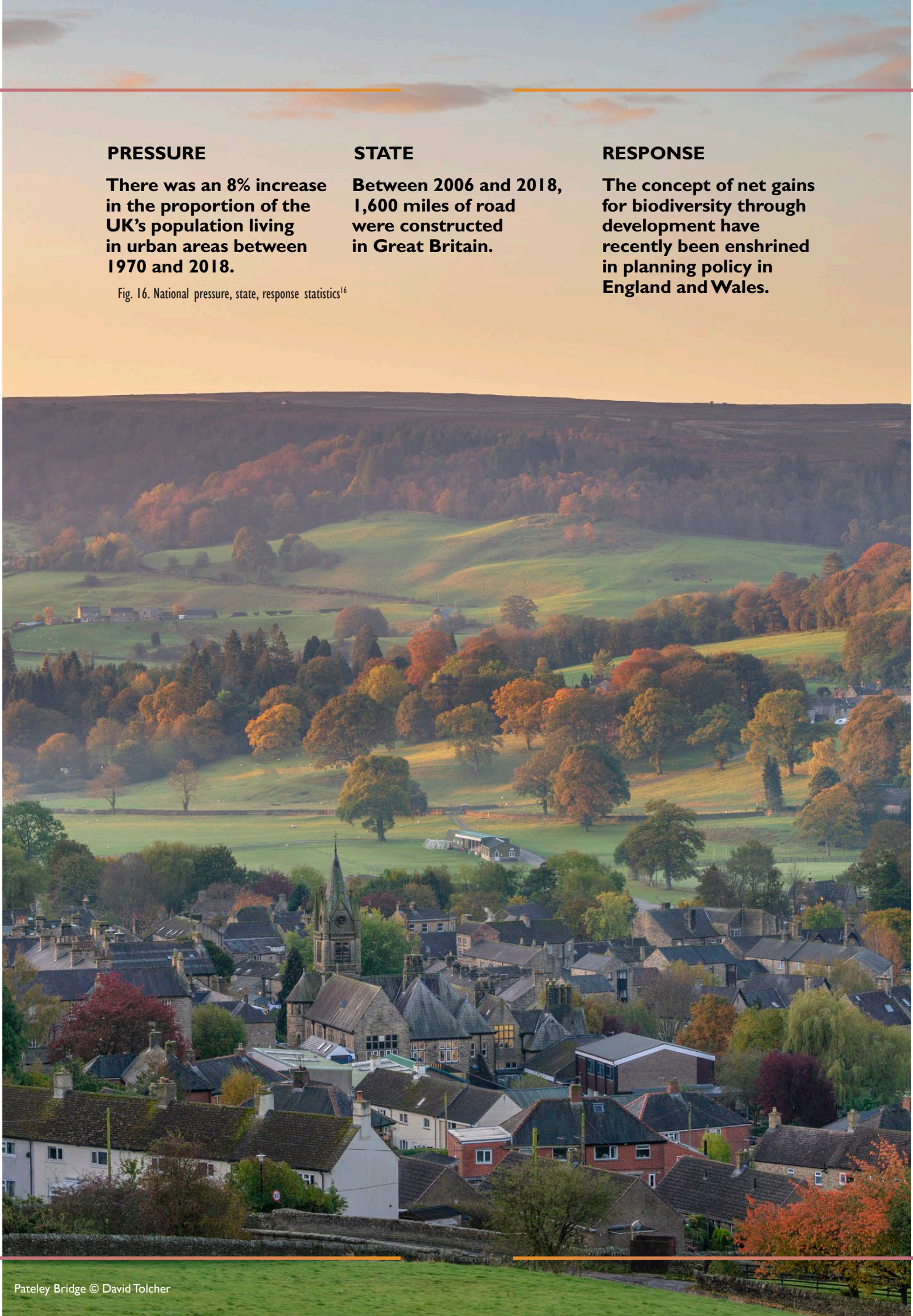
To stimulate new investment in peatlands in the northern uplands, the NUC LNP has produced a Natural Capital Investment Plan. The current area of peatlands in the LNP is 253,500ha and includes almost 40% of all the deep peat in England. In the 10 years to March 2019, the Yorkshire Peat Partnership has completed restoration plans for over 46,500ha of blanket bog, blocked 1844km of eroding grips (moorland drains), and blocked 181km of eroding gullies¹⁵. However, despite significant successful restoration activities in recent years, an estimated 130,000ha

remains degraded. Improving the condition of this degraded peatland will provide £460 million net benefit to society over 40 years, just from reducing the amount of carbon being released into the atmosphere. Further significant benefits are likely to accrue through improved biodiversity (estimated at £300 million over 40 years), improved water quality through reduced sedimentation and water colouration, and improved natural flood management reducing downstream flooding.

Urbanisation

The UK’s human population has risen steadily over the last century, mainly centred around urban areas. This has required infrastructure developments to meet the demand for food, homes and transport. Development for housing, industry and infrastructure result in direct habitat loss as well as fragmentation and changes in the remaining habitat.

Nidderdale AONB is home to around 16,000 people and is largely rural. While it has modest development pressure compared to many other areas, the landscape is such that the siting of development is key and even small-scale development can have a significant impact. Proposals in the AONB tend to be of small-scale, however in recent years there has been increased housing development in some of the larger villages. Working with applicants to ensure development proposals are consistent with AONB objectives, commenting on planning applications that are large scale or might have an impact on the AONB, and contributing to planning policy affecting the AONB is a key part of the AONB’s work.



PRESSURE	STATE	RESPONSE
There was an 8% increase in the proportion of the UK’s population living in urban areas between 1970 and 2018.	Between 2006 and 2018, 1,600 miles of road were constructed in Great Britain.	The concept of net gains for biodiversity through development have recently been enshrined in planning policy in England and Wales.

Fig. 16. National pressure, state, response statistics¹⁶

Pateley Bridge © David Tolcher

Case Study Habitat Suitability Modelling and the role of citizen science in providing data for local decision-making

Dan McAndrew, Principal Ecologist, Harrogate Borough Council

Planning for biodiversity is dependent on having access to good data, especially in the light of growing policy pressure to ensure that development incorporates net biodiversity gain. This policy shift reflects widespread and growing public concern about the progressive decline in biodiversity, and the consequent acceptance that land use planning could and should contribute to reversing this decline. To achieve this for development management in planning requires a baseline of ecological data to ensure that appropriate ecological mitigation, compensation and enhancement is put in place as a requirement for granting of planning permissions. Site-based ecological surveys are essential in order to provide this baseline information but the wider landscape context of the setting is also important. The costs of surveys must also be reasonable in relation to the scale of the proposal, so that including improvements for wildlife within developments is not viewed negatively and so that excessive survey costs do not deflect the provision of resources away from compensation and enhancement for wildlife.

The compilation and dissemination of existing ecological data to relevant parties (including the applicant’s ecological consultants, local planning authority, and interested third parties) by organisations such as the North and East Yorkshire Ecological Data Centre plays an important role in providing the context for site-based ecological surveys. However, Harrogate District covers a large area (over 500 square miles) approaching half of which lies within the Nidderdale AONB. Existing data on the presence of protected and priority species in the District is patchy. Habitat Suitability Modelling (HSM) can provide scientifically objective criteria to help focus survey effort on where it is most required and for what species. So it could

provide evidence, for example, that surveys for great crested newts might not be required for developments adjacent to ponds in moorland habitats if these habitats are demonstrated to be very unlikely to support great crested newts, whilst highlighting other areas where an absence of records may more likely indicate a lack of survey effort to date, rather than the absence of a species.

In other cases, HSM may support the case for ecological surveys and mitigation to be undertaken where the requirement for them may be in dispute or where professional judgements may differ. This has sometimes occurred, for example in areas fringing the uplands of the AONB, where habitats may be sub-optimal for bats in comparison with some lowland areas. Nevertheless, work undertaken in the Yorkshire Dales and Nidderdale AONB by Eloise Brown of Leeds University¹⁷ has shown that such habitats are likely to support a number of bat species, depending especially on their proximity to trees, woodland, and open or running water. This has resulted in a habitat suitability map which indicates the probability of the presence of individual species or an assemblage of bat species foraging within particular locations at a scale that is useful for development planning purposes.

I have used this work to argue successfully for bat surveys to be undertaken and for mitigation to be provided in situations where ecological consultants have felt intuitively that this might not be necessary, but where the HSM maps have demonstrated that several bat species are likely to occur. HSM is also able to demonstrate the value of connectivity and corridors within the landscape which has enabled the local planning authority to require such features to be buffered from development, particularly in respect of lighting impacts. This pioneering work provided an inspiration for the AONB's Wild Watch project.

The future development of HSM on the basis of work undertaken by The Wild Watch project's volunteers offers the opportunity, using citizen science, to provide more detailed data on which improved modelling can be built and to extend this approach to other species and habitats.

As the results of structured surveys are compiled so that better models can be developed and widely disseminated on accessible desk-top GIS platforms, this can tie into a requirement to provide net gain for biodiversity, including the principle of biodiversity offsetting, within the planning system. There is great potential for HSM to be used more pro-actively as a tool to identify important stepping stones and corridors for wildlife where habitat creation should be prioritised. This can help ecological compensation and enhancement in planning to be utilised in conjunction with other delivery mechanisms, such as agri-environment schemes to help develop local ecological networks, providing connectivity for wildlife across the landscapes of the Nidderdale AONB and Harrogate District.

Case Study **Yorkshire Water Biodiversity Net Gain Commitment**

Ben Aston, Technical Specialist (Ecology, Biodiversity and Invasive Species), Yorkshire Water

Within their 2020–2025 business plan, Yorkshire Water have committed to achieving Biodiversity Net Gain within their internal development and maintenance projects and signed up to the CIEEM/CIRIA/IEMA 10 Good Practice Principles¹⁸. Whilst the legal framework is currently lacking in formally defining and measuring how this will be achieved, the company has committed to mapping its estate to create a publicly reported baseline on the various ecological habitats present across its landholdings, publicly report on gains and losses within these over the business cycle, and to pilot mechanisms through its construction and land management programmes to help achieve biodiversity net gain through the DEFRA 2.0 Metric¹⁹.

Invasive Non-Native Species

The impact of invasive non-native species (INNS) has long been recognised as a major driver of environmental damage, noted as one of the top five drivers for biodiversity loss and ecosystem change²⁰. Impacts are evident across all ecosystems, with particularly severe impacts on native woodlands, freshwater and riparian habitats, and INNS impacts can exacerbate other pressures, such as land use change and climate change. There are currently around 2,000 non-native species known to be established in Great Britain, with 10–12 new species establishing each year on average. Around 12% of these species cause serious adverse impacts, and are therefore classed as invasive (INNS).

The introduction and spread of INNS and animal/plant diseases pose a significant threat to the special landscapes and wildlife of Nidderdale AONB, either directly, for example through the spread of disease or competition for resources, or indirectly, for example by causing or exacerbating damage to vital wildlife habitats. They can also impact on our enjoyment of the AONB by restricting access or changing the character of landscape features. Species such as Giant Hogweed can even present a hazard to human health.

Introduction of INNS to an area can also have economic and social impacts, by increasing flood risk, damage to infrastructure, or costs of control. It is estimated that INNS and animal/plant diseases cost the UK economy approximately £1.7 billion²¹ a year. Once established, eradication is often impossible and costs of control are large. Therefore stopping the spread by implementing simple biosecurity measures is often the most cost-effective way of combatting the problem. Table I summarises the INNS species currently known to be present in the AONB.

Nidderdale is part of the Yorkshire Dales Biodiversity and INNS Group²², which collaborates to take a strategic and co-ordinated approach to biosecurity and the management of INNS. The group recently agreed a scoring system to evaluate the impact of various INNS in the Yorkshire Dales and assigned targets for INNS control for each species.

Table I. Known INNS in Nidderdale AONB

Species name	Status in AONB
Himalayan balsam (<i>Impatiens glandulifera</i>)	Extensive within the AONB – see case study below
Japanese knotweed (<i>Fallopia japonica</i>)	Present but not extensive within the AONB
Zebra mussel (<i>Dreissena polymorpha</i>)	Present at some sites within the AONB
New Zealand pigmy weed/Australian swamp stonecrop (<i>Crassula helmsii</i>)	Present at some sites within the AONB, including Gouthwaite Reservoir – see case study below
Batchelor's buttons (<i>Cotula alpina</i>)	Present at some sites within the AONB, including Upper Nidderdale – see case study below
Giant hogweed (<i>Heracleum mantegazzianum</i>)	Common around the fringes of the AONB
Signal crayfish (<i>Pacifastacus leniusculus</i>) & crayfish plague	The gradual spread of signal crayfish within our river systems threatens the future of our native white-clawed crayfish within the AONB and across the UK
Floating pennywort (<i>Hydrocotyle ranunculoides</i>)	Currently found on some of the river systems linked to the Yorkshire Dales, but has not yet made it into the AONB
Tree diseases	Non-native diseases threaten the health of our woodlands with ash and larch currently under particular threat
New Zealand Willowherb (<i>Epilobium brunnescens</i>)	Present at some sites within the AONB
American Skunk Cabbage (<i>Lysichiton americanus</i>)	Not currently in the AONB, but close by
Common yellow monkeyflower (<i>Mimulus guttatus</i>)	Present at some sites within the AONB
Muskflower (<i>Erythranthe moschata</i>)	Present at some sites within the AONB
American Mink (<i>Neovison vison</i>)	Present at some sites within the AONB
New Zealand mud snail (<i>Potamopyrgus antipodarum</i>)	Present at some sites within the AONB



Case Study **Himalayan Balsam Control: Upper River Nidd and tributaries**

Jackie Smith, Headwaters for Healthy Rivers Project Officer, Nidderdale AONB

In 2019 Nidderdale AONB were awarded an EU Water Environment Grant (WEG) by the Environment Agency to address invasive non-native species (INNS), in particular Himalayan balsam, in the Upper Nidd catchment. The control of Himalayan balsam in Upper Nidderdale is listed as an action priority in the INNS Strategy for the Yorkshire Dales.

Himalayan balsam is a highly invasive non-native species that creates dense stands of vegetation and is able to outcompete native flora, particularly on riverbanks and in damp areas. The plant is an annual and following winter dieback it leaves fragmented habitats and riverbanks vulnerable to accelerated erosion which can then lead to the sedimentation of riverbeds. This has serious consequences for riparian/freshwater ecosystem functioning and poses a risk to the integrity of the habitats, as well as to water quality.

The key objectives of the Headwaters for Healthy Rivers project are:

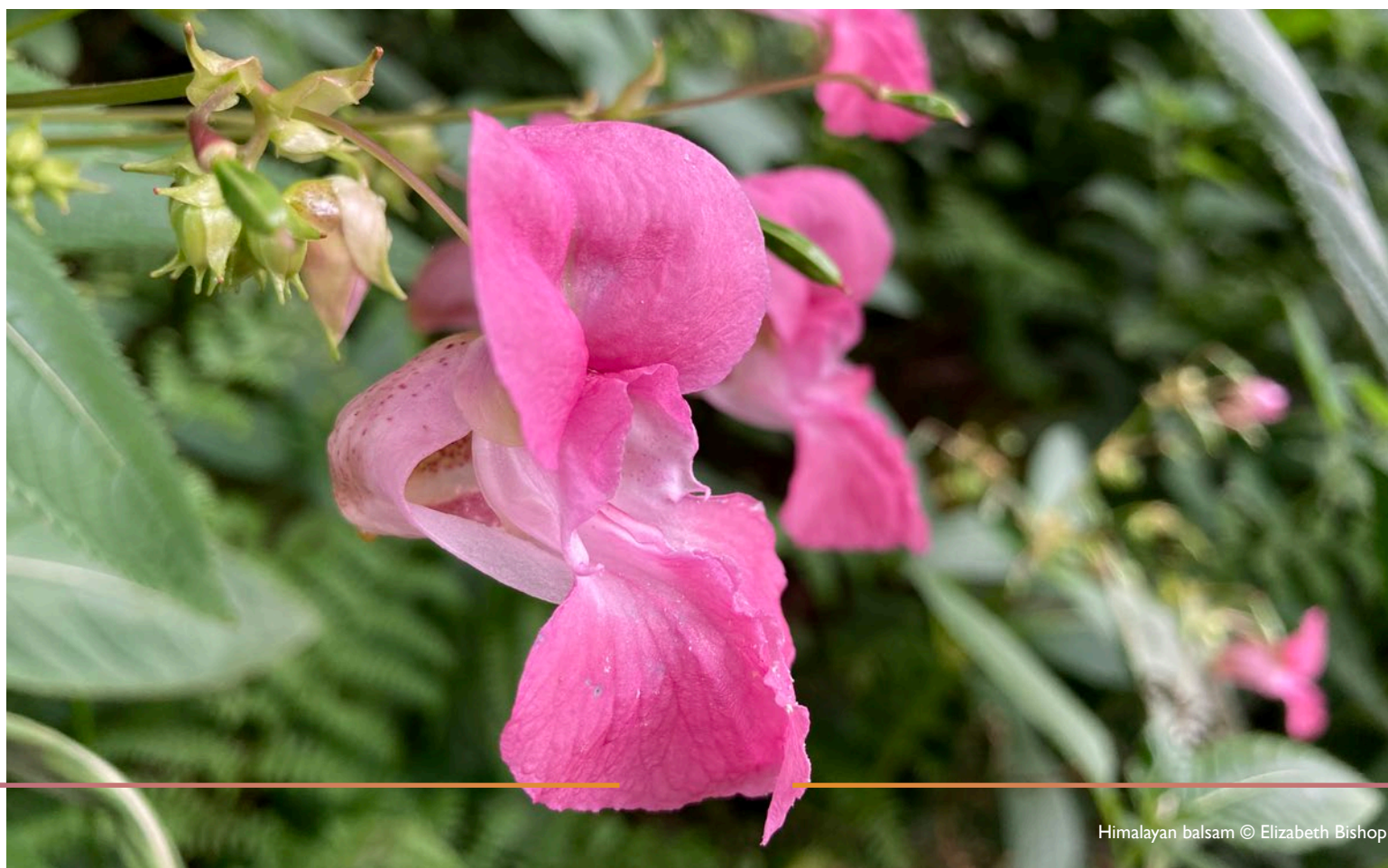
- Prevent Himalayan balsam establishing in areas currently unaffected.
- Reverse the spread and eradicate it at sites currently affected.
- Stakeholder engagement to encourage the prevention, identification, control and monitoring/reporting of Himalayan balsam.

The headwater waterbodies of the Nidd (The River Nidd, How Stean Beck, and Gouthwaite Reservoir SSSI) and associated tributaries have been surveyed to establish the distribution and extent of Himalayan balsam on the River Nidd from Wath bridge, upstream. The survey found that Himalayan balsam occurs along 16km of the River Nidd and its tributaries including the length of Gouthwaite Reservoir; covering an estimated 13.5ha with varying densities ranging

from localised areas of dense cover to occasional clusters or singular plants. Himalayan balsam is also found along roadsides and within areas of ungrazed land such as woodland or bracken beds.

Should it continue to spread, its impact will be much more difficult to manage in future years and of detriment to the habitats and the ecological status of the watercourses and Gouthwaite Reservoir SSSI. To ensure the complete eradication of Himalayan balsam in the upper catchment, a concerted effort to control the species by landowners and targeted contractor effort is required to avoid an escalation of the problem.

Through funding from the Environment Agency and from Yorkshire Water, a programme of Himalayan balsam control has been initiated within Upper Nidderdale with approximately 5ha controlled in 2018 and 16ha controlled in 2019. Control methods used were both chemical spraying and hand-pulling; using volunteers and targeted contractor efforts for hand pulling and contractors for specialised chemical control. Four landowners are currently involved and helping take control of Himalayan balsam on their land.



Funding from the project continues for the 2020 control season, with potential further funding from Yorkshire Water in future years.

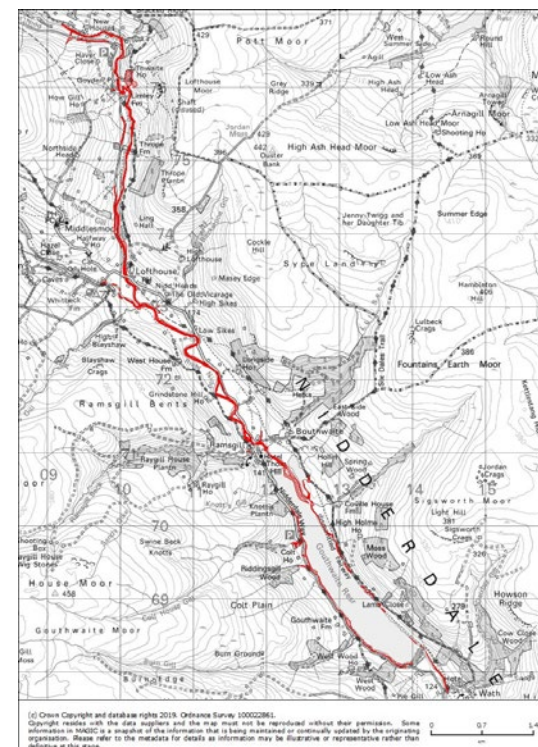


Fig. 17. Extent of spread (marked red) of Himalayan balsam in the Upper Nidd catchment. Note: the red line depicts recorded Himalayan balsam irrespective of whether it is singular plants or dense continuous patches.

Case Study **Gouthwaite Reservoir *Crassula helmsii* trials**

Ben Aston, Technical Specialist (Ecology, Biodiversity and Invasive Species), Yorkshire Water

Yorkshire Water own Gouthwaite Reservoir, a nationally important SSSI site designated for the bird assemblages that are present. An invasive non-native species, variously known by the common names of New Zealand pigmy weed or Australian swamp stonecrop (*Crassula helmsii*) is present on the site, and is dominant across the mudflat and delta areas commonly used by wading birds for feeding. The company is mid-way through a programme of trials to attempt to manage this species and thereby help safeguard the ecosystem services the site can offer.

Trials of herbicide, hot foam and hot water have been undertaken, where along with control plots, management was undertaken at a variety of depths of *Crassula*. Initial results have not been promising, with only glyphosate offering partial control, and at a level where both *Crassula* material remains, preventing access to the mudflats, and regrowth occurs quickly undoing the benefit.

The company has subsequently partnered with CABI, DEFRA, Natural England and South West Water to trial the use of a biocontrol mite from *Crassula*'s native range. Initial investigations have been testing the mite's ability to overwinter in Yorkshire, prior to large scale releases to test the efficiency of management.

The company is committed to protecting the value of the site for nature, and has further plans in its next business cycle to ensure robust monitoring and management is available where evidence suggests it will be effective.

Case Study **Alpine cotula (*Cotula alpina*) – an invader from Australia**

Kevin Walker, Head of Science Botanical Society of Britain and Ireland, Harrogate District Naturalists Society

In 2009 Linda Robinson, the Botanical Society of Britain and Ireland's recorder for Northwest Yorkshire, found an unfamiliar plant growing by a roadside above Lofthouse in Upper Nidderdale. After searching images on the web she soon realised that the plant was an introduction, *Cotula alpina*, a rare native of southwest Australia and Tasmania that up to that point had not been recorded anywhere else in the world.

Subsequent research by Linda and by Kevin Walker have shown that Alpine cotula is well established along about 35km of moorland tracks on the eastern side of Upper Nidderdale as well as in similar habitats on the North Yorkshire Moors. In addition, in 2009 it was also found on the Coigach peninsula in northwest Scotland where it is spreading rapidly in acid turf by tracks and roads. In its native range *C. alpina* is confined to damp heaths and springs at high altitudes in the mountains of New South Wales, ACT, Victoria and Tasmania.

In Northern England it has a very different niche – its main habitats are constructed moorland tracks and roadside acid grassland grazed by sheep. More rarely it colonises areas of burnt heather or mosses in trackside ditches. Although it barely reaches more than a few centimetres in height it flowers prolifically over an extended period (April till October) producing hundreds of tiny seeds that stick to the feet of passing sheep, people and to vehicles. It also produces tough rhizomes that route at the nodes allowing it to spread vigorously in short grassland. Detached fragments are also likely to re-root. It therefore is able to disperse effectively along tracks or colonise new sites.

Research has shown that it has been present in Nidderdale since at least the early 1970s. How it arrived is a mystery. *C. alpina* is rarely grown in gardens although survives in lawns and

parkland at Roundhay Park in Leeds where it was presumably introduced for ornament during the early 20th century. Alternative theories include introduction in wool waste or medicated grit imported from Australia. However it arrived, it is now thoroughly naturalised within the AONB where it appears to be relatively benign despite having become locally dominant within road and trackside grasslands.



Fig. 18. Known locations of Alpine cotula in the UK.

Recommendations and future actions

AONB plans and commitments

The AONB is committed to the following actions by 2024:

- **Agricultural management**
Increasing the environmental sustainability of farms in Nidderdale by contributing to the development of the new Environmental Land Management scheme.
- **Climate change**
Reducing carbon emissions and increasing the AONB's capacity for carbon storage through moorland restoration and increasing the amount of woodland cover.

Adopting climate change adaptation measures:

- Implementing a habitat expansion, linkage and creation programme;
- Working with land managers and partner organisations to reduce the risk of moorland wildfires;
- Implementing natural flood management measures on AONB river catchments.

Urbanisation

Developing a Biodiversity Net Gain policy and working with businesses to ensure proposals for new development deliver a net biodiversity gain.

Invasive Non-Native Species

- Reducing the impact of INNS by participating in the Yorkshire Dales INNS Steering Group including using risk assessment outputs to help fund biosecurity for AONB volunteers and staff.
- Collaborative work with the Yorkshire Dales Group to strategically manage INNS, especially Himalayan balsam in Upper Nidderdale.
- Undertaking public awareness measures to help people identify, control and monitor INNS.

What can you do?

Groups, individuals and the general public can:

- Contact us to discuss new development proposals.
- Volunteer with the AONB for example in recording INNS, and taking part in INNS management.
- Take biosecurity measures to protect the AONB from the spread of INNS²³ and consider designating a biosecurity officer for your organisation.

Local action and people

Headlines

- People are interested in nature, but there is a gap between people's values and actions, thought to be at least part due to people's disconnection from nature.
- Nidderdale AONB has a long history of active naturalist groups collecting valuable biodiversity data and people volunteering in practical nature conservation.
- The Wild Watch project sought to build on this, raising awareness of Nidderdale AONB's nature with wider audiences and collecting large amounts of new survey data. Over 3,000 new surveys were carried out and in excess of 1,000 new citizen science records submitted. Over 6,400 people attended over 140 events and volunteers gave 4,500 hours of their time.
- Over the last five years, public sector spending on biodiversity in the UK has declined, while spending by NGOs has increased. In this period Nidderdale AONB has helped channel over £3.4 million of external grants into nature conservation and two local funds, the Greenhow Fund and the Friends of Nidderdale AONB Countryside Fund, have invested over £86,000 in local wildlife and cultural heritage conservation projects.
- The AONB is committed to supporting our biodiversity volunteers, collaborating with others, and continuing to raise awareness of Nidderdale AONB's biodiversity whilst raising funds for nature conservation work. Contact us if you are interested in volunteering.

Connection to nature

As wildlife populations decline, there is increasing concern about people's willingness to act to reverse this. Wildlife programmes such as the BBC's Spring and Autumn Watch are extremely popular and conservation NGOs such as The National Trust and RSPB have high membership. Recent research on how people enjoy and use nature¹ shows how important greenspaces are to the nation's mental and physical wellbeing, and there has been a marked increase in visits to the natural environment over the last decade. However, there are inequalities in access, with children from the most deprived areas 20% less likely to spend time outside than those in affluent areas.

There is a recognised gap between people's values and their actions. This is thought to be in part due to people's disconnection from nature – people don't protect what they don't know. Research commissioned by RSPB² reveals the proportion of children playing out in natural spaces has dropped by as much as 75 % over the last 30 to 40 years, and

the RSPB predicts that if the decline continues, the consequences for wildlife and people could be catastrophic. This underlines the importance of creating new opportunities for people to connect with nature, wherever they live and whatever their age, so that a much broader range of people can enjoy the many benefits nature brings and also take part in caring for their environment.

We know Nidderdale's natural heritage is important to people. In the 25 years since the AONB designation was confirmed by Government, thousands of people have taken part in wildlife events and hundreds of people have joined our brigade of conservation volunteers. And when Nidderdale's wildlife habitats and species are threatened or harmed, people contact us for reassurance – members of the local community certainly, but those from further afield as well. The Wild Watch sought to build on this interest, increasing the number of people aware of, and engaged in looking after Nidderdale's nature.

Time given by volunteers

Volunteers donate a huge resource to UK conservation. It is estimated that 7.5 million volunteer hours go into collecting biodiversity monitoring data each year³.

Nidderdale AONB has a long history of volunteers undertaking practical conservation work including habitat management activities like tree planting. Whilst there are a number of local naturalists and naturalist groups active in the area, it was apparent from analysing historical data that there were huge gaps in the information available for the AONB. The Wild Watch has started to raise further awareness of Nidderdale's amazing nature and fill these gaps to gain a better understanding of wildlife and habitats in the AONB.

A key part of The Wild Watch was to gather new data, working not only with professional ecologists and local naturalists but also to train volunteers to carry out surveys. A total of 110 volunteers were recruited, and trained in different survey techniques and identification skills. This has amassed a huge 4,500 volunteer hours over the course of the three year project, and has significantly increased the skills of the volunteers. Feedback from volunteers involved with the project has been positive.

- “ It's an opportunity to learn more about our local wildlife. It encourages you to get outside and to do something useful for the AONB.” - Volunteer 2018
- “ It extends your knowledge and puts your knowledge to good use. There's a variety of training to opt into. I'm enjoying doing it. There's a semi-social element to it.” - Volunteer 2018
- “ It's an opportunity to learn more about wildlife, play an active part in helping gather data needed to protect it, and a really good excuse to be outdoors in fabulous surroundings.” - Volunteer 2018

Case Study Nidderdale AONB Botany Volunteers

A small group of volunteers were recruited and trained in plant identification skills by the Upper Nidderdale Landscape Partnership (a previous Nidderdale AONB Heritage Lottery-funded project). The volunteers all completed the online and homebased 'indentiplant'⁴ training and attended various AONB-run training courses. As the Upper Nidderdale LPS project came to end, The Wild Watch project gladly took on the training and support mantle, knowing that the botany surveys planned for The Wild Watch required volunteers with good plant identification skills. More training was planned and the volunteers started plant surveys for the project during 2018 and 2019.

Over the two years 52 transects were walked in all areas of the AONB. Along the survey transects 520 quadrats were also surveyed by volunteers. This has led to 283 species records (from The Wild Watch target list) being gathered. There was an exciting moment whilst out on one training course when it was thought that the very rare pale forget me not (*Myosotis stolonifera*) had been found (see *Pale Forget-me-not case study on page 120*), to the disappointment of all it turned out not to be!

The volunteers have worked really well together, forming a close knit group that go out regularly to look at plants. They are continually increasing their plant identification skills and several are members of local naturalist groups. Nidderdale AONB is also planning to use the volunteer's skills to help monitor the local Sites of Importance for Nature Conservation (SINCs) through a rolling programme of surveys.

Case Study Wading bird surveys with gamekeepers

In 2017 the British Trust for Ornithology (BTO) published a report on their work with gamekeepers and farmers to monitor wader populations in the Yorkshire Dales. During the 2017 breeding season, gamekeepers and farmers carried out breeding wader surveys at a range of sites across Wensleydale using BTO survey methods tailored to fit with their work schedules.

Farmers and gamekeepers are out working throughout the AONB most days and often have a highly detailed knowledge of the area and its wildlife. Survey methodologies that fit into gamekeeper's work routines have the potential for a wide uptake as well as generating useful data, provided that appropriate training is made available. Embedding the monitoring of breeding waders within the work practices of gamekeepers could be an effective approach for improving the monitoring of breeding waders in key areas.

On the basis of this, The Wild Watch, working collaboratively with the Upper Nidderdale Landscape Partnership, approached the Swinton Estate and gamekeepers of Upper Nidderdale to see if they would participate in a similar bird survey and help gather information for the AONB. Two training sessions were run during February in advance of the bird breeding season, at a relatively quiet time for the gamekeepers.

The training outlined the survey methods and the species to target. A bird identification guide was also provided. The Wild Watch worked with the gamekeepers to identify suitable survey transects that encompassed a variety of habitat but that was on or close to their daily route around their respective estates. We asked them to survey each route twice between April and July.

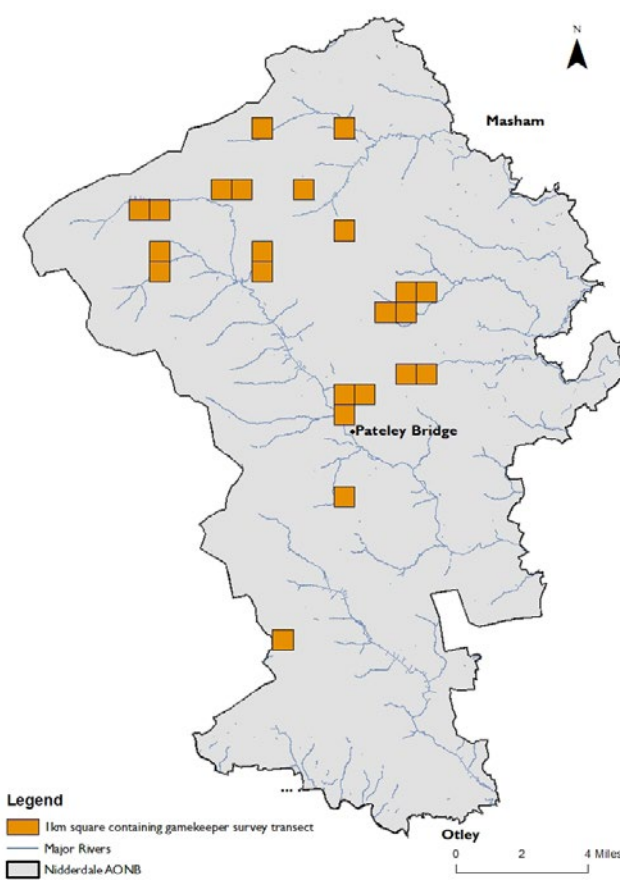


Fig. 19. km grid squares with gamekeeper survey transect

In the first year there was good uptake with the majority of the gamekeepers carrying out the surveys. The second season was less successful. The survey transects were moved to increase the data, however this meant that some transects were further away from the gamekeeper's daily routes and the uptake was noticeably lower. This demonstrates the vital importance of working in conjunction with the gamekeepers when drawing up routes and transects.

It is worth noting that whilst this method has the potential to increase wader monitoring across managed areas of moorland, any data analysis and interpretation would need to take into account the predator control and aspects of moorland management that can have a positive or negative effect on wading bird populations and may not be representative of all areas of moorland.



Case Study The Nature Conservation Volunteers

Liz Milner, Volunteer Co-ordinator, Nidderdale AONB

The Nidderdale Conservation Volunteers (NCVs) number around 50 core volunteers and is made up of the three groups— Tuesday Task NCVs (30 volunteers), Heritage Volunteers (10 volunteers), and the Walling Group (10–12 volunteers).

The Tuesday Task NCVs carry out nature conservation work within the AONB. They focus on tasks for AONB externally-funded projects (such as the Upper Nidderdale Landscape Partnership and The Wild Watch), on designated sites such as Hackfall Wood Site of Special Scientific Interest, and/or on routes with public access such as bridleways and footpaths. Tasks can include hedgelaying, tree and hedge planting, Himalayan balsam pulling, and coppicing. There is an emphasis on learning traditional skills with regular training sessions held alongside the practical conservation works. A scything course for meadow management was held, and also a coppicing and green woodwork course so that the volunteers can make use of brash on site to create basic seats and hazel hurdles, turning waste materials into a valuable resource.

One area of the AONB that the NCVs have carried out a huge amount of work at, and made

a huge difference to, is Hackfall Wood near Grewelthorpe. They spend one day per month there maintaining the paths and steps around the site, the Victorian features such as the waterfalls and pond, as well as Himalayan balsam pulling and other tasks. They have been so successful in balsam pulling that this year, there are only tiny isolated pockets of it within the wood and no major pulling was required. A key success.

At Ellington Banks Military Training Areas the NCVs have carried out winter woodland management, cutting back willow and alder off the species-rich grassland to enable the wild flowers flourish. The group has been back in the summer to see the benefits of their work and also map some of the ancient and veteran trees onsite. There is a huge variety of work that people can get involved in – the group's mantra is 'low impact, environmentally-friendly onsite conservation work, fuelled by homemade cake'. They don't use chemicals and the only machinery necessary is a chainsaw for woodland management. If you are interested in the NCVs carrying out work on your land, or in becoming a NCV, please contact the AONB.

Local wildlife and naturalist groups

The AONB is acutely aware of the expertise that local naturalist groups have and the large amounts of time they spend gathering knowledge about the wildlife in the area, helping with surveys, and passing on their knowledge to other people. In some areas it has become increasingly difficult to recruit new members to these groups and time spent marketing the groups and recruiting new members is taking the committee members away from the reason they joined the group in the first place.

The Wild Watch has been supporting local naturalist groups to improve their marketing and expand their membership. For example, working with Harrogate District Naturalist Society to refresh their branding, produce a leaflet, and offer guidance on revamping their website. We have tried to tailor the support available to each group – for the larger Wharfedale Naturalist Society, The Wild Watch has supported their work through reprinting their leaflet. This has been used to promote the group at events such as the Ben Rhydding Community Fete. The Wild Watch has also supported Nidderdale Birdwatchers in a similar way.

A key part of this work has been to support the groups in recruiting new members, in continuing to gather information on local wildlife, and in providing expertise where resource within the group is lacking.

Case Study Wharfedale Naturalist Society

Peter Riley, President

The Wharfedale Naturalists' Society (WNS) was founded in October 1945, when a group of keen local naturalists gathered in Ilkley to establish a group with the objective of studying and learning about local wildlife in Wharfedale, including its tributary, the River Washburn. Articles were placed in local publications to generate interest and it wasn't long before the Society was flourishing with a growing membership and a full programme of outdoor and indoor meetings, the latter called 'Lantern Shows'. Within a year,

membership had grown to 50, plus 12 junior members (encouraged in their interest by local teachers who featured prominently in the Society in those early days).

The Society continued to develop through subsequent decades and special publications were produced for the 25th, 40th and 50th Anniversaries. The 60th Anniversary featured an evening with member Alan Titchmarsh at the Kings Hall. Membership increased and peaked at 516 in 2010. A fall in recent years has been arrested with membership currently standing at 450 and growing. It is thought that this figure means that WNS is the largest wholly voluntary natural history society in the UK.

Today, Wharfedale Naturalists is a Registered Charity with two objectives – to promote and foster the study of all branches of natural history, and to promote the conservation, protection and improvement of the physical and natural environment. It fulfils these objectives principally by the provision of over 50 events (generally free

to members) throughout the year, by funding conservation projects throughout Wharfedale, and by active involvement in five Nature Reserves. The annual membership fee of just £12.50 is deliberately kept low to encourage as many people as possible to join and participate, and to ensure we have funds available to fulfil our funding objectives. Every effort is made to ensure new members are made welcome and encouraged to participate in the Society's activities.

Annual Reviews (called 'Transactions' to begin with) were produced from the start and today form a superb historical record of the wildlife in the local area. Given the beleaguered state of wildlife and conservation in the UK at the present time, Wharfedale Naturalists are determined to raise awareness of this disturbing trend and to do all we can to try to make a positive wildlife impact at the local level.

Further information can be obtained by visiting the WNS website at wharfedale-nats.org.uk



Case Study Nidderdale Birdwatchers

Tony & Alwin Knowles, Founder Members

Nidderdale Birdwatchers (NB) was formed in 2008, with a formal constitution stating these aims:

- To promote interest in and understanding and knowledge of birds, their environment and conservation, and in particular to promote the study and welfare of the birds within Nidderdale;
- To promote access to opportunities for learning and the gaining of new skills and competencies;
- To encourage participation in active recreational pursuits and in local environmental research and conservation.

It was also agreed, although not stated formally, that NB should always be friendly, welcoming and inclusive, and this has been maintained as the membership has risen from the original 22 members to over 100. Since then, activities by the club and its members have increased year on year in line with the stated aims of the club. In 2014, Nidderdale Birdwatchers was recognised by HM Revenue & Customs as having charitable aims thus allowing the club to claim gift aid on membership and donations.

Regular club meetings, involving either bird watching events or educational talks, were introduced in the first year, and this annual programme of activities continues with at least two events each month, both in Nidderdale and further afield. A quarterly newsletter is produced for members, and regular updates sent out by email. The club also has a website and a blog, and has a regular presence at the Nidderdale Show, highlighting the work we do and encouraging involvement.

Conservation activities also began in the first year, with the emphasis on making nest boxes for Bryan's Wood, which the club 'adopted' with the then owner's consent, and with AONB support, undertook to help to conserve and monitor. In the following year, members volunteered to

participate in the British Trust for Ornithology (BTO) Nest Record Scheme (NRS) involving regular monitoring of breeding activity which over the years has provided a body of significant data. The number of boxes increased and 130 boxes were checked each week during the breeding season. Additional boxes were made for other areas in the Dale by members of NB and the AONB's Nidderdale Conservation Volunteers (NCVs) and, although not included in the BTO NRS, they are maintained regularly and replaced when damaged.

In 2010, a new initiative to record members' bird sightings within the Nidderdale AONB area began, with the results published annually and shared with other wildlife organisations. Work with school children started and pupils at eight schools in the Dale have been involved in making nest boxes and bird feeders; some schools have taken part in the RSPB's Big School Birdwatch.

In 2011, work started on preparations for building a sand martin wall at Gouthwaite Reservoir, an idea first suggested in 2008. Support was given by Nidderdale AONB, Yorkshire Water, four local councils, landowners, Natural England and others. Consultation with other organisations and presentations to local residents was an important part of the project development. Fundraising began with a sponsored Three Peaks Walk in 2013. The Upper Nidderdale Landscape Partnership (UNLP) became a crucial co-ordinator of the Sand Martin Wall scheme in 2014 and the wall was built in the autumn of that year. Martins have nested in the wall each year since 2015, with the exception of one year when the wall went unused. In 2019, live camera coverage of the wall was organised and funded by the UNLP. As part of the Upper Nidderdale Landscape Partnership, Nidderdale Birdwatchers was also involved in a project to provide a Wildlife Watching Centre at Gouthwaite Reservoir but this did not come to fruition.

In 2016, NB was involved in a fundraising programme for the national Curlew appeal which undertakes research and conservation in response to the population decline of this upland bird.

Since the formation of the club, individual members have been involved in wildlife surveys and conservation work for the AONB, UNLP, The Wild Watch, BTO, RSPB, High Batts Nature Reserve and other organisations, and continue to be actively involved in caring for the environmental welfare of Nidderdale.

People/children engagement

A key aim of The Wild Watch was to involve local people in nature conservation and galvanise people into taking action for wildlife. Local residents, volunteers, landowners and land managers have been able to get involved in the project in a variety of different ways, depending on their interest, time and skill level. Over the course of the project a total of 143 events were run with 6,427 people attending. This included a project launch, numerous training courses and an evening with Chris Packham.

The Wild Watch

1095 citizen science records

3,197 surveys carried out

4,500 volunteer hours (approx.)

143 events

6,427 event attendees

540 training attendees

7 training events for gamekeepers

31 events run in schools

275 landowners asked for survey access (approx.)

Case Study Engaging young people with the natural world

Zach Haynes, Youth Patron, The Wild Watch

I can't believe it was three years or so ago when I was asked to do something quite special, I was asked to be the youth patron of The Wild Watch. This was an honour and exciting for a number of reasons but the main one was that I was keen to share my passion for the natural world with other young people. That's harder than you think sometimes, maybe it was just my school but if you were into something that wasn't football or celebrities then you were seen as 'a bit weird' – hunting was more popular than conservation. So this was a great opportunity for me to help show other young people with similar interests how amazing and important the natural world is.

Nidderdale has some fantastic wildlife and it was great to go to the training sessions and learn



Zach Haynes © Zach Haynes

about surveying different species. I had a great patch to survey and I had some lovely days out with dad looking for signs of otters, tracking down golden-ringed dragonflies and trying to find adders. One of the projects was to survey owls across Nidderdale. To do this the team wanted to work with schools, recruit lots of young people to get out to look and listen for owls and report any sightings. To get the message out to schools they made a short film which I was asked to present along with a few other young people. Working with the owls, telling people what wonderful creatures they are and encouraging the school kids of Nidderdale to get involved in their conservation was a great project.

The surveying, the film to engage others, and another big interest of mine, photography, all came together to give me an idea. I am also lucky to be an ambassador of the #iwill campaign which is all about promoting youth social action. At the welcome event for this I saw a presentation for the Grow Wild project run by Kew Gardens. This provided small grants for young people to undertake projects inspired by wildflowers and fungi. I developed a project using accessible technology to show how easy it is to get out and discover wildflowers and their pollinators.

Using a smart phone and some clip on lenses the idea was to get young people out to look at flowers, their different shapes and photograph them. This helped to explain how important wildflowers are, how different plants have developed to be pollinated by different insects and how a wide range of insects are supported by wildflowers. The workshops went well and everyone got stuck in, including parents, finding different plants and trying to get shots of them being pollinated by lots of different insects.

Thank you to The Wild Watch and the project funders for giving me a chance to be involved.



Wildlife Detectives event attendees @ Paul Harris

Case Study Rewilding ourselves

Jeff Davitt, Wild Watch Volunteer

After an intense career in business, I decided in 2017 to wind down to part-time work, leaving me more space to pursue my life-long passion for the natural world. I wanted to spend more time outdoors seeing wildlife, and also to support conservation and rewilding activities.

As a member of Wharfedale Naturalists Society, I heard about The Wild Watch, and was grabbed by the 'citizen science' nature of the project. I therefore got in touch with Alice Crosby, and began providing admin support at the Nidderdale AONB office two years ago. Activities vary from copying and scanning survey maps, to recording owl and hedgehog sightings, to commenting on management plans. Spring and summer give me the chance to undertake bird, river and reptile surveys – no two weeks are the same.

I've also been able to develop my understanding of the natural world, with a particular focus on rewilding (in its broadest definition, not reintroducing apex predators!) through residential courses in Wales and at Knepp in Sussex, and attendance at the Oxford Real Farming Conference. I carry out wading bird surveys for the Yorkshire Dales National Park, and support the RSPB/YDNP Peregrine Watch at Malham Cove. The more I learn, the more I feel like a novice, as there are so many experts around, and so much that we don't yet understand.

Involvement in The Wild Watch and the other activities outlined above give me hope that many people do care about the environment, and that there is much going on – but so much more is needed. I am therefore working with my wife and with Rewilding Britain to set up a network for those interested in small-scale rewilding, starting with a regional pilot in Yorkshire. Watch this space!

Citizen science

An outright success of the Wild Watch that has successfully tapped into local people's enthusiasm for wildlife is The Wild Watch's 'Owl Watch' campaign.

We asked people to tell us where and when they saw an owl so that we could start to build up a better picture of the owls in the local area. We ran this alongside an evening talk about owls, which was attended by over 100 people. Citizen science owl sessions were also delivered by volunteers to schools across the area. The sessions included an illustrated presentation with a short educational film about how to spot different types of owl in Nidderdale, with specific reference to the little owl, barn owl and tawny owl. The children were each given a high quality information pack that included a sightings record postcard, further information, and activity sheets. These sessions were all delivered by volunteers.

The campaign is ongoing. So far 675 owl records have been logged with the AONB and the data has been used for Habitat Suitability Modelling.

Owls recorded March 2018 to January 2020

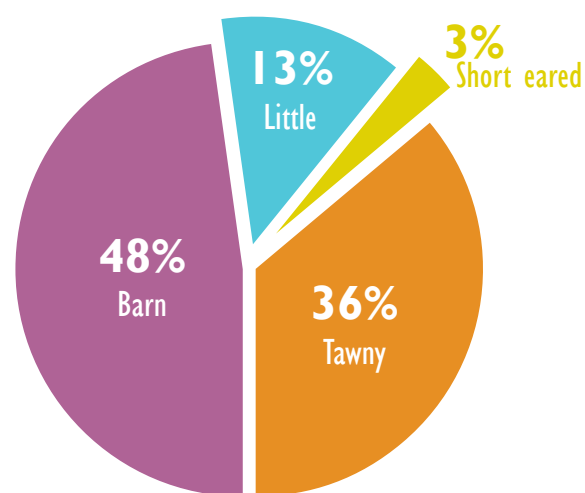


Fig. 20. Owl records logged with The Wild Watch between March 2018 and January 2020 including a summary of species



Fig. 21. The 'Owl Watch' postcard

Local funding for conservation action

In 2017/2018 an estimated £456 million of UK public sector funding was spent on biodiversity. This funding has been declining, by 29% over the last five years, and by 34% since a high point in 2008/2009. By contrast spending on biodiversity in the UK by NGOs with a focus on nature has increased, reaching £239 million in 2017/2018, 24% higher than five years ago⁵.

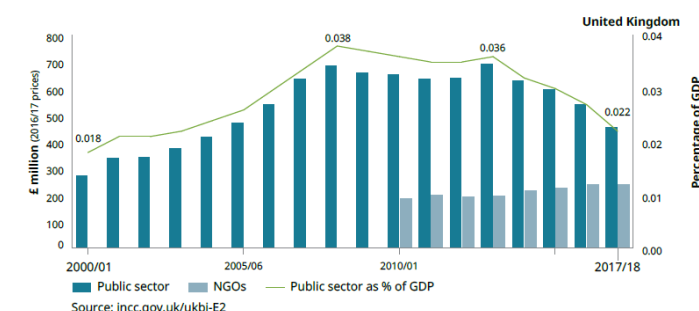


Fig. 22. Expenditure on biodiversity in the UK, 2000/2001 to 2016/2017⁶

Over the last five years Nidderdale AONB has helped channel £3.4 million in external grants into conservation works in Nidderdale AONB. The success of the conservation work in Nidderdale is underpinned by partnership working, with government, charities, business, landowners, and individuals.

Countryside Fund

The Friends of Nidderdale AONB Countryside Fund was set up in 2014 to raise and distribute money for local wildlife and cultural heritage projects in Nidderdale AONB. Since its establishment over

£36,000 of grant funding has supported 24 projects. Biodiversity projects which have received funding contributions have included:

- Access and interpretation at Fishpond Wood, Beverley.
- Black Grouse relocation to Upper Nidderdale.
- Tree Planting at Knabbs Farm.
- Creation of upland bird habitat in Upper Nidderdale.
- Hedgelaying in Azerley.
- Woodland bulb planting at Fellbeck.
- Save our Swifts, Mashamshire.

For more information about the Friends Countryside Fund see nidderdaleaonb.org.uk/countryside-fund

The Greenhow Fund

The Greenhow Fund was established in 2006 by Hanson UK following the granting of planning permission at their Pateley Bridge Quarry. A total of £10,000 of grant funding has been available to spend each year, and a total of 51 projects have received support. These have made a significant and long lasting positive impact, and include funding to help protect the special habitats of the area and to support local groups doing fantastic volunteer work. Biodiversity projects⁷ which have received funding contributions have included:

- Hay meadow restoration – four landowners have been supported to restore and enhance 20ha of traditional hay meadows.
- Humberstone Peatlands Project – The Yorkshire Peat Partnership was supported to undertake practical restoration work, run educational events, install interpretation boards, and produce a leaflet
- Creation of Dacre Nature Reserve – Open Country, a group with learning disabilities and mental health issues, were supported to undertake practical work including creating a wildflower meadow, planting an orchard, and creating a seating/education area.
- Ecological survey work at Humberstone Bank Farm.
- Restoration of Fishpond wood⁸

For more information about applying for the Fund see nidderdaleaonb.org.uk/greenhow-enhancement-fund



Fishpond Wood

Case Study **How to restore a large woodland pond (Don't try this at home!)**

Dr Peter Brambleby

When I was fortunate enough to acquire Fishpond Wood in 2012, my first thought was how to restore the woodland, not how to restore the pond. But it soon became evident that the pond was a high priority. It had never been dredged in living memory and was about half silted up. As trees, rushes and rhododendron moved into the silt, the rate of loss was accelerating and would have displaced the aquatic wildlife and water fowl. After all, this fishpond was what gave the woodland its name.

The origins of the pond are not known for sure, but it seems likely it goes back to monastic times when monks and lay brothers from Fountains Abbey managed the local woods, fields and mines. They would simply have needed to build a dam across the stream to create a pond ready for 'fish on Friday'. What we do know is that 18th century landowners John Yorke and his nephew improved the pond and surrounding area. There was a wooden boat house and, to store ice from the pond, an ice house. The ice house has been restored (with support from Upper Nidderdale Landscape Partnership (UNLP)) and is home to European cave spiders – well worth a visit.

Getting advice on how to drain a pond with least adverse impact on wildlife, let alone the technical challenges proved difficult and came from various sources. The UNLP selected Fishpond Wood as one of the Partnership's Flagship Heritage Sites and the Friends of Nidderdale AONB donated £1,000 towards the effort. Natural England advised doing the work in September when the amphibians would be on land, and the National Rivers Authority advised against releasing fish into local streams.

In the end, three of us took it on during three (very rainy!) weeks in September 2015 – Tim who did all the digger driving and Dave, my friend and I, who drove the dumpers. We drained the pond by the siphon principle – filling 10cm diameter, 20m

long, flexible pipes with pond water then letting the lower end go. We had four pipes on the go at one time. That took three days but gravity did the work. The remaining puddle was kept low with an electric pump and petrol generator. Our first two diggers got trapped in the mud and had to be rescued by a 15 ton digger that finished the job. There was a lot of agricultural junk in the pond but no Medieval treasures! Most of the rich loam was dropped around the woodland and below the dam.

As fish (mostly perch and roach and one large goldfish!) became trapped in puddles, we netted all we could and took them to a temporary home in a pond up the hill. Herons and moorhens and the occasional cormorant grew fat on easy pickings.

We excavated the original island as a refuge for nesting wildfowl. One side of the pond was left fairly steep, and the other more gently shelving to encourage marginal plants. The pond refilled very quickly from rainfall and the stream. We returned several hundred fish and they were soon multiplying. That spring the moorhens nested and had two successful broods. The ducks returned in greater numbers and a heron became a regular visitor. A big thrill the year after was the visit by a kingfisher and he is a regular now too. Frogs and toads spawned as usual. Visiting winter wildfowl still drop by. The marginal plants are re-establishing more slowly, but accelerating now, and dragonflies were more evident during the summer of 2019.

Fishpond Wood and its restored pond is a magical place, so do stop and look about you when you visit. And let The Wild Watch know if you see anything special!

For more information about Fishpond Wood see uppernidderdale.org.uk/historic-nidderdale/flagship-heritage-sites/fishpond-wood

Dr Peter Brambleby is a semi-retired public health physician, and former Director of Public Health for North Yorkshire and York. His vision for Fishpond Wood is of a 'natural health service' where nature can contribute to health and wellbeing. A study barn for this purpose has been established in a clearing near the ice house. He can be reached on p.brambleby@btinternet.com

Case Study Save Our Swifts

Mashamshire Swift Conservation Project

The Countryside Fund is currently supporting a project to help the recovery of swifts in the Masham area. Swifts have been in national decline for some time and this project seeks to provide new nest boxes and innovatively, recorded sound systems, designed to attract birds to established colonies and/or form new ones. The Project has also increased awareness through a combination of school visits, a market stall and an open evening meeting.

To date, the Project has helped install 90 nest boxes in the Masham area, with 18 in the church tower!

The Friends of Nidderdale AONB are looking to expand this work more widely and we would be keen to hear from anybody interested and/ or prepared to run a similar project in their local area.

For more information about the swift project see swift-conservation.org

Recommendations and future actions

AONB plans and commitments

- Supporting our volunteers to collect new biodiversity data, raise awareness of nature, and deliver on the ground nature conservation.
- Continued collaboration with local naturalist societies.
- Continuing our citizen science initiatives.
- Raising awareness of the value of Nidderdale AONB's nature.
- Fundraising for nature conservation work.

What can you do?

Contact the AONB if you:

- Are interesting in becoming a Nidderdale Conservation Volunteer (NCV) or be involved in other biodiversity-related volunteering with us.
- Have a site and are interested in the NVCs carrying out work on your land.

Habitat coverage

Headlines

- Nidderdale AONB has a wealth of semi-natural and modified habitats that support a rich variety of wildlife. These habitats are divided up into four broad chapters in this report – moorland, grassland and farmland, woodland and trees, and water and wetlands.
- The AONB is committed to improving the management of priority habitats outside designated sites.
- We have produced a detailed habitat model of the AONB as part of The Wild Watch and will use this to underpin decision-making about future conservation action.
- Key priority habitats are upland heathland (22% of the area) and blanket bog (almost 15% of the area).

Priority habitat

Priority Habitat (as defined in section 41 of the Natural Environment and Rural Communities Act (2006)) accounts for 40% (24,029ha) of Nidderdale AONB. The most prominent habitats are upland heathland (22% of the area) and blanket bog (almost 15% of the area) - see Table 2 and Figures 23 and 24. Table 3 and Figure 25 shows protection currently

afforded to the AONB's priority habitat by SSSI designation and higher level agri-environment schemes. This priority habitat information is compiled at national level from a range of data sets compiled in 2016 and 2017 and so may not provide up to date information, particularly for priority habitat outside SSSIs.

Table 2. Priority habitat coverage in Nidderdale AONB¹

Priority habitat	Total area (ha)	Percentage of Nidderdale AONB	Percentage of national habitat resource
Blanket bog	8,315.23	13.8	3
Calaminarian grassland	4.73	0.008	4.3
Coastal and floodplain Grazing Marsh	110.40	0.02	0.1
Deciduous Woodland	2,175.32	3.62	0.3
Lowland Calcareous Grassland	10.17	0.02	0
Lowland Dry Acid Grassland	31.61	0.05	0.2
Lowland Fens	265.10	0.44	1
Lowland Heathland	71.58	0.12	0.1
Lowland Meadows	19.6	0.03	0
Purple Moor-grass and Rush Pastures	22.86	0.4	0.2
Traditional Orchards	3.55	0.01	0
Upland Calcareous Grassland	17.69	0.03	0.2
Upland Flushes, Fens and Swamps	54.28	0.09	0.5
Upland Hay Meadows	8.74	0.01	0.3
Upland Heathland	12,917.74	21.49	5.5
Total	24,028.58	39.97	13.3

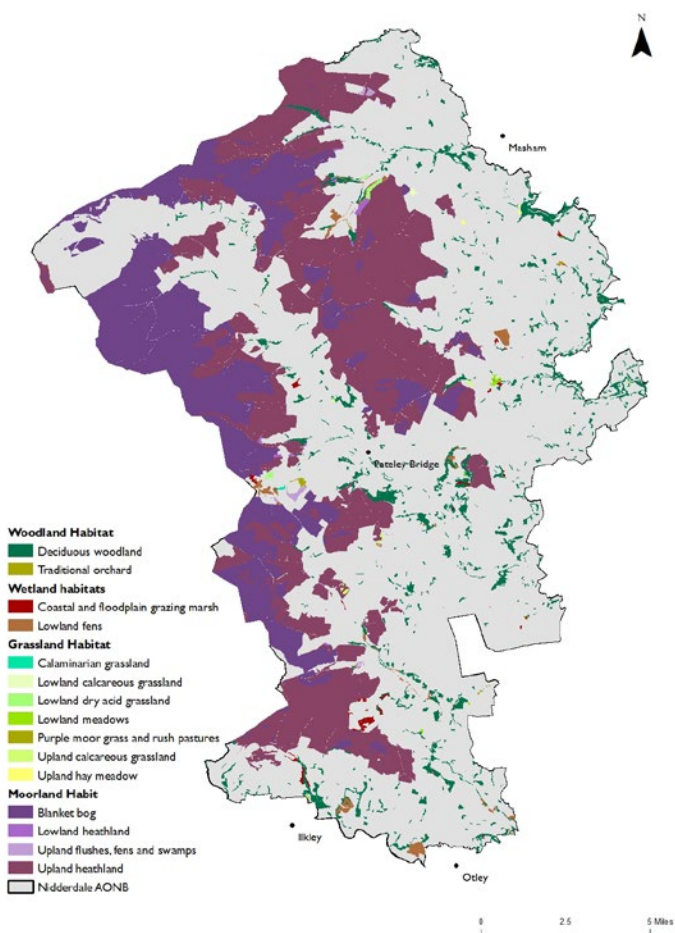


Fig. 23. AONB priority habitat map²

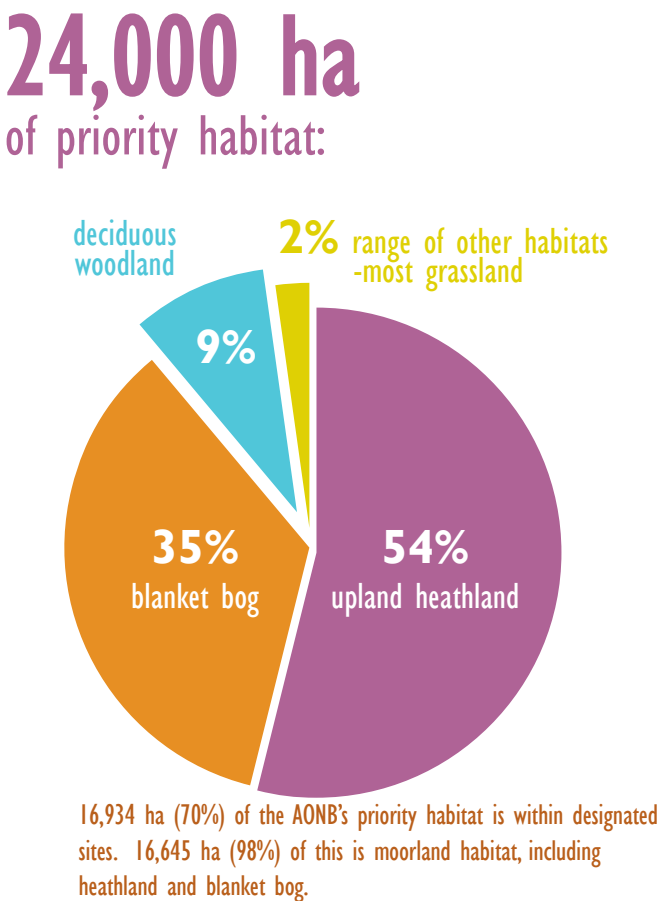


Fig. 24. Overview of priority habitat in the AONB

Table 3. Priority habitat protection in Nidderdale AONB in 2018³

	In SSSI (ha)	In Higher Tier / HLS Outside SSSI (ha)	Outside SSSI Not in Higher Tier / HLS (ha)	Total (ha)
	16,933.92 (70%)			
Favourable Condition ⁴	1,735.32 (10.2%)	4,261.34 (18%)	2,833.32 (12%)	24,028.58 (100%)
Unfavourable Recovering	15,185.66 (89.7%)			
Unfavourable No Change	13.94 (0.1%)			

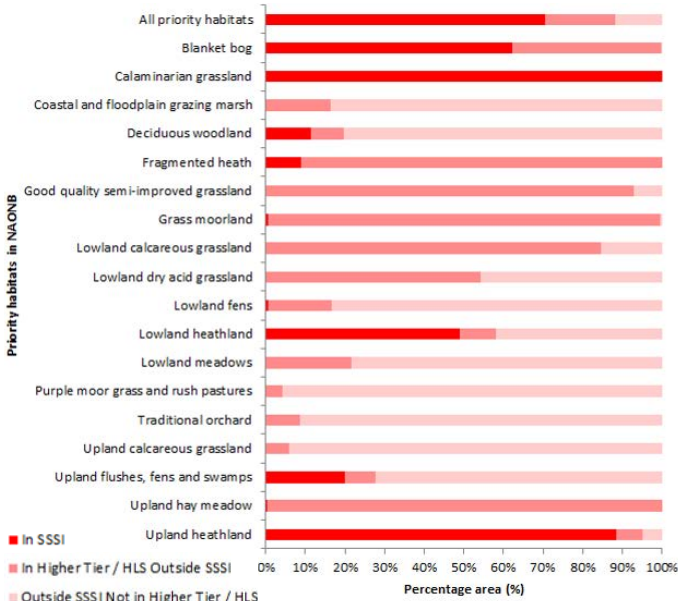


Fig. 25. Current protection afforded to priority habitat in the AONB⁵

AONB habitat

We have detailed data about some sites in the AONB from site specific ecological surveys, but to provide more comprehensive information about habitats in the AONB, particularly outside SSSIs, we have created a modelled habitat map of the AONB using the National Vegetation Classification (NVC) as part of The Wild Watch.

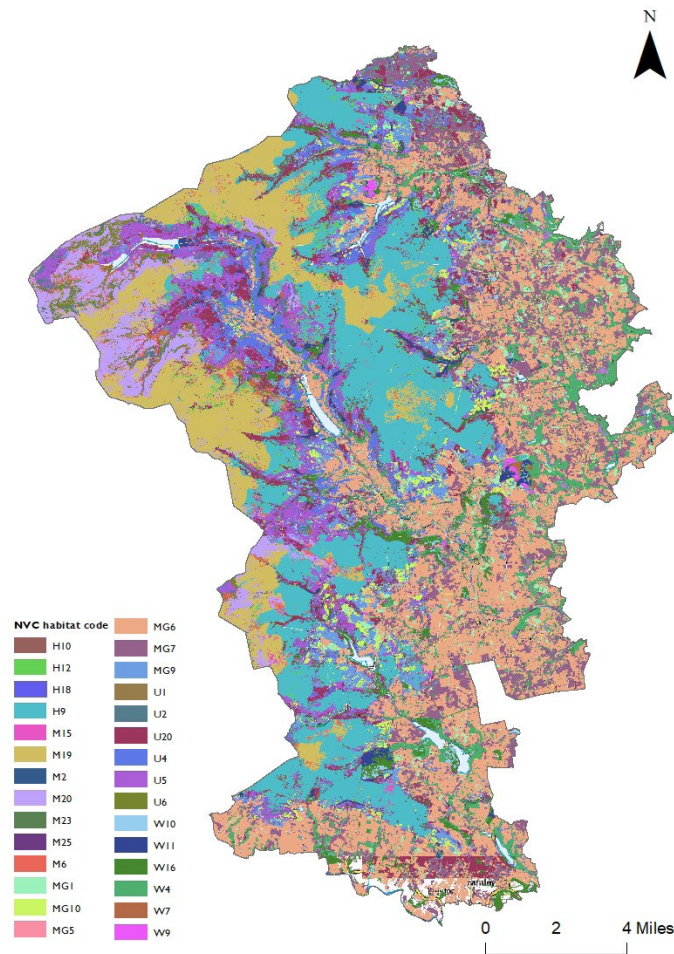


Fig. 26. Nidderdale AONB NVC habitat map

This detailed habitat map will underpin our future decision-making about biodiversity in the AONB. As the new DEFRA Net Biodiversity Gain metric (see *Yorkshire Water Biodiversity Net Gain Commitment case study on page 24*) is based on the new UK Habitat Classification approach (UKHab)⁶, we also intend to convert our NVC habitat map into this format. UKHab is a free to use, unified and comprehensive approach to classifying habitats, designed to provide a simple and robust approach to survey and monitoring.

Recommendations and future actions

The AONB is committed to improving management of priority habitats outside designated sites so that 50% are in favourable or recovering condition by 2024. We will use our new habitat map to produce a Nidderdale Nature Recovery Strategy which includes actions for priority habitat and as a baseline for future monitoring.

Designated sites

Headlines

- Almost 35% of the AONB is covered by sites with European, national or local designations. These offer some level of protection to valuable wildlife habitats, as well providing natural spaces for people.
- 16,844.7ha (28%) of the AONB is within designated sites with moorland habitats (upland heaths and bogs).
- 2,050ha (12%) of the AONB's SSSIs are in 'favourable' condition, compared to 39% of English SSSIs.
- 15,300 (88%) of the AONB's SSSIs are in 'unfavourable recovering' condition, which generally means they have been entered into a scheme to improve their condition over time, compared to 55% of English SSSIs.
- The AONB currently has 86 local wildlife sites. We do not have comprehensive information about current management of these sites.
- Lack of ongoing management resource is a constant challenge for wildlife sites, even if they are covered by a designation.
- The AONB is committed to ensuring our designated sites are managed to the highest standards. By 2024, we will ensure that at least 25% of our SSSIs are in favourable condition and 50% of SINCs are maintained in accordance with conservation management plan objectives.

Introduction to designated sites

Nature sites and areas of countryside can be designated at different levels. The highest level of protection is offered to sites that are of European significance: Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), together Natura 2000 sites designated under European Union Regulations. The next level of protection is for nationally important sites: Sites of Special Scientific Interest (SSSIs). There are then regionally designated sites: Sites of Importance for Nature Conservation (SINCs) which have been identified across North Yorkshire. In total almost 35% of the AONB is covered by designations with European, national and regional protection (see Figures 27 and 28).

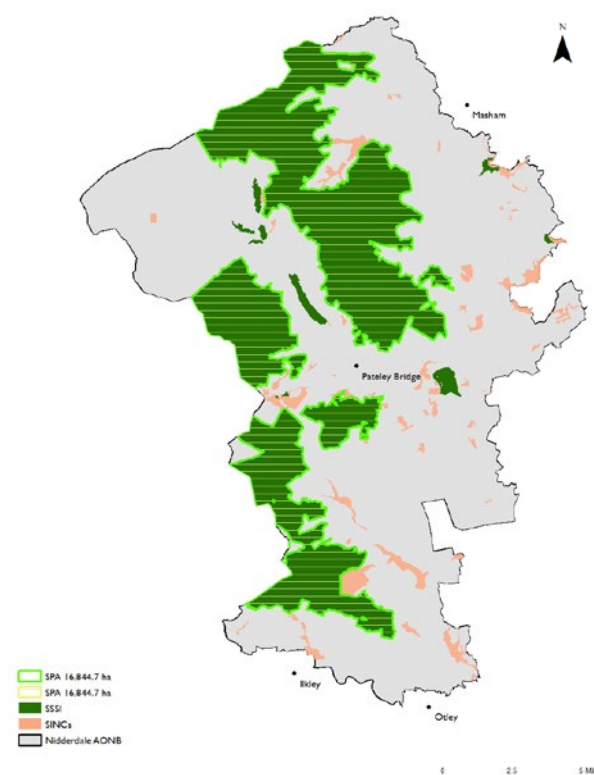
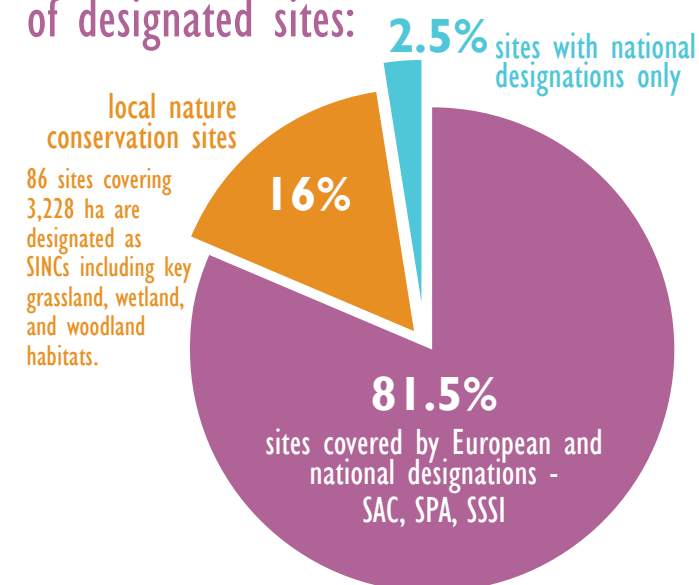


Fig. 27. Designated sites in Nidderdale AONB¹

20,600 ha
of designated sites:



2,050 ha (12%) of the AONB's SSSIs are in 'favourable' condition, compared to 39% of English SSSIs. 15,300 ha (88%) are in 'unfavourable recovering' condition, compared to 55% of English SSSIs, meaning they have been entered into a scheme to improve their condition over time.

Fig. 28. Overview of designated sites in the AONB

European sites

West Nidderdale Moors Site of Special Scientific Interest (SSSI) and East Nidderdale Moors SSSI are large sites of international importance designated for their blanket bog and heather moorland communities and their moorland breeding birds including merlin, golden plover, snipe, curlew, redshank, short-eared owl, and peregrine. Together they form part of the North Pennine Moors Special Protection Area (SPA) and the North Pennines Special Area of Conservation (SAC).

The North Pennine Moors SPA is 147,246.41 ha of which 16,844.7ha (11%) is in the AONB. Key species for which the SPA is designated are golden plover, hen harrier, merlin (which all breed on moorland habitat) and peregrine (which tend to breed on inaccessible cliffs and rock faces).

The North Pennines SAC is 103,114.4 ha, of which 16,844.7ha (16%) is in the AONB and covers the same area as the SPA. Key habitats for which the

site is designated are dry heath, wet heath and blanket bog. In total, the SPA/SAC designations cover 28% of the AONB area.

SSSIs

Sites of Special Scientific Interest (SSSIs) are nationally important sites designated by DEFRA and based on advice from the Government's conservation advisory body Natural England under the Wildlife and Countryside Act, 1981. SSSIs can be biological, geological or both.

Natural England's objective is to achieve 'favourable condition' status for all SSSIs. The interim target is to achieve "... at least 50% of SSSIs in favourable condition, while maintaining at least 95% in favourable or recovering condition" by 2020². Favourable condition means that the SSSIs habitats and features are in a healthy state and are being conserved by appropriate management (for definitions see Glossary on page 140). Natural England carry out periodic assessments of SSSI condition.

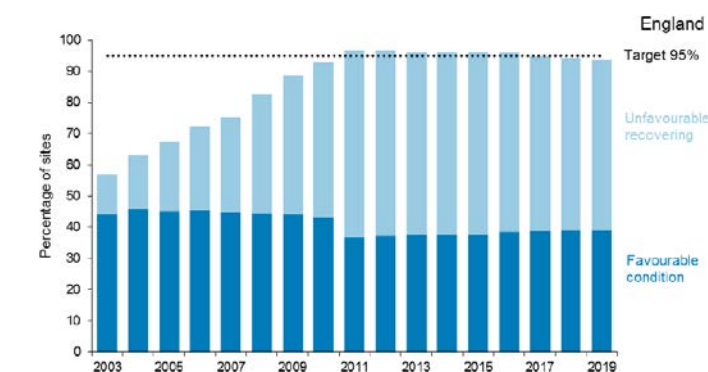
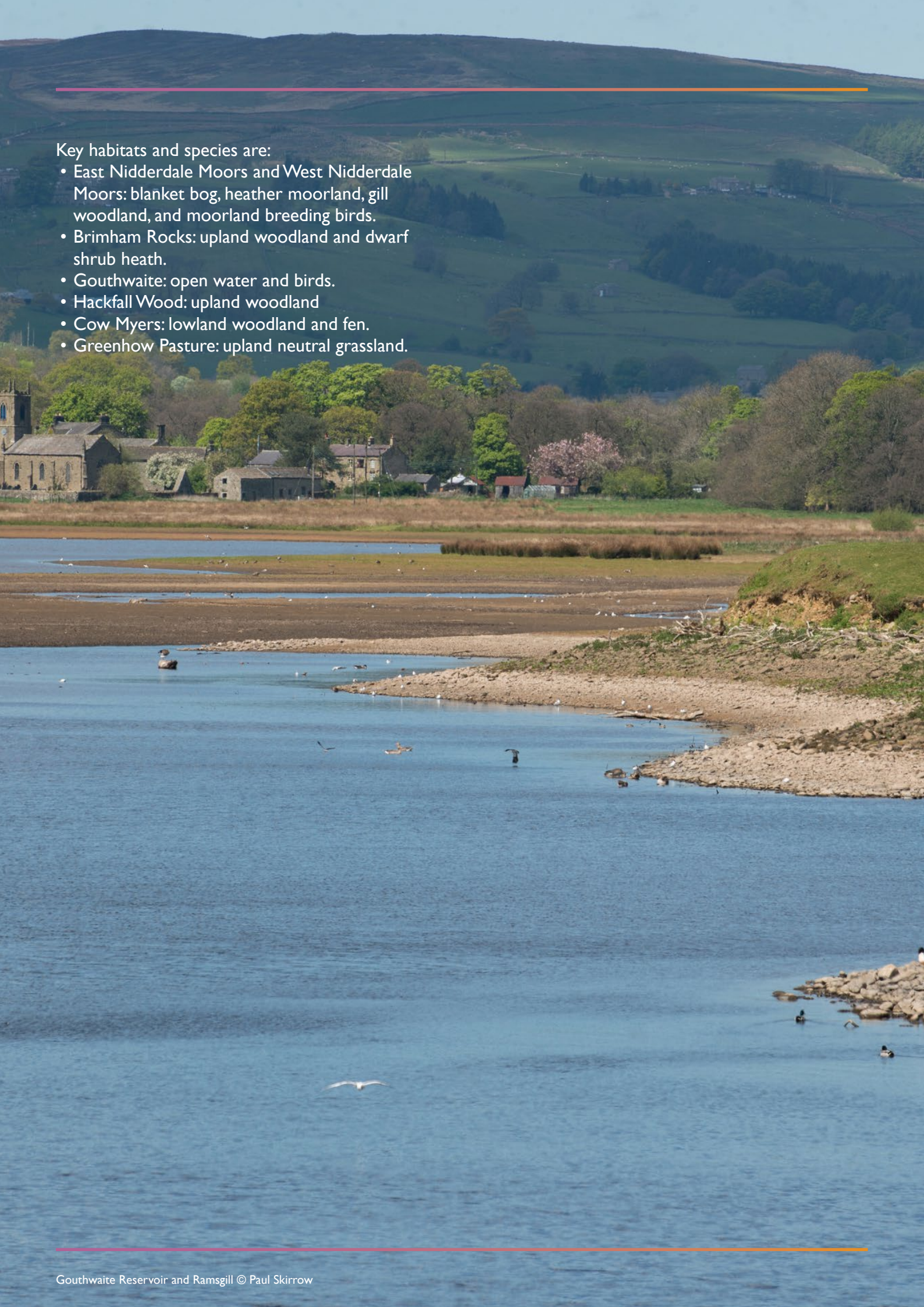


Fig. 29. Cumulative proportion of SSSIs in favourable or unfavourable recovering condition, 2003 to 2019³

There are nine SSSIs in the AONB (see Figure 30 on page 50). Brimham Rocks is both a biological and geological SSSI. Greenhow Quarry SSSI and Upper Nidderdale SSSI are designated for their geology. The total area of the AONB designated as SSSI is 17,364 ha (28.5%).



Key habitats and species are:

- East Nidderdale Moors and West Nidderdale Moors: blanket bog, heather moorland, gill woodland, and moorland breeding birds.
- Brimham Rocks: upland woodland and dwarf shrub heath.
- Gouthwaite: open water and birds.
- Hackfall Wood: upland woodland
- Cow Myers: lowland woodland and fen.
- Greenhow Pasture: upland neutral grassland.

Table 4. Main NVC habitats in Nidderdale
AONB’s largest SSSIs

NVC Community	Common name	%AONB	%SSSI Cover
East Nidderdale Moors			
H9	Ling-wavy-hair grass heath	11.30	61.71
M19	Ling-hare’s tail cotton grass mire	2.58	14.11
U20	Bracken-heath bedstraw community	1.56	8.52
H18	Bilberry-wavy-hair grass heath	0.65	3.55
M6	Star sedge-Sphagnum recurvum mire	0.57	3.10
H12	Ling-bilberry heath	0.44	2.40
M16	Cross-leaved heath-Sphagnum compactum heath	0.31	1.67
M23	Soft rush-marsh bedstraw rush-pasture	0.21	1.13
M15	Deer grass-cross-leaved heath	0.17	0.95
U6	Star sedge-Sphagnum recurvum mire	0.13	0.73
U5	Mat grass-heath bedstraw grassland	0.11	0.62
W16	Oak-birch-wavy hair grass woodland	0.07	0.36
W11	Sessile oak-downy birch-wood sorrel woodland	0.06	0.31
U2	Wavy hair grass grassland	0.03	0.16
M18	<i>Sphagnum papillosum</i> raised and blanket mire	0.01	0.07
M25	Purple moor grass-tormentil mire	0.01	0.05
U4	Sheep’s fescue-heath bedstraw grassland	0.00	0.03
West Nidderdale Moors			
H9	Ling-wavy-hair grass heath	7.95	45.02
M19	Ling-hare’s tail cotton grass mire	4.08	23.08
H12	Ling-bilberry heath	1.52	8.60
U20	Bracken-heath bedstraw community	1.35	7.65
M6	Star sedge-Sphagnum recurvum mire	0.79	4.45
M20	Hare’s tail cotton grass mire	0.72	4.07
U5	Mat grass-heath bedstraw grassland	0.27	1.51
U6	Star sedge-Sphagnum recurvum mire	0.20	1.16
M15	Deer grass-cross-leaved heath heath	0.16	0.89
H18	Bilberry-wavy-hair grass heath	0.11	0.60
H19	Cladonia arbuscular heath	0.08	0.44
M25	Purple moor grass-tormentil mire	0.07	0.39
M16	Cross-leaved heath-Sphagnum compactum heath	0.06	0.37
U4	Sheep’s fescue-heath bedstraw grassland	0.06	0.35
U2	Wavy hair grass grassland	0.01	0.08
M2	Feathery/recurved bog-moss pool	0.00	0.01

Figure 31 shows the current condition of Nidderdale's SSSI's based on surveys carried out between 2009-2016. Figure 32 shows the timing of the last survey – as can be seen from this around a third of the SSSI's have not been assessed since 2012.

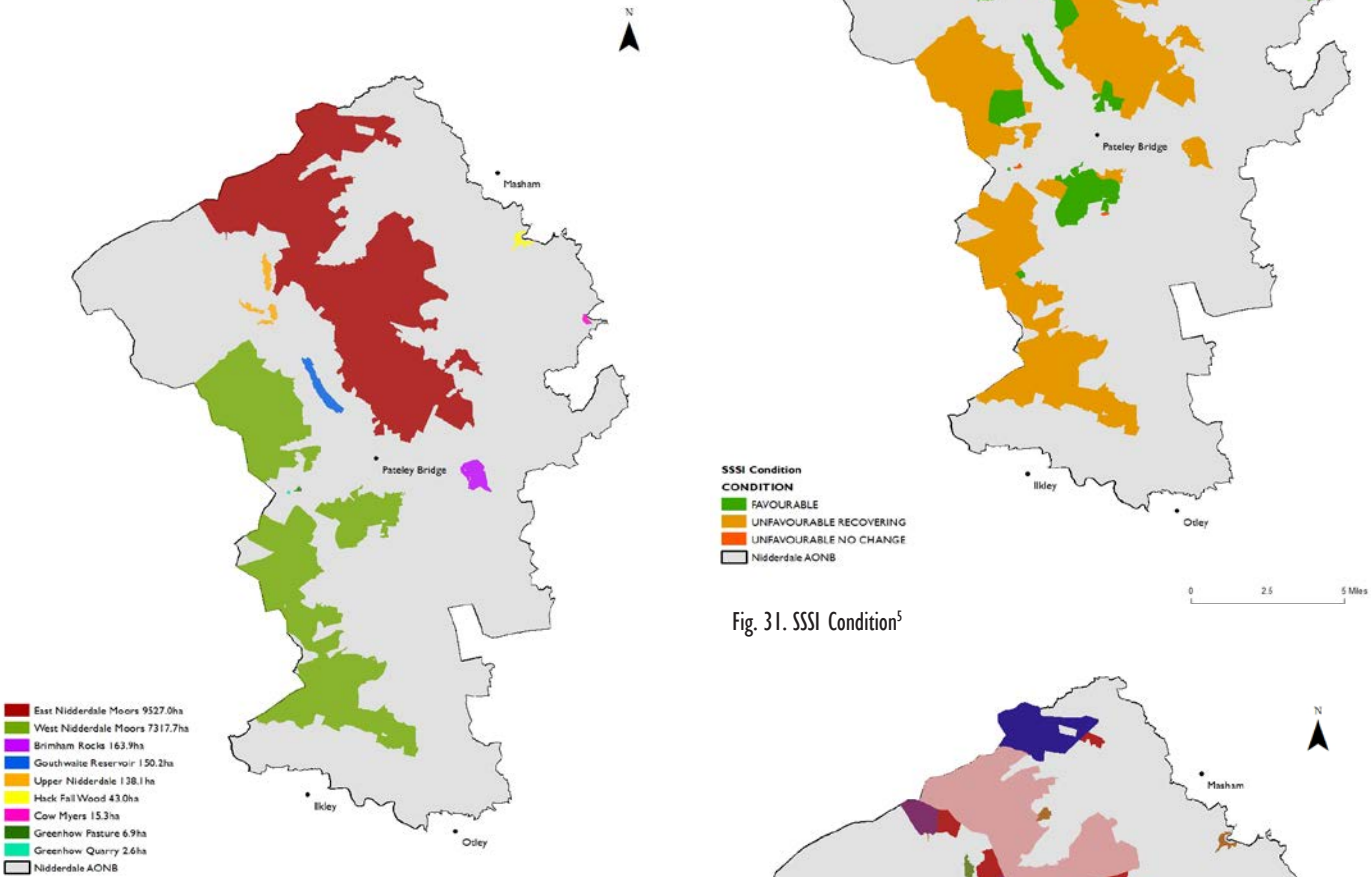
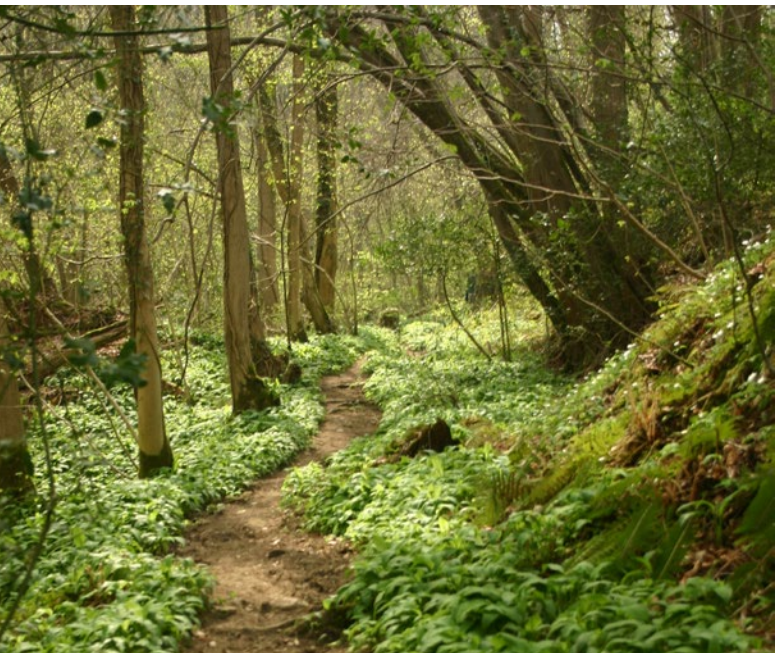


Fig. 30. SSSIs in Nidderdale AONB⁴



Hackfall Wood © Eric Moss

Fig. 31. SSSI Condition⁵

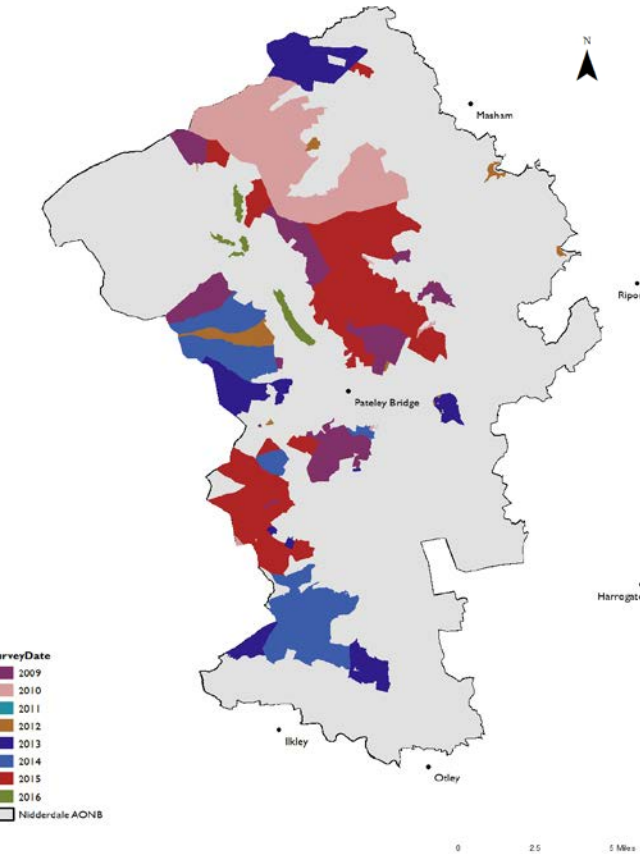


Fig. 32. SSSI date of last survey⁶

Table 5 shows current Nidderdale AONB SSSI condition. Over 17,345ha (99%) of the total area of AONB's SSSI's of 17,364 ha are in 'favourable' or 'unfavourable recovering' condition. This is higher than the UK figure of 93.6% for all SSSIs. Breaking this down further 2,048ha (12%) is in 'favourable condition' (compared to 38.9% of English SSSIs (by area) in favourable condition in 2019⁷), 15,297 (88%) is in 'unfavourable recovering' condition (compared to 54.7% of English SSSIs).

Table 5. Nidderdale AONB SSSI Site Condition 2019⁸

Condition	SSSI Area (ha)
Favourable	2,048 (11.79%)
Unfavourable Recovering	15,297 (88.1%)
Unfavourable No Change	10.87 (0.06%)
Unfavourable No Change	18 (0.1%)
Total	17,364(100%)

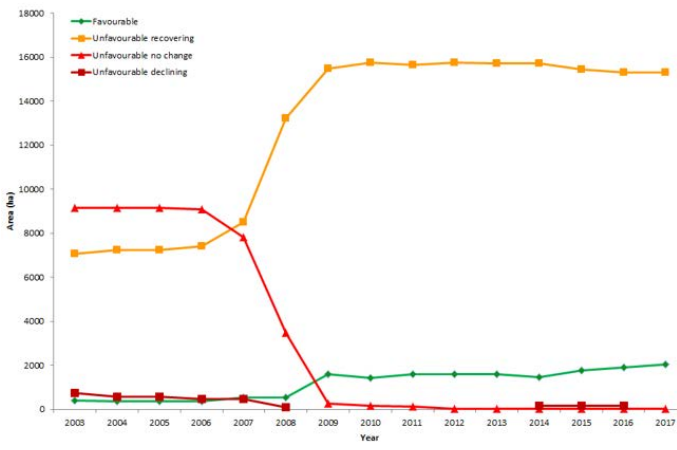


Fig. 33. Nidderdale SSSI condition 2003-2019⁹

Figure 33 shows SSSI condition over time from 2003 – 2017. The period 2006 – 2009 shows a big change in SSSI condition status, with most habitat moving towards unfavourable recovering. Mostly this will be the entrance of SSSI land into agri-environment schemes with anticipated future improvement in condition. Those statuses hold steady until 2014 onwards where we start seeing a change from unfavourable recovering to favourable status. So, overall, it's a modestly positive picture with some measurable change in the right direction. However, a comparison of SSSI condition across

other AONBs shows that only two AONBs (Forest of Bowland and Cannock Chase) have less habitat in favourable condition than Nidderdale AONB.

The condition of our main habitats (blanket bog and upland heath) are shown in Figure 34 Compared to other Northern AONBs, blanket bog is in better condition in other AONB's but our upland heath is in better condition than elsewhere. The condition of all habitats are shown in Figure 35.

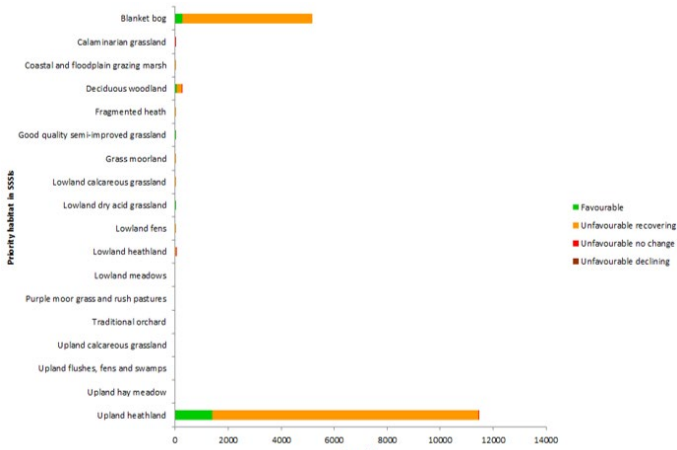


Fig. 34. Nidderdale AONB SSSI condition by habitat (area ha)¹⁰

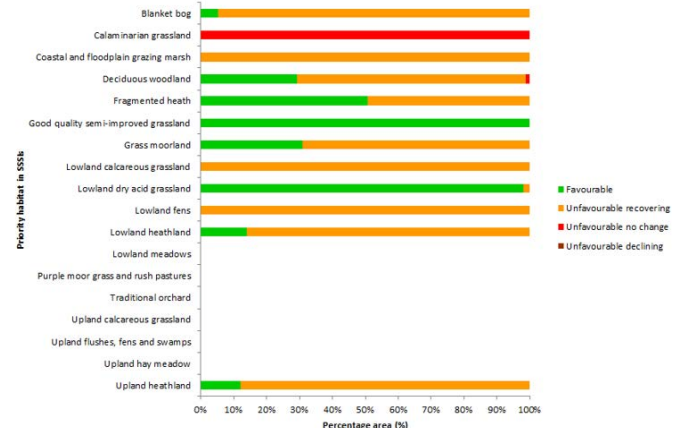


Fig. 35. Nidderdale AONB SSSI condition by habitat (% of total habitat)¹¹

SINC's

In North Yorkshire local Wildlife sites are called Sites of Importance for Nature Conservation (SINC) and their designation seeks to protect areas rich in wildlife, including ancient woodland and flower-rich grassland.

As a result of increasing pressures on land and climate, SINC's are often small, isolated and fragmented. Local Authorities have a duty under the Natural Environment and Rural Communities Act 2006, to have due regard for biodiversity and they need to include Local Wildlife Sites in their Local Plan. There are 86 SINC's in the AONB. Key habitats represented in the AONB's SINC's are grassland, wetland and woodland - see Table 6. For a full list of SINC's in Nidderdale AONB, see *Annex 3 on page 151*.

Table 6. Main habitats in SINC's in Nidderdale AONB

NVC code	Common name	No of occurrences of this as a principal SINC habitat
M23	Soft rush-marsh bedstraw rush-pasture	35 (41% of AONB SINC's)
W10	English oak-bracken-bramble woodland	27 (31%)
U4	Sheep's fescue-heath bedstraw grassland	25 (29%)
W16	Oak-birch-wavy hair grass woodland	24 (28%)
W8	Upland birch woodland	20 (23%)
W7	Alder-ash-yellow pimpernel woodland	18 (21%)
MG5	Crested dog's tail-knapweed grassland	17 (20%)
MG6	Ryegrass-crested dog's-tail grassland	17 (20%)
MG10	Yorkshire fog-soft rush rush-pasture	16 (19%)
U1	Sheep's fescue-Common bent-sheep's sorrel	15 (17%)

Note: top 10 principal habitats only shown

We do not have comprehensive information about the current condition or management of our SINC's. Some of our SINC's have management plans e.g. voluntary 10 year management plans for various woodland SINC sites were produced in 2010 and will come to an end in 2020.

Over half of the SINC's have not been surveyed in the last 15 years – see Table 7.

Table 7. Last SINC survey/monitoring dates

Last survey/ monitoring date	% of SINC's
Before 2000	4
2000-2004	49
2005-2009	27
2010-2014	14
2015-2019	6

Recommendations/future actions

AONB plans/commitments

Ensuring our designated sites are managed to the highest standards in accordance with national guidelines. By 2024 we will ensure that at least:

- 25% of our SSSI's are in favourable condition - by working with Natural England and targeting advice and support to land managers whose land includes designated sites; and
- 50% of SINC's are maintained in accordance with conservation management plan objectives - by producing an AONB SINC management strategy and by attending meetings of the NYCC SINC panel.

What can you do?

Get in touch with us to discuss land management if you own/manage land that is in a SSSI or SINC site or if you own a site that you think may qualify for SINC site status.

Moorland

Headlines

- Several priority habitats are present including upland heath, blanket bog and upland flushes, and fens and swamps, with the majority lying within internationally designated sites. Upland heathland covers 22% of Nidderdale AONB, with an additional 15% covered by blanket bog.
- Over 78% of moorland priority habitats are covered by designated sites, mostly with the highest level of European protection.
- Almost 10% of moorland habitat within SSSIs is in 'favourable' condition. 90% is in 'unfavourable recovering' condition, which generally means that it has been entered into a scheme to improve its condition over time.
- Characteristic moorland species include red grouse, sphagnum mosses, ling heather, cotton grass, wading birds, birds of prey and other bird species including ring ouzel, wheatear and cuckoo.
- Nidderdale AONB is a key area at a national scale for wading birds including curlew. We have developed Habitat Suitability Maps for curlew, lapwing, and snipe which we will use to target conservation action.
- Nidderdale AONB is of national importance for birds of prey, but some key species, such as peregrine and hen harrier, may be at risk from disturbance and persecution.
- Positive actions include working with moorland land managers and the Yorkshire Peat Partnership to restore peat habitats, promoting best practice for moorland management, helping the general public understand the value of moorland habitats and their management, and working with others, including shooting estates, to safeguard birds of prey and prevent their illegal persecution.

National context

The national State of Nature reports show that over the long-term 55% of upland species have declined, with 54% declining over the short-term and that 15% of upland species are threatened with extinction in Great Britain¹. Key reasons why upland wildlife is changing are:

- Management – including grazing, drainage and burning.
- Climate change – many of our upland species are at the southern limit of their ranges and may be forced to move northwards and to higher elevations. The result would be smaller UK ranges for these species.
- Expansion of forest cover.
- Air pollution – deposition of nitrogen fertilising nutrient-poor areas and changing vegetation type with effects on wildlife.

Habitats

Nidderdale AONB has some of the finest heather moorlands in the country. They are internationally important for conservation because of their rich concentration of rare plants and wildlife. The AONB's moorlands are a result of close management over several centuries by moor owners, gamekeepers, and sheep farmers. They work to provide the best conditions for red grouse and sheep grazing. This management has created a network of important habitats that support rare plants and internationally important bird populations:

- **Upland heath:** more commonly called heather moorland, it occurs above the upper edge of enclosed agricultural land. Drier upland heath is characterised by heather, bilberry and acidic grasses. Wet heath by cross-leaved heath with heath rush, deer grass, and sedges.

- **Upland flushes and pools:** very wet areas ranging from species-rich pools dominated by sphagnum moss, sundews, and sedges to species-poor flushes dominated by rushes.
- **Blanket bog:** Underlain by a deep layer of peat (over 400mm) the bogs are rich in sphagnum moss with cotton grass and heather. Characteristic plants such as cranberry, bog asphodel, sundews, and butterwort can also be found.
- **Gill woodlands:** remnant woodland, oak, birch, alder shrub and bracken, grow in the sheltered gills providing biologically rich habitats.
- **Moorland edge:** the transition habitat between agricultural land and heather. This area provides a very diverse range of habitats and is very important for a wide range of upland birds.

Figure 36 shows the extent of the moorland priority habitat in Nidderdale AONB

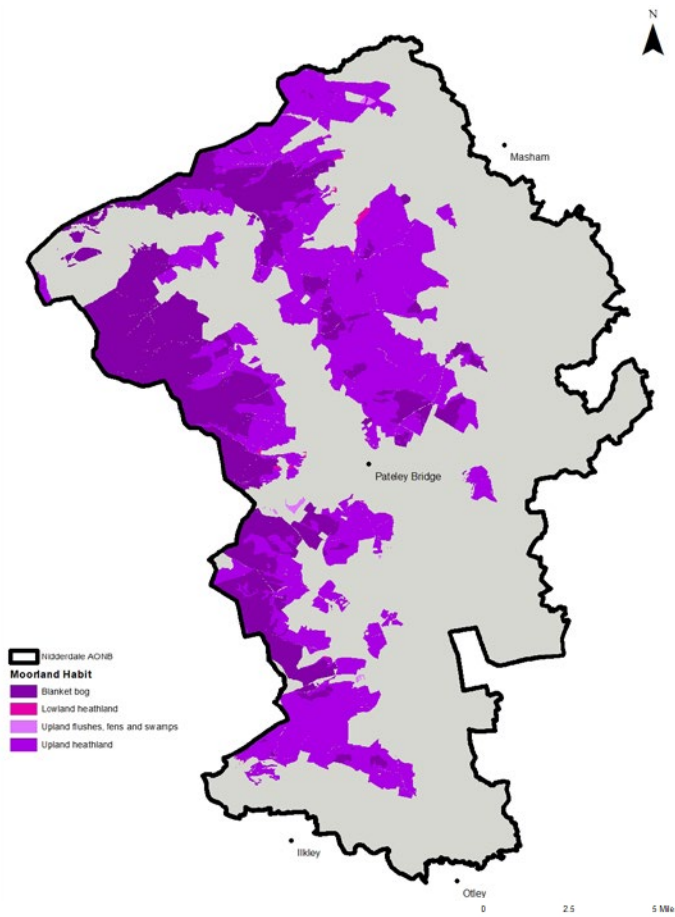


Fig. 36. AONB moorland priority habitat map²

The majority of Nidderdale’s moorland priority habitat is covered by designated sites - see Tables 8, 9 and 10.

Table 8. Moorland priority habitat coverage in Nidderdale AONB in 2018³

Priority Habitat	In SSSI (ha)	In Higher Tier / HLS Outside SSSI (ha)	Outside SSSI Not in Higher Tier / HLS (ha)	Total (ha)
Blanket bog	5,183 (62%)	3,113 (37%)	19 (0.2%)	8,315 (100%)
Upland flushes, fens and swamps	11 (20%)	4 (8%)	39 (72%)	54 (100%)
Upland heathland	11,451 (89%)	854 (7%)	613 (5%)	12,918 (100%)
Lowland heathland	35 (49%)	7 (9%)	30 (41%)	72 (100%)
Total	16,645	3,978	701	21,359

Table 9. Condition of moorland priority habitat within SSSIs

Priority Habitat	Condition	In SSSI (ha)
Blanket bog	Favourable	266 (5%)
	Unfavourable Recovering	4,917 (95%)
Upland flushes, fens and swamps	Unfavourable Recovering	11 (100%)
Upland heathland	Favourable	1,392 (12%)
	Unfavourable Recovering	10,053 (88%)
	Unfavourable No Change	6 (0.05%)
Lowland heathland	Favourable	5 (14%)
	Unfavourable Recovering	30 (86%)
	Unfavourable No Change	0.01 (0.03%)

Table 10. Moorland designated sites in Nidderdale AONB in 2018⁴

Designated site*	Total Area (ha)	% of Nidderdale AONB area	Key habitats	Key species
North Pennine Moors SPA	147,246.41 of which 16,844.7 is in Nidderdale AONB	27%	Upland heath Blanket bog	Hen harrier Merlin Peregrine Golden plover
North Pennines SAC	103114.4 of which 16,844.7 is in Nidderdale AONB	27%	Upland heath Blanket bog	
West Nidderdale Moors SSSI	13,418.94	22%	Blanket bog Dry heath Upland flushes Acid grassland	Moorland breeding bird populations including merlin, golden plover, snipe, curlew, redshank, teal and short-eared owl Foraging peregrine, hen harrier and buzzard
East Nidderdale Moors SSSI	10,776.97	18%	Blanket bog Dry heath Flushes Mires Acid grassland	Merlin, peregrine, golden plover, short-eared owl, teal, red grouse, curlew, redshank and twite
Brimham Rocks SSSI	162.7	0.27	Millstone Grit tors together with a mosaic of upland plant communities including dry and wet heath, birch woodland and acid bog	

Note: *The SPA and SAC sites overlap and share a common geography with the two large moorland SSSIs.

A large area of moorland is currently in higher level agri-environment schemes – 20,000ha restoration of moorland and 2,500ha maintenance of moorland⁵. This protection is forecast to reduce over time as the area in schemes reduces unless the new ELMS scheme can reverse this trend (see Figure 14 on page 18). As SINC sites do not overlap with SSSIs there is little moorland habitat protected in SINCs, an exception is Angram SINC which is situated on non-SSSI moorland.

Ownership and access

Overall about 40% (246km²) of the AONB is accessible to walkers in accordance with the provisions contained in the Countryside and Rights of Way Act 2000, the majority of which is moorlands. Within this open access land there are 60.5km of bridleway, out of a total of 171km in the AONB, and 161km of footpath, out of a total 731km in the AONB – see Figure 37.

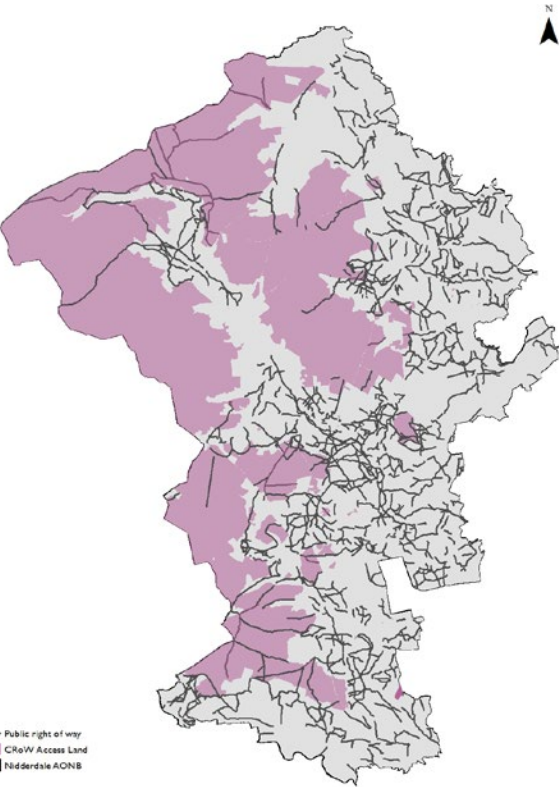


Fig. 37. Open access land and public rights of way⁶

Case Study Restoring upland peat in Nidderdale AONB

The Yorkshire Peat Partnership

Peatlands form over thousands of years. They are the accumulation of layers and layers of slowly decomposing plants, which over time turns into a sort of organic soil we call peat. On average, it takes about 1,000 years to form a 1m depth of peat. Peat can only form in very wet conditions, which cause the plants to rot very slowly, trapping carbon. A large proportion of the plants that form peat are sphagnum mosses a group of around 380 species worldwide.

Yorkshire Peat Partnership is restoring peatlands in Nidderdale AONB. The AONB contains over 21,000ha of peatland – of which around 80% are degraded. Our goal is to restore and conserve upland peat resources in order to ensure the long-term future of these unique and valuable habitats.

Healthy peatlands are wet environments; sphagnum can hold 20 times its weight in water! They're also fully saturated, meaning they can't absorb any more water. The plants and mosses that thrive in the wet habitat help to slow the flow of water across the land, reducing the risk of flash flooding downriver.

Peatland degradation

Formed over thousands of years, it has taken just six decades to devastate Yorkshire's peatlands. Most damage occurred in the 1950s and 1960s, when the government attempted to drain the land to make it more productive for agriculture, by digging drainage channels or 'grips'.

This releases the water the peat was previously holding. Sphagnum and other important peat-forming plants were unable to survive without saturated conditions. As the plants on the surface of the peatland die, the peat underneath is exposed. This has three major impacts:

- the carbon stored within the peat is released into the atmosphere;
- the peat is washed into the grips and ends up in our water system; and

- winding channels, called gullies, erode into the peat, allowing yet more water to drain from peatland and causing more erosion.

What is left is huge areas of bare, exposed peat broken up by deep gullies.

How are we restoring our peatlands?

- **Blocking grips and gullies**
This is the main focus of peatland restoration. Blocking drainage channels helps to slow the flow of water, helping reduce flood risk downstream. It also brings the water table closer to the surface.
- **Re-profiling**
Some of the drainage and erosion features we find are incredibly steep and several metres high. This not only makes it difficult for plants to colonise this exposed area, it also makes these features vulnerable to further wind and rain erosion. The trick is to 're-profile' these inclines to a shallower angle and cover the bare peat with vegetation.

Revegetation and blanket bog plants

Bare peat is good for no one. It isn't useful for the landowner, wildlife cannot thrive there, and it releases carbon into our atmosphere and water supplies.

The first step for treating bare peat is damage limitation. We just need to get plants (heather, upland grasses and dwarf shrubs) established to cover and stabilise the peat. Once this vegetation has taken root we look to plant sphagnum moss and cotton grasses; two iconic blanket bog species and vital to peat growth.

Since 2009 the Yorkshire Peat Partnership has worked on 17,410ha of upland peat in Nidderdale AONB.



Case Study Brimham Rocks: Moor than just Rocks

Catherine Barber, National Trust Ranger

At Brimham Rocks we care for 150+ acres of SSSI moorland. We manage it as moorland because it provides a home to species of interest and is a small island of 'wild' land in amongst the surrounding fields. Looking to the future we want to foster a peat forming environment to help lock away carbon from the atmosphere, and slow the flow of water into the tributaries of rivers and prevent flooding downstream. Currently we maintain the habitat mostly by hand with our fabulous team of volunteers, cutting back the birch growth and removing the biomass. We've been working our way through the planning process to erect fencing that will allow us to graze the moorland with hardy cattle. This will provide the management we need to deliver sustainable benefits for years to come. We also have future plans to increase the cover of bog-forming mosses. We're always thinking of how we can improve the ways we work on site, and in the coming seasons we're looking to start working with some heavy horses to minimise the amount of vehicular traffic on site. They will help us remove logs from the felling work and manage the bracken through rolling and bruising.

Species

The moorlands of Nidderdale are particularly important for birds, especially for breeding wading birds (lapwing, curlew, snipe, redshank, golden plover and dunlin) and birds of prey. Other notable species are ring ouzel and black grouse.

Wading birds

Between 2007 and 2012, Nidderdale AONB volunteers undertook surveys of breeding waders to understand the density of waders outside SSSIs – see *Figure 38 on page 58*. This work found a significantly greater number of breeding pairs within improved pasture, rush pasture, and rough grassland habitats implying these habitats are more favourable for breeding waders. There was a positive correlation between both elevation and area, and number of breeding pairs, implying that larger areas at higher elevations are more suitable for breeding waders. A negative correlation between distance from moorland and number of breeding pairs supported previous research indicating that moorland habitats are favoured by wader populations. The results are also supported by the higher densities of wader species located around the edge of moorland habitats. Conversely, distance from woodland was positively correlated with number of pairs, implying that waders prefer

habitats further away from woodland regions This could be due to an increase in the chances of predation for ground-nesting birds when nearer to woodland. The areas of highest wader density were found to be located around the perimeter of current SSSIs, suggesting these locations should be prioritised for conservation as wader populations in Nidderdale AONB are of national significance.

Wader data collected by Natural England within the moorland SSSIs in 2006 is shown in Figure 39⁷. Further data for Upper Nidderdale was collected during 2015–2017 as part of the Upper Nidderdale Landscape Partnership – see Figure 40. This survey collected data on the numbers of breeding waders present to provide a baseline for assessing the effects of targeted agri-environment schemes and management, including scrape creation, rush management, and hay meadow restoration.

Work undertaken for the Northern Upland Chain Local Nature Partnership (NUC LNP) has found that in 2010 the NUC LNP area supported 49% of the breeding curlew population in England and Wales and 27% of the breeding curlew population in mainland Britain. This is despite the fact that the NUC LNP area accounts for only 4.9% of the land area of England and Wales, and 3.4% of the land area of mainland Britain⁸. This work also found that abundance of breeding curlew over much of the NUC LNP area, including Nidderdale AONB, had remained stable or had increased between 1990 and 2010. This is in marked contrast to trends in the surrounding countryside where curlew numbers declined during this period.



Redshank © Gillian Day

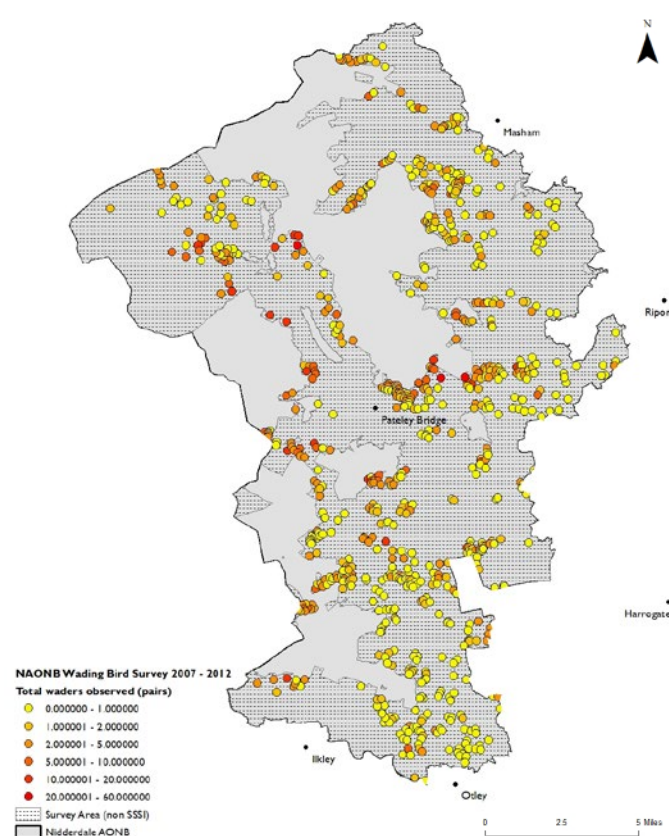


Fig. 38. Wading bird survey 2007–2012⁹

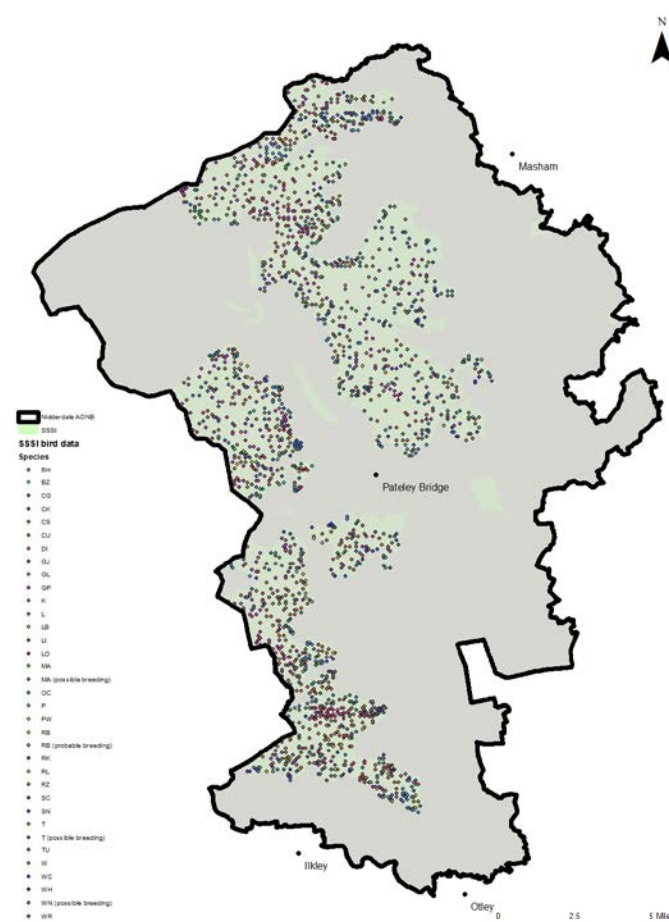


Fig. 39. Wading bird survey within moorland SSSIs¹⁰



Curlew © Paul Skirrow

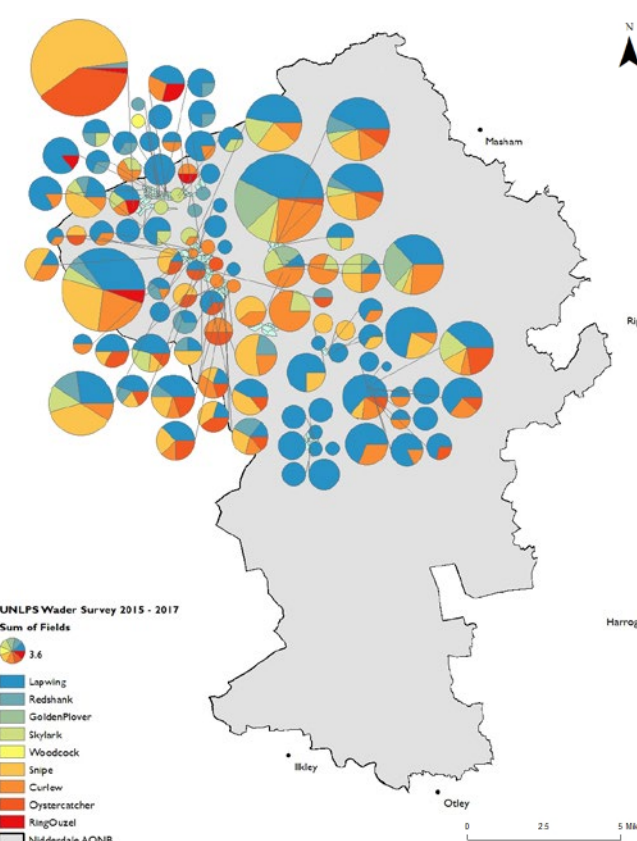


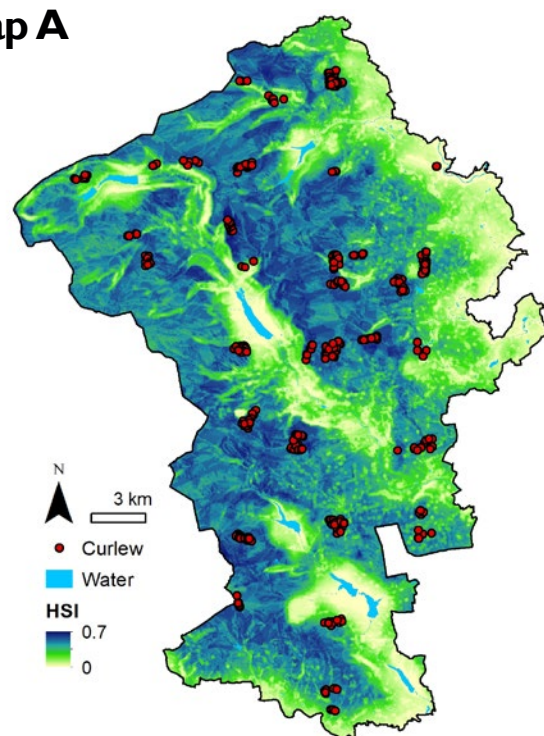
Fig. 40. Wading bird survey 2015–2017¹¹

Habitat Suitability Modelling for wading birds

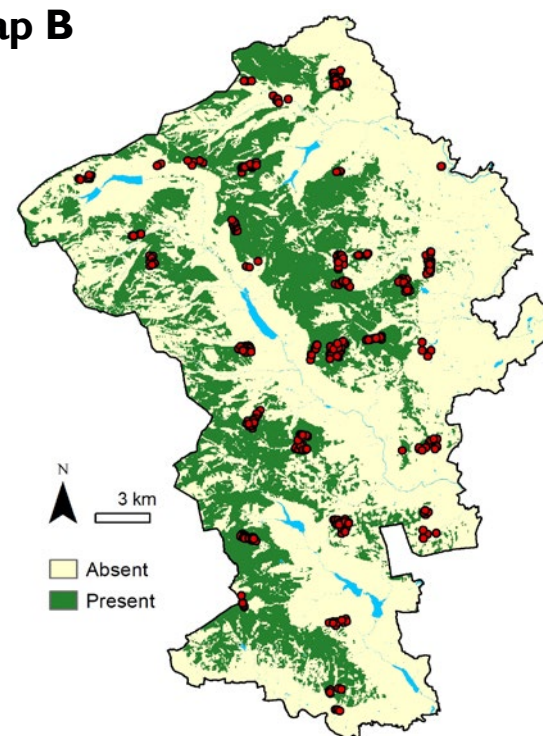
Habitat Suitability Models were produced for snipe, curlew and lapwing as part of The Wild Watch. Both regional and local scale variables were important for predicting their presence. The cover of woodland, and the density of buildings, trees and hedges generally had negative effects on habitat suitability. The cover of water, such as rivers and lakes, soil moisture, slope, aspect, distance to/cover of grassland, and cover of arable land were also important variables with preferences varying between species.

The Habitat Suitability Maps showed differences in the distribution of suitable habitats across the AONB for each wading bird species (see Figures 41–43). Suitable habitats for curlew are the most widespread across both upland and lowland areas, whereas suitable habitats for lapwing and snipe are more restricted. Patches of suitable habitat for snipe are mostly found in upland areas and on moorland, whereas the most suitable habitats for lapwing are on the fringes of these habitats.

Map A



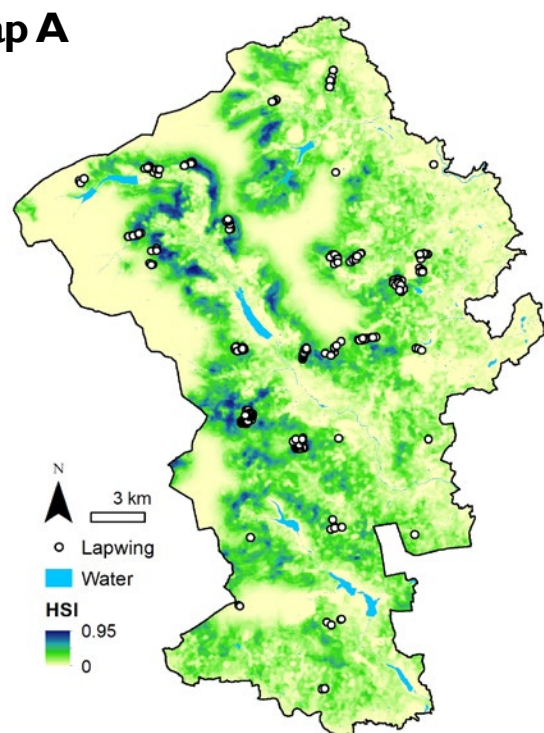
Map B



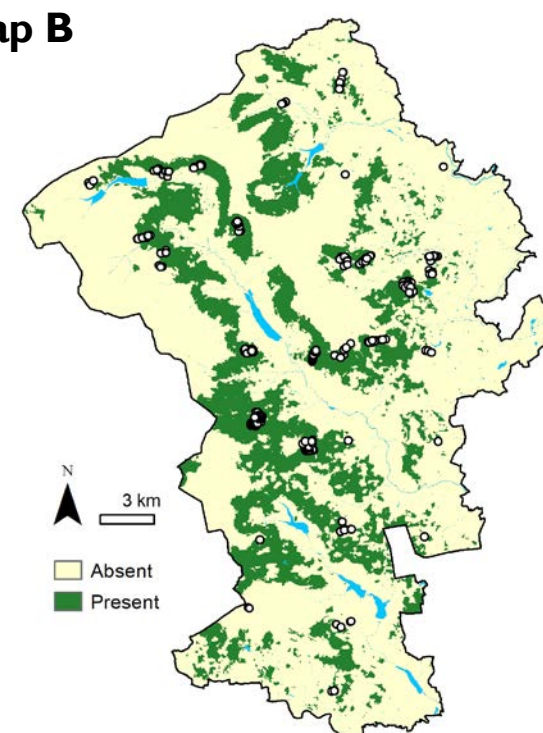
Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of curlew according to the tenth percentile occupancy threshold.

Fig. 41. Habitat Suitability Maps for curlew¹²

Map A



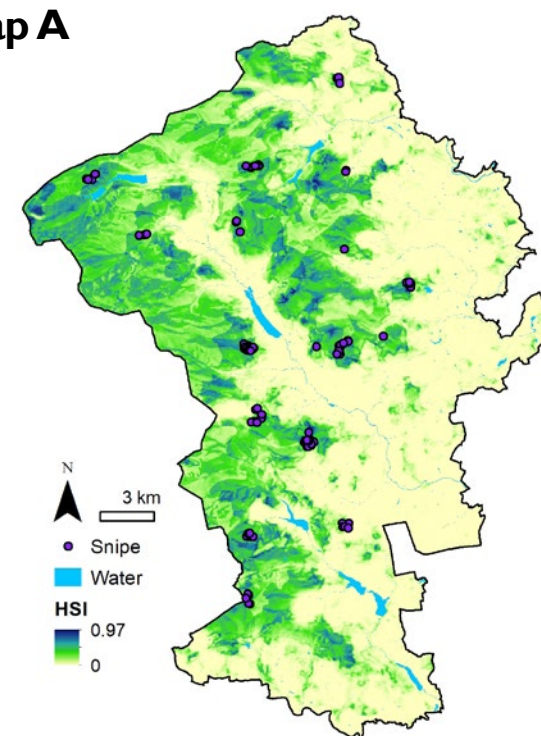
Map B



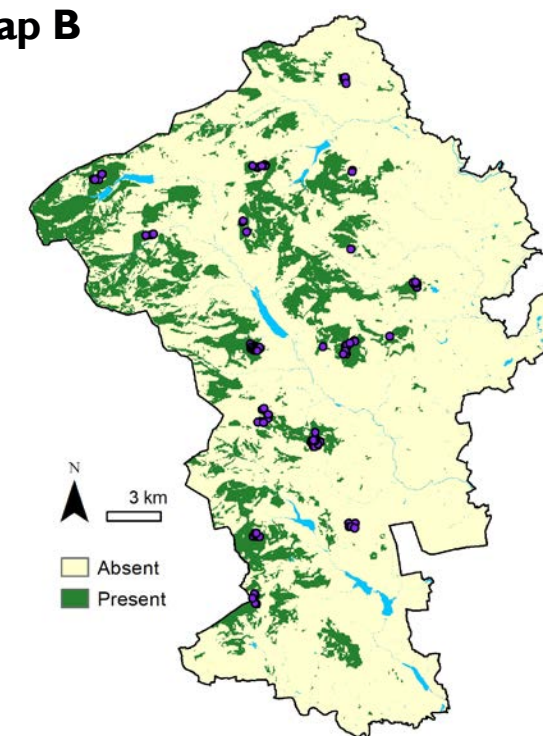
Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of lapwing according to the tenth percentile occupancy threshold.

Fig. 42. Habitat Suitability Maps for lapwing¹³

Map A



Map B



Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of snipe according to the tenth percentile occupancy threshold.

Fig. 43. Habitat Suitability Maps for snipe¹⁴

Case Study Upland Bird Habitat¹⁵

Upper Nidderdale Landscape Partnership (UNLP), 2015–2019

The rough, damp, tussocky pastures produced by extensive traditional management provide perfect nesting and chick-rearing habitat for several species of ground nesting waders: lapwing, curlew, snipe, redshank and oystercatcher. These birds were once widespread on farms throughout the country but many are now listed as 'of conservation concern', with many experiencing declines of more than 50% in the past 30 years. Research has suggested that failure to breed successfully is the main reason for population declines. Our UNLP Upland Bird Habitat project worked with farmers to enhance habitat for waders and other ground nesting birds during the breeding season.

Waders prefer to nest in damp, tussocky, rush pastures but when rush cover becomes dense

and extensive, the birds will choose to nest elsewhere. We helped farmers to manage the rush in their fields by cutting the rush in the late summer or autumn after the breeding season. Ideally up to 30% of rush covers should be left in a field as some species like snipe prefer to have more cover.

Wader chicks need wet places to feed; wet mud is full of insects and other invertebrate food which chicks can easily find and adults will often lead chicks a considerable distance to find water. We helped farmers to put scrapes in the fields where birds were breeding to give chicks' access to a vital food supply and help ensure their survival. Scrapes are shallow wet depressions which dry out in summer but are designed to have a continual wet muddy edge during the breeding season.

Black grouse were re-introduced to Upper Nidderdale about six years ago by the Game and Wildlife Conservation Trust (GWCT), who also re-introduced grey partridge to Stean in Upper Nidderdale¹⁶. These nationally declining species are surviving well here due to low intensity farming and the variety of food and cover that this provides. The Upland Bird Habitat project encouraged farmers not to intensify fields next to the moorland edge and plant small pockets of woodlands in ghylls to provide winter shelter and food for these birds.

Key project outcomes:

- 9 bird habitat sites surveyed by trained volunteers;
- over 566ha of rush and rough grassland management carried out;
- 9.5ha of wetlands created; and
- Over 14ha of new native woodland planted.

Case Study Northern Upland Chain Local Nature Partnership – Curlew Project

Ian Proudler, Curlew Project Funding and Development Officer

The project covers a geographic area of 6,635 square km (2,560 square miles) which incorporates five Protected Landscapes (Northumberland National Park Authority, Yorkshire Dales National Park Authority, North Pennines AONB, Nidderdale AONB and the Forest of Bowland AONB).

In 2008, the curlew was deemed of global conservation concern and became listed as 'Near Threatened' on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Steep declines have been particularly evident in the UK. Between 1995 and 2012, the breeding populations declined by 55% in Scotland and 30% in England.

The project aims to conserve this flagship species with considerable positive knock on benefits

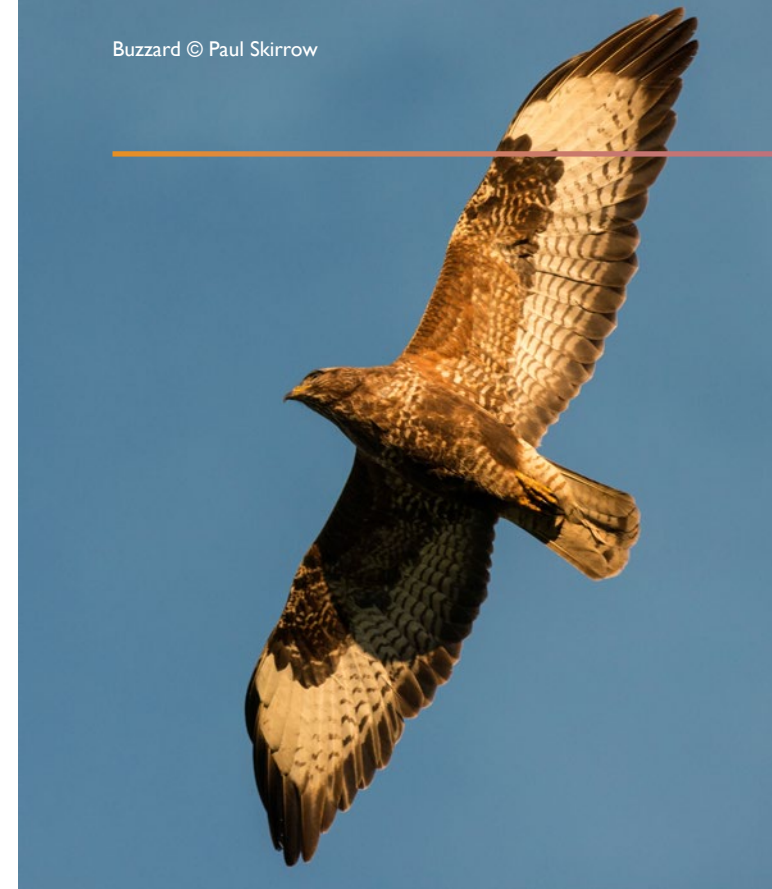
for all our upland breeding waders. It will work within clearly defined 'focus areas' within each of the five protected landscapes and develop themes which include;

- Developing new data, recording and monitoring of bird populations, trends and dynamics.
- Engaging with farmers and landowners through new or existing advisory networks.
- Sharing the plight of the curlew to a wide range of people from both upland (breeding) and coastal (over wintering) communities, through which a sense of ownership and connection will develop.

The work within Nidderdale AONB has supported the development of this Curlew Project, such that the NUC LNP aims to roll out a number of initiatives piloted by Nidderdale AONB throughout the northern upland chain geographic area. First will be enhanced Curlew Habitat Suitability Modelling using a similar model to that which has been developed within Nidderdale AONB. In addition, work being championed through the Moorland Groups in Nidderdale, Yorkshire Dales and Northern Pennines with bird transect data currently being collected by gamekeepers will be further refined and developed. This may lead to gamekeeper training by the British Trust for Ornithology in colour ringing and, where appropriate, the GPS tagging of young curlew.

The project will employ staff in varying roles but with a remit of supporting the Protected Landscapes through specialised training relating to the Curlew and wider wader population, developing additional public engagement as appropriate and sharing new information and data as it becomes available.

The Curlew Project is still in development, and it may not begin until 2022, but once it starts it is intended to run for five years.



Case Study Birds of Prey¹⁷

Nidderdale AONB is important for a number of key upland bird of prey species, including hen harrier, merlin, peregrine, and short-eared owl which are all associated with moorland habitats. To better understand the status of its birds of prey, in 2019 the AONB compiled data from a wide range of sources and assessed the populations of its key bird of prey species, publishing the findings in the Birds of Prey in Nidderdale AONB Evidence Report September 2019¹⁸. Assessments were based on the best breeding data currently available up to and including the 2018 breeding season (data from the 2019 season was not included as it was not fully available). Although full details were not made public, it has been confirmed that hen harrier chicks did hatch in Nidderdale AONB in 2019¹⁹. The AONB intends to repeat this exercise in the future to assess progress against this baseline. The report also looked at confirmed incidents of persecution and identified that key species such as peregrine and hen harrier may be at risk from disturbance and persecution. To address data gaps there is a need to establish additional, more robust bird of prey monitoring programmes, including for buzzard, merlin, short-eared owl, and goshawk.

Recommendations/future actions

AONB plans/commitments

- Restoring peat habitats to reduce carbon emissions and increase the AONB's capacity for carbon storage. We will continue to support work by moorland land managers, the Yorkshire Peat Partnership, Natural England, Yorkshire Water and other partners to increase the carbon storage capacity of Nidderdale's moorlands by helping landowners access Countryside Stewardship grants including moorland restoration options.
- Continuing to work with land managers and partner organisations to reduce the risk of moorland wildfires, particularly in light of changing climate and the increased likelihood of extreme weather conditions.
- Promoting best practice for moorland management by working collaboratively with land managers and providing training events for landowners.
- Continuing to deliver water quality and natural flood management improvements through peatland restoration and sustainable land management.
- Helping the general public understand the value of moorland management and the importance of these habitats by running moorland events.
- We will continue to work with landowners, moorland managers, the police and others to safeguard birds of prey in the AONB by working with Operation Owl²⁰ and by collaborating with shooting estates and moorland gamekeepers on actions agreed by the Raptor Persecution Priority Delivery Group²¹.

What can you do?

- Follow the Moorland Visitors Code²².
- Keep dogs under control.
- Prevent uncontrolled moorland fires.
- Protect plants and animals, and take your litter home.
- Come on an event and find out more about Nidderdale AONB's moorlands.
- Take biosecurity measures – cleaning your footwear before and after visiting moorland areas.

Grassland and farmland

Headlines

- At a national scale most specialist farmland birds are declining due to changes in agricultural practices. Current threats to farmland and grassland habitats include agricultural intensification, lack of protection, neglect and pressure from development.
- Nidderdale has over 115 ha of grassland priority habitats. Priority habitats include upland calcareous grassland, calaminarian grassland and upland hay meadows.
- Most of our grassland is outside designated sites, with only 4% in SSSIs. Grassland habitats are better represented in SINC, but information about the current management of these is limited.
- We have developed Habitat Suitability Maps for skylark and song thrush which we will use to target conservation action.
- Positive actions include working with landowners to increase the environmental sustainability of the AONB's farming industry through provision of land management advice, supporting Yorkshire Water's plans to expand its network of 'Beyond Nature' farms and working with landowners to restore hay meadows. We are also raising awareness of the wealth of plants and wildlife of our meadows and supporting volunteers to help with surveys and monitoring of meadows and verges.

National context

The national State of Nature reports show that, over the long-term, 52% of farmland species have declined and that 12% of farmland species are threatened with extinction in Great Britain¹. UK biodiversity indicators show that farmland birds have declined by 54% since 1970, and butterflies by 41% since 1976.

Short-term, between 2011 and 2016 the smoothed UK farmland bird index declined by 7%, see Figure 44. Most specialist farmland birds are declining due to changes in agricultural practices. Four of the five most severely declining breeding bird species are farmland specialists (grey partridge, turtle dove, tree sparrow and corn bunting). The key reason why farmland wildlife is changing is increased agricultural intensification – see *Headlines in Why is nature changing?* section on page 17.

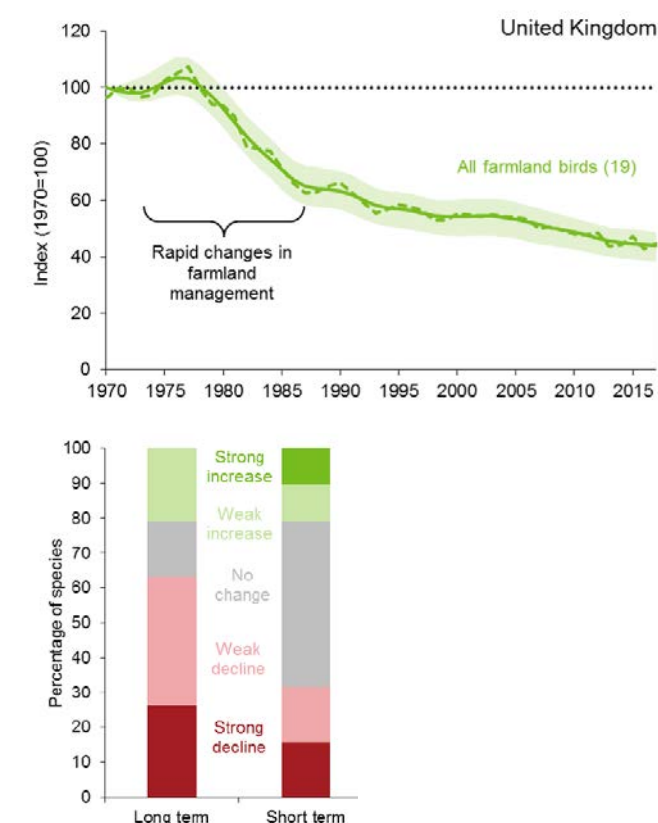


Fig. 44. Breeding Farmland Birds in the UK, 1970 to 2017²

Habitats

Species rich grasslands and meadows are a valuable habitat for plants and wildlife, they are an uncommon sight in Nidderdale AONB, but are increasing with our hay meadow restoration and road verge projects.

- **Upland calcareous grassland** is present within small areas of carboniferous limestone. It is species rich and dominated by fine-leaved grasses.
- **Calaminarian grasslands** grow on the waste from the once extensive lead-mining industry. The spoil heaps support a very specialised heavy metal-tolerant range of plant species such as alpine pennycress and spring sandwort along with rare lichens and mosses.
- **Magnesian limestone grassland** grows on outcrops of Permian-era limestone or dolomite laid down 225 million years ago. They contain a unique range of plant and invertebrate species, including over 13 nationally-scarce plants and 84 nationally-scarce invertebrates.
- **Flower-rich meadows** stir memories of childhood visits to fields awash with colour and alive with insects. But over the last fifty years approximately 97% of meadows in the UK have been lost, largely due to modern, intensive farming methods³. Although an increasingly rare sight, there are still some species-rich meadows in the AONB due to restoration, agri-environment schemes and traditional framing practices.

Figure 45 shows the grassland priority habitat in Nidderdale AONB.

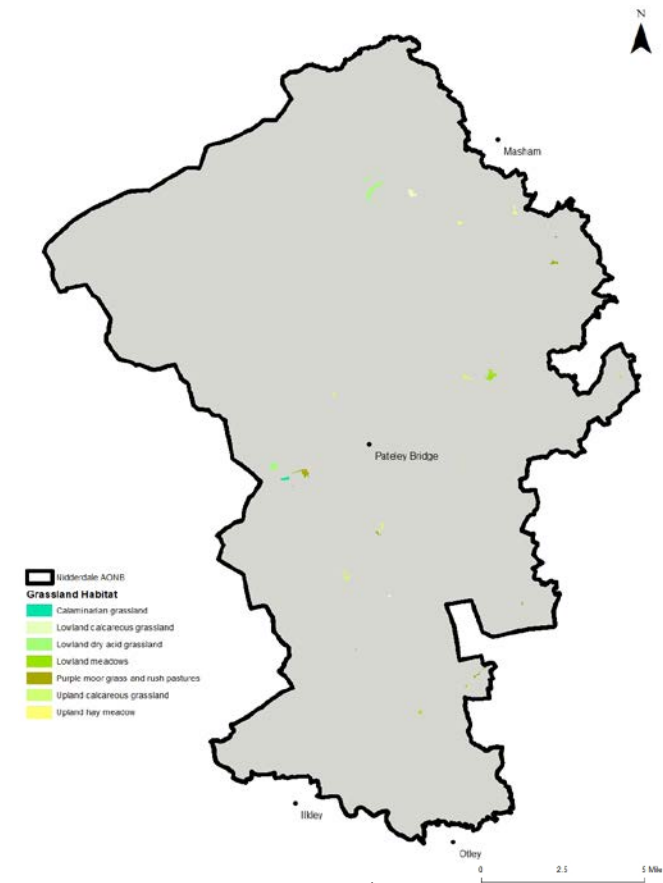


Fig. 45. AONB Grassland Priority Habitat map⁴

Most of Nidderdale AONB’s valuable grassland and meadow habitat is outside protected areas – see Tables 11 and 12. However, calaminarian grasslands are protected in two SINC’s (Cock Hill and Sunny Side Lead Mines & Gilbeck (a site of almost 30 ha), and Coldstones Grasslands (an 83.5ha site). A smaller area (7ha) is designated as Greenhow Pastures SSSI⁵. Unfortunately, due to current management regimes the calaminarian grassland sites are currently not in good condition, for example, over 90% of the Greenhow Pastures SSSI site is currently in unfavourable condition – see Table 12. The AONB has been working with landowners to provide recommendations for land management to improve grassland sites, including reduction of grazing levels in the spring and summer to allow plants to flower and set seed. Note that due to the nature of calaminarian grassland, the attributes for such a habitat will decrease over time as the elements are leached from the spoiled land.

Table 11. Priority Grassland Habitat coverage in Nidderdale AONB in 2018⁶

Priority Habitat	In SSSI (ha)	In Higher Tier / HLS Outside SSSI (ha)	Outside SSSI Not in Higher Tier / HLS (ha)	Total (ha)
Calaminarian grassland	4.73 (100%)	0	0	4.73
Lowland calcareous grassland	0.02 (0.2%)	8.6 (84%)	1.56 (15%)	10.17
Lowland dry acid grassland	0.01 (0.03%)	17 (54%)	14.49 (46%)	31.61
Lowland meadows	0	4.25 (22%)	15.35 (78%)	19.60
Purple moor grass and rush pasture	0	1 (4%)	22 (96%)	23 (100%)
Upland calcareous grassland	0	1.05 (6%)	16.64 (94%)	17.69
Upland hay meadows	0.02 (0.2%)	8.72 (99.8%)	0	8.74
Total	4.78 (4%)	40.62 (35%)	70.04 (61%)	115.54

Table 12. Condition of Grassland Priority Habitat within SSSI⁷

Priority Habitat	Condition	In SSSI (ha)
Calaminarian grassland	Unfavourable No Change	4.73 (100%)
Lowland calcareous grassland	Unfavourable No Change	0.02 (100%)
Lowland dry acid grassland	Favourable	0.01 (100%)
Upland hay meadow	Favourable	0.02 (100%)

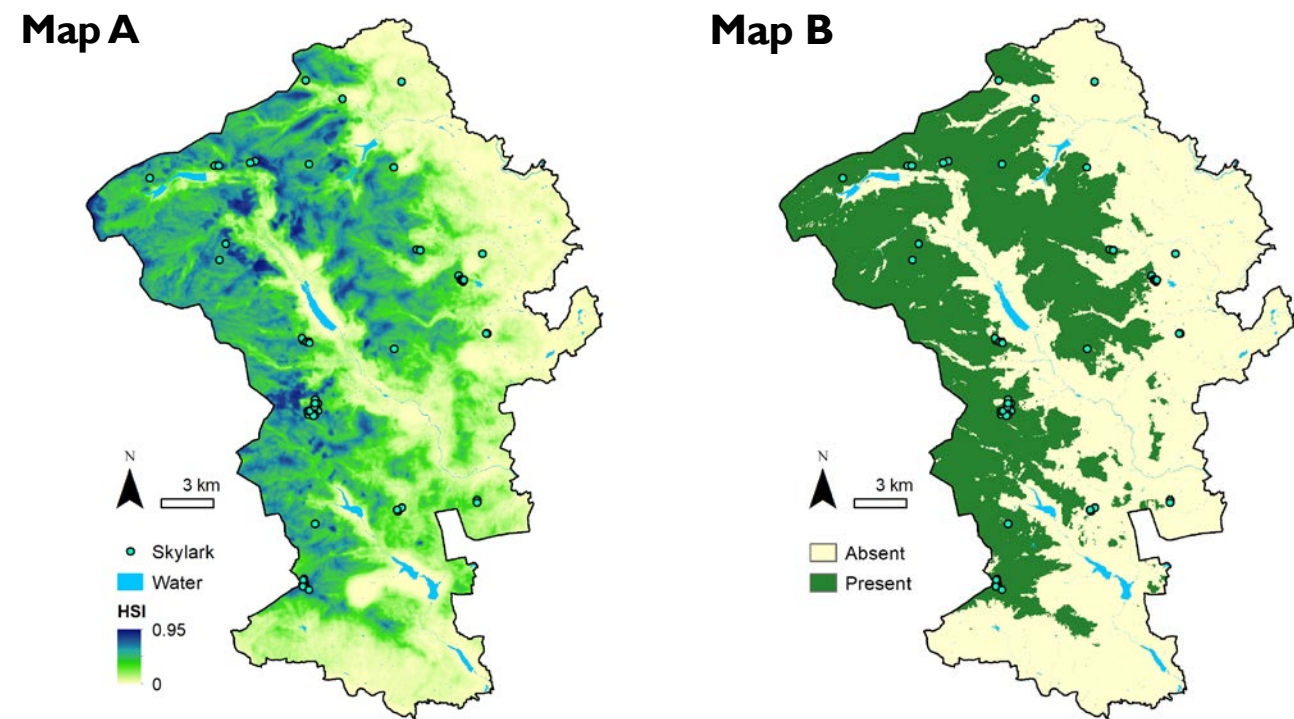
Grassland and farmland habitats are well represented in Nidderdale AONB’s SINC’s (see Table 6 on page 52). Sites include March Ghyll Grassland, Redlish Road Verges and Greenhow Burial Ground.

Species

The grassland and farmland of Nidderdale are important for birds. As part of The Wild Watch project we have been collecting data on five farmland birds - cuckoo, skylark, song-thrush, linnet, lesser redpoll.

This new data has been used to produce Habitat Suitability Models for song thrush and skylark. Regional scale variables were important for skylark. The cover of arable land, water and woodland, and the density of buildings and trees had negative effects on the presence of skylark, whereas semi-natural grassland on flatter ground was preferred and suitable habitats were generally located in upland areas in the west of the AONB - see Figure 46 on page 68.

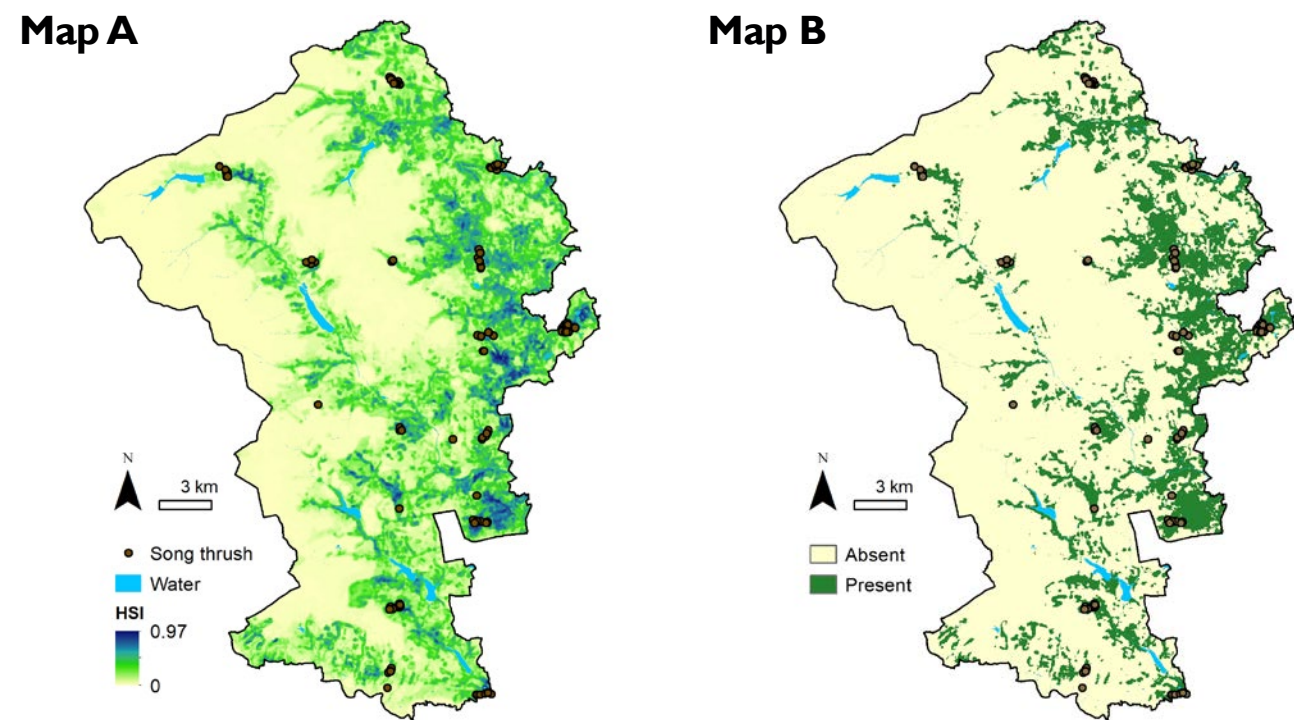




Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of skylark according to the tenth percentile occupancy threshold.

Fig. 46. Habitat Suitability Maps for skylark⁸

By contrast, regional variables did not have an effect on song thrush and song thrush habitat suitability showed a different pattern, with suitable habitats located in lowland areas in the east of the AONB – see Figure 47. The presence of woodland, hedges and trees, damp soils and grassland were important predictors with positive effects on song thrush presence.



Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of song thrush according to the tenth percentile occupancy threshold.

Fig. 47. Habitat Suitability Maps for song thrush⁹

Case Study Hay meadow Restoration¹⁰

Kelly Harmar, Biodiversity Officer, Nidderdale AONB

The AONB team, volunteers and landowners are working to reverse the decline in hay meadows by enhancing and restoring carefully selected grassland sites. Seed is harvested locally from species-rich meadows and spread on to meadows that have lost their special species but still have suitable soil conditions. Harvesting local seed ensures that wildflower species are appropriate to our area and that local genetics are maintained. Using local seed also retains project funding locally and rewards farmers who have maintained their species rich meadows.

Since 2011, we have surveyed over 300ha of meadow and grassland, with 30 volunteers trained to carry out surveys, and restored and enhanced about 230ha of hay meadow – see Table 13. Funding has come from a range of sources – including agri-environment schemes, heritage lottery, the Landfill Community Fund (from both Biffa Award and Sita Trust) and funding from individual landowners, including Yorkshire Water¹¹. Our aim is restore or enhance further meadow habitat across the AONB¹².

Table 13. Hay meadow restoration and enhancement areas

Year	Total Area (ha)
2011	41.91
2012	20.58
2013	43.35
2014	15.88
2015	24.94
2016	39.87
2017	22.27
2018	17.81
2019	3.58
Total	230.19

Case Study Roadside verges survey project

Kelly Harmar, Biodiversity Officer, Nidderdale AONB

Roadside verges are patches of grassland that have avoided the disturbance of farming, though many have been affected by road works, underground cables, parking, litter and salt gritting. They are home to some of the rarest plant species in the UK. In 2012 and 2013 wildflower surveys were completed across all the road verges in Nidderdale AONB, with some fascinating results. Following the survey, all roads in the AONB were colour coded red, amber, yellow or green depending on wildflower interest and 34 ‘Special Interest Verges’ were identified.

The best sites botanically were classified as ‘red’, being characterised by high species richness and the presence of some species rare in the area. Sites in the next tier were classified as ‘amber’; these are also good sites with high diversity of species but lacking many rarities. Other verges in non-built-up areas were classed as ‘green’, being characterised by low diversity and low species richness.

These were by far the commonest verges – a situation familiar from other areas in the county. Verges through villages or across reservoir dams were not included, as their vegetation is either artificial or non-existent. The ‘red’ and ‘amber’ sites together comprise the Special Interest Verges (SIVs). SIVs include Leighton Reservoir (with unusual species), Scar House Road Corner, Scar House Reservoir Road, Brimham Rocks (with heathland species), Thruscross (with lots of orchids), Redlish Road (also a SINC), and Sandwith Moor (wetter with ragged robin and orchids).

Detailed species surveys were undertaken at each Special Interest Verge (SIV) and star species included twayblade, Solomon’s seal, common spotted orchid, rock-rose, marjoram, bilberry, cowberry, sweet woodruff and a rare sighting of Melancholy thistle in Nidderdale¹³. The survey was carried out by experienced volunteers

from PLACE (People, Landscape and Cultural Environment of Yorkshire). SIVs need managing, particularly to prevent brambles, gorse and saplings getting established. They are best cut after the end of August to allow the seeds time to mature and spread. Mowing in mid-summer can cut down species such as marsh orchids and also destroy the food plants of butterflies such as the meadow brown and ringlet. Following identification of its special status, volunteers have taken over the management of the SIV in Glasshouses.

Case Study **Wilsill Churchyard**

Kelly Harmar, Biodiversity Officer, Nidderdale AONB

In early 2019 the caretaker of Wilsill Church contacted us for advice about how they could create a wildlife area in the churchyard. We visited the site and after spotting the leaves of several wildflowers in the close cut turf we advised them to let it grow up and see what species were present before adding to this. A survey later in the season found about 25 species present, with particularly good flowers in the early season. Species found included bugle, cat's ear, common sorrel, cowslip, creeping buttercup, cuckooflower, pignut, white clover, yarrow and Yorkshire fog. After identifying which species were already present, the site was then hand scarified and donor seed was added – including yellow rattle to thin the sward as the sward is dense and grass dominated, and seed for late flowering plants to add colour late in the season. Additional cowslips were also added as plug plants. The meadow is currently being cut with a strimmer in late summer/early autumn, raked and the grass cuttings removed. The plan is to see how the meadow develops in 2020 and adapt the management as necessary. The churchyard is now a little oasis in the midst of more intensively managed pasture and silage and demonstrates what can be achieved at a modest scale in a relatively short time frame and could easily be replicated at other sites across the AONB.



Case Study **Upper Nidderdale Farm Facilitation Fund Group**

Originally Tara Challoner, YWT for the Upper Nidderdale LPS, now Claire Foster, Farmer Network

The Upper Nidderdale Farm Facilitation Fund Group has been running since late 2016 supported by Countryside Stewardship Funding. The group has 24 members and has held a number of workshops and training events on a range of topics including woodland creation and management, countryside stewardship, water quality – through soil and sward management, and priority habitats and species. Group meetings are scheduled to best fit with the hill farming calendar, so group meetings are concentrated in the winter months and July-August. Since its inception the group has held 14 workshops/training events, had two demonstrations (wader habitats and scrapes and woodland management) and looked at enhancing priority habitats (hay meadows and grassland for breeding waders) on three member farms. Meetings are well attended, with members joined by spouses and other local farmers, and feedback from farmers attending is positive with the group appreciating the opportunities the Facilitation Fund is enabling.

Case Study **Beyond Nature, Yorkshire Water**

Lisa Harrowsmith, Land and Property Lead Surveyor, Yorkshire Water

Beyond Nature¹⁴ is Yorkshire Water's ambitious initiative on innovative sustainable land management to optimise multiple ecosystem values. The aim is for outcomes from land to be diverse and appealing to all, protecting the Yorkshire landscape for future generations. There are 9 themes to Beyond Nature:



With a struggling upland farming industry, and the uncertainty as a result of Brexit, there is a need to look wider at the future management of land, and the values which can be delivered from it. There continues to be a need for those living and working on these holdings to earn a living, and future policies need to capture and value the ecosystem services and reward those who maximise the values of these.

There are currently eight farms in the Beyond Nature portfolio, six of which are in Nidderdale AONB – see Table 14.

Table 14. Overview of current Beyond Nature tenancies in Nidderdale AONB¹⁵

Farm	Beyond Nature tenancy / management plan commencement	Ha
Humberstone Bank	September 2016	904
High Woodale	August 2017	969
Trees House	February 2019	139
Lodge Moor and Scar House Pasture	April 2019	995
Baudshaw	May 2019	30
Breaks Fold & Redshaw	January 2020	90
Total		3,127

From the outset, Nidderdale AONB has been at the heart of Yorkshire Water's Beyond Nature initiative, and over 64% of the land currently in the initiative is within the AONB.

The first farm to be signed up to a Beyond Nature tenancy was **Humberstone Bank**. When we put the tenancy out to tender, we made it explicit that we were looking for someone to take on the farm who would share our Beyond Nature vision and have the enthusiasm and initiative to help us take it forward. Since September 2016 Yorkshire Water have been working in partnership with Jonathan Grayshon¹⁶, the new farming tenant, and the Pockstones Moor Shoot owner with a shared vision to deliver on five of the Beyond Nature themes: water quality, biodiversity, carbon storage, and farming and shooting enterprises. In these first three years of the tenancy a wide range of work has been completed to implement the management plan. Work to improve habitats has started on moorland and in bye grazing land and creation of new woodland areas – see separate case study below. In Summer 2018 the Upland Hub at Humberstone was completed. This is a converted farm building, funded by Yorkshire Water with the facilities to host conferences, meetings and educational visits.

The 970 ha **High Woodale Farm** at the head of Nidderdale was the second farm to enter into a Beyond Nature tenancy¹⁷. High Woodale is farmed by Martyn Brown and his family, and is a classic upland farm on the margins of economic viability, but with very high biodiversity, cultural and landscape values. The Beyond Nature management plan focuses on water quality, biodiversity, carbon storage, farming and sporting enterprises, and social values. As well as its natural environment this landscape has a rich industrial heritage, which draws interest from visitors and recreational users. The farm carries 800 breeding ewes – mainly Swaledales and Dalesbreds and has a no input policy in the drinking water protection zone around Angram reservoir. Alongside the sheep enterprise, in the last couple of years a range of initiatives have been delivered which build on the biodiversity and landscape values of the farm. Actions taken to improve habitats have

included land management for breeding waders, woodland creation and management, with planting over 10,000 trees, and hay meadow restoration.

Trees House Farm entered into a Beyond Nature tenancy in February 2019. Situated near Harrogate this is predominantly a dairy farm, (with some sheep) tenanted by the Ryders. The farm is set in a transitional landscape between upland and lowland and extends to 140 hectares. The Beyond Nature management plan focuses on all nine of the Beyond Nature themes. More than half of the holding is within the Nidderdale AONB and the land is bounded to the South by John O'Gaunt's reservoir. At the core of the farm's management is a commitment to extensive grassland management and water quality.

Also entering into a Beyond Nature tenancy in 2019 is 995 hectares of land at **Lodge Moor and Scar House Pasture**. This is predominantly moorland and wet rough grazing. All the land is catchment land for Angram, Scar House and Gouthwaite reservoirs and lies within the Nidderdale AONB. The vision to be an exemplar in upland land management concentrates on six of the Beyond Nature streams: water quality; biodiversity; carbon; farming enterprise; sporting enterprise and social. This land is of significant importance for its blanket bog and heather moorland. Work to implement the management plan will include restoration of upland vegetation and blanket bog, planting gill woodlands and maintaining the low input grazing enterprise.

Entering into a Beyond Nature tenancy in May 2019, the land at **Baudshaw** extends to 30 hectares of grazing land, forming part of the catchment land for Thruscross Reservoir. Proposals for implementing the Beyond Nature management plan are focused on extensive grassland management, maintaining key boundary walks, maintaining the barn to prevent deterioration and maintaining access for barn owls, native gill woodland creation and the creation of new leaky ponds.

2020 started with **Breaks Fold Farm** entering into a Beyond Nature agreement. Along with the land at Redshaw Gill, this holding extends to

New off-stream sediment pond at Humberstone Bank



89.83 hectares and is situated at West End, the village which was flooded for the construction of Thruscross Reservoir in the 1960's, west of Harrogate. The farm is a grassland-based sheep and beef farming enterprise, running 250+ breeding ewes (Swaledale & Mules) and small herd of 15 Dexter cattle. The farm has also successfully diversified with a popular campsite, affiliated with the Freedom Camping Club, and self-catering accommodation in the 'Old Peat House'. In November 2019 they also opened a farm café in what was an old derelict cottage – 'Flock to the Fold'. Ground-nesting waders, including curlew, are a key priority species, and large parts of the farm are being managed to benefit these as well as botanical diversity. Planning for works to extend the existing broadleaved woodland in Redshaw Gill, along with some new hedge planting, is already underway. This will also help to buffer and improve the environmental value and water quality in Redshaw Gill Beck. Wall restoration is also planned which will help to consolidate the historic landscape. A circular self-guided trail from Breaks Fold Farm utilising the permissive paths and public rights of way and with a new route through Redshaw Gill is also proposed.

Partnership working is a key part of the Beyond Nature ethos and since the outset Nidderdale AONB staff have been working closely with Yorkshire Water and the tenants – helping produce and implement farm management plans, secure funding and promote the Beyond Nature approach through media, public events and educational visits. The plan is to continue this collaboration as Yorkshire Water works with its current Beyond Nature tenants and increases the size of its 'Beyond Nature' Estate.

Case Study **Humberstone Bank Farm**

Kelly Harmar, Biodiversity Officer, and Marian Wilby, Land Management Team Leader, Nidderdale AONB

In 2016, Humberstone Bank Farm was chosen as the first "Beyond Nature" tenancy on a Yorkshire Water land holding. The new Beyond Nature vision for the farm means that, in addition to the usual agricultural returns and water quality benefits generally required from Yorkshire Water farm tenancies, land management on site will be required to deliver multiple ecosystem services gains, for example, biodiversity gains and carbon storage improvements.

To support this new approach to land management, Nidderdale AONB facilitated a series of baseline surveys at Humberstone Bank in 2016 and 2017, looking at vegetation, birds, reptiles and invertebrates as well as taking soil samples. These surveys were designed to ensure that the current biodiversity is fully considered when developing a management plan for the site and to provide a basis by which to evaluate the future land management at the site.

Informed by this baseline information we worked with the tenant, Jonathan Grayshon to develop and implement a Biodiversity Conservation Grant programme to enhance the environmental value of the farm, targeted at pollinators, breeding bird populations and improved water quality. This work had three elements:

- **Construction of an off-stream sediment pond and drainage ditch works to improve habitats for breeding waders.** Drains in the wader habitat fields were reprofiled to allow access to the ditches for waders and their unfledged chicks. These have proved to be important sources of water for birds during the 2018 drought conditions. The sediment /flood storage and wildlife pond, approximate area 1000m², was completed in summer 2018 and is gathering water well. The pond provides lots of edge habitat for feeding wading birds, open water for bats, wild fowl and insects.

- **Restoration of 13.3ha of upland species rich hay meadow.** Initial soil sampling and survey work was carried out to assess suitability, this indicated a low pH. To improve the pH status of the meadows to a level sufficient to sustain wildflower species, all the meadows were limed. Brush harvested seed was collected from two donor sites in the AONB and spread on the meadows at Humberstone Bank in July 2018. The meadows are developing well and are now being managed under a ten-year Countryside Stewardship agreement with annual surveys to monitor progress. The diverse sward in the upland hay meadows will increase the food source for pollinators which at the bottom of the food chain provide food source for the wide range of birds found at Humberstone Bank.

- **Installation of new livestock drinking points.** Ten hard standings and cattle drinking troughs were installed in Spring 2019 to mitigate for water quality from introduction of cattle as a new initiative. Introduction of cattle on to the farm has multiple benefits including: grazing sward structure to benefit breeding waders, enhancing stock health by mixed stocking and producing manure which will increase invertebrate activity in the soils for grass production and food supply for breeding birds.

Key lessons learned from the project:

- Without the financial help of the Yorkshire Water biodiversity fund the majority of the works could not have been implemented because of the financial costs.
- The synergies between the biodiversity fund and Countryside Stewardship have facilitated inclusion of restoration of species rich grassland options within the Countryside Stewardship Scheme Higher Tier application..
- Collaboration between parties (YW, AONB and tenant) has resulted in a well-executed project.
- For some of the works the results will start to be seen quickly e.g Pond as a water source and feeding area for waders invertebrates and bats.

Recommendations/future actions

AONB plans/commitments

- Continuing to increase the environmental sustainability of the AONB's farming industry (alongside increasing its resilience and profitability) through provision of land management advice and support to Yorkshire Water's plans to expand its network of 'Beyond Nature' farms.
- Working with landowners to restore meadows through our hay meadow project
- Running events for the general public about the rich plants and wildlife of our meadows
- Producing a Special Interest Verge management plan
- Supporting volunteers to help us survey and monitor meadows and verges in the AONB

What can you do?

- Landowners can contact us for land management advice or to find out how you can get involved in the hay meadow project
- Come on an event and find out more about the AONB's meadows

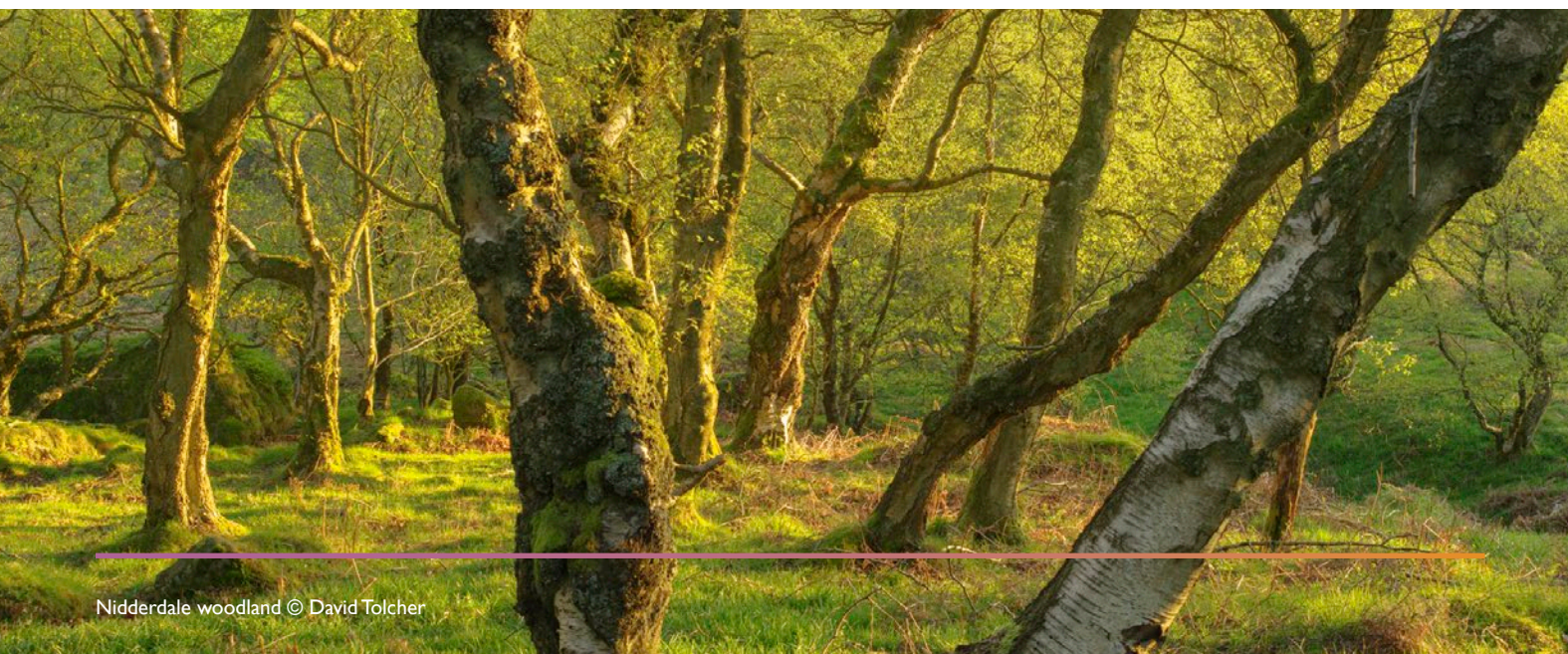


Woodland and trees

Headlines

- Across the UK woodland birds have declined by 20% since 1970 and butterflies by 51% since 1991. Current threat to woodlands includes habitat fragmentation and spread of invasive species. Improvements to woodland management can help tackle this¹.
- 8% of Nidderdale AONB is classed as woodland² lower than the national figure of 10% and the national target of 12% by 2060³.
- Around 5% of the AONB's woodland is within protected areas.
- The AONB is within the White Rose Forest⁴, part of the wider Northern Forest⁵.
- 25% or 1,245ha of Nidderdale AONB's woodland is categorised as ancient semi-natural woodland (ASNW) or plantations on ancient woodland sites (PAWS). This covers 2% of the AONB which is slightly lower than the figure of 2.3% for the UK.
- 50% or 2,500ha of Nidderdale's woodland is broadleaved woodland, 35% or 1,825ha is planted conifer woodland and 4% is mixed woodland⁶.
- Most of our woodland is outside of the SSSIs. Woodland habitats are better represented in SINC's.
- We have developed a Habitat Suitability Map for redstart which we will use to target conservation action.
- Positive actions include a commitment to tree planting demonstrated by the development of a new woodland opportunity plan, working with landowners to increase the active management of existing woodland and to significantly increase the amount of woodland cover for key ecological benefits, reduce carbon emissions and increase carbon storage capacity. Also working with landowners to plant trees to slow the flow of water and increase water quality.
- We will raise awareness of the impact of ash dieback and help increase the resilience of our woodlands to future diseases and climate change by working from 'the right tree in the right place' principle using a wide mix of native, and if appropriate non-native species, all sourced and grown in the UK and Ireland, when planting new woodlands, and carrying out biosecurity measures.

Note: *remaining percentage made up from other NFI categories e.g. ground prep.



Nidderdale woodland © David Tolcher

National context

The national State of Nature reports show that over the long-term 53% of woodland species have declined and that 11% of woodland species are threatened with extinction in Great Britain⁷. UK biodiversity indicators show that butterflies have declined by 51% since 1991 and woodland birds have declined by 20% since 1970, although the indicator has now been relatively stable for a number of years. The key reasons why over 50% woodland wildlife is declining are changes in the extent of woodland cover and in the intensity and type of woodland management.

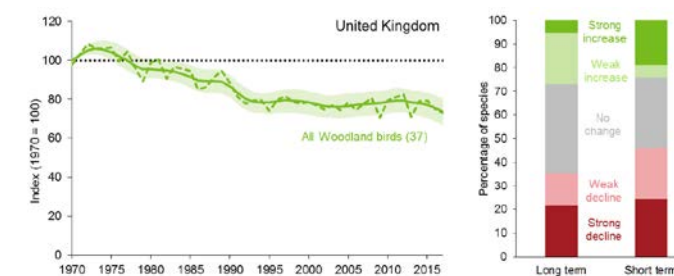


Fig. 48. Breeding woodland birds in the UK, 1970 to 2017⁸

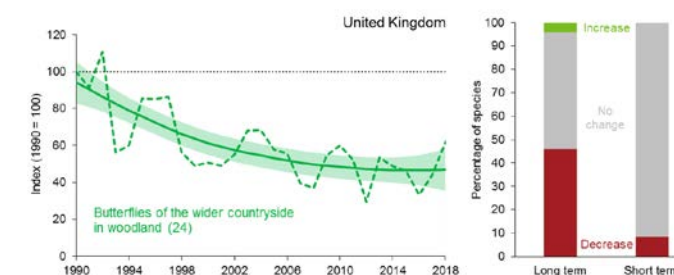


Fig. 49. Trends of butterflies of the wider countryside in UK woodland, 1990 to 2018⁹

Central government has pledged 'to focus on woodland to maximise its many benefits' by expanding woodland cover and ensuring that existing woodlands are better managed to maximise the range of benefits they provide. This includes supporting the development of the Northern Forest¹⁰.

Nidderdale AONB is located within the White Rose Forest, part of The Northern Forest an initiative to plant 50 million trees around the cities of Liverpool, Manchester, Leeds, Sheffield and Hull. The increase in woodland cover will help transform the landscape. Benefits include:

- contribute to natural flood management, helping to reduce the risk of flooding

- store thousands of tonnes of carbon and help us fight climate change
- help link and expand habitats at a landscape scale
- health and wellbeing benefits to local communities
- create thousands of new jobs

Habitats

Trees, woods and hedgerows form an important series of habitats for plants and wildlife in Nidderdale AONB.

Woodland in Nidderdale AONB can be grouped as:

- **Upland semi-natural woodland:** only small remnants remain as most of the woodland in upland areas was cleared more than a thousand years ago. Woodland sites are often scattered and small, but despite this they can be of national or international importance with a wide range of species and communities not found in lowland English woods. The cool, wet upland conditions favour the growth of rare ferns, mosses and lichens.
- **Coniferous plantations:** planted in more recent times for commercial purposes with non-native species. Their establishment has often been controversial because they replace open ground of high conservation value. However, some plantations have become a nature conservation resource in their own right providing a refuge for rarer bird species such as goshawk and long-eared owl.
- **Wet woodland:** consisting of alder and willow where drainage is poor. This can be in upland ghylls, the valley bottom or even within the other types of woodland already described. They host sedges and ferns along with rare insect species.
- **Orchards:** old and former orchards are of both historic and biodiversity value. The Historic Parks and Gardens Study Group has researched the location and history of orchards in the area (see hpg-nidderdale.co.uk).

Wood pasture and parkland were created for different purposes but both have clumps or individual trees set in grassland. Wood pasture has the longest history of the two types of woodland in Nidderdale AONB. It was created during the

Medieval period when much of the area was kept as hunting forest, or Chase, for the nobility. Areas of trees were managed within open pasture, providing a renewable source of firewood and leaf as fodder, while being far enough apart to allow grass to grow underneath for both farm animals and deer for the chase.

In parkland, individual trees were either leftover from forest clearance or deliberately planted to enhance the landscape by their wealthy owners. The earliest parks were created to hold herds of deer for hunting, such as Knaresborough Forest, while later parks were associated with grand country houses such as Studley. Some of these parkland trees may be very old and are identified as veteran trees. They support colonies of fungi and provide habitats for rarer saproxylic beetles such as the stag beetle that eat decaying wood. The trees also provide important habitats for bird and bat species.

Hedgerows are, in effect, linear woodlands. The oldest ones were often left along fields and lanes after surrounding woodland was cleared. Whether ancient or recently planted, hedgerows provide a complex series of mini habitats within their narrow margins. Older hedges may be the remnants of cleared ancient woodland and the rich variety of species in and around them is a clear indicator of their origins. Plants like primroses, wood garlic and wood anemone are common. More recently planted hedges, like the hawthorn hedges associated with the 19th century Enclosure Acts, may have fewer plant species in them. However, they provide thin corridors of woodland along which birds and other animals may safely move from place to place. Thousands of miles of hedgerows have been ‘grubbed out’ since the 1950s as farming has become ever more intensive, but thankfully today most agricultural hedgerows are protected by law and Countryside Stewardship Schemes encourage farmers to look after and even improve their hedges.

Eight percent of Nidderdale AONB is classed as woodland, lower than the national (England) figure of 10% and the 25 Year Environment Plan’s national target of 12% cover by 2060¹¹, for England. If we exclude the area of our moorland habitats, which are not suitable for planting trees the percentage

of the remaining AONB area with woodland is much higher and in line with the national figure and target. Figure 50 and Table 15 show National Forest Inventory (NFI) information for the AONB from 2018. Figure 51 and Table 16 shows ancient woodland and Figure 52 and Table 17 priority habitat information.

Table 15. National Forest Inventory woodland category coverage in Nidderdale AONB in 2018¹².

NFI Woodland Category*	Area (ha)
Assumed	87.23
Broadleaf	2497.60
Conifer	1825.41
Felled	314.70
Failed	2.67
Ground Prep	6.3
Low density	16.56
Mixed mainly broadleaf	94.54
Mixed mainly conifer	87.48
Shrub	2.62
Windblow	1.08
Young trees	71.09
Total	5007.28

Note: *NFI data only includes woodland over 0.5ha

Table 16. Ancient woodland habitat coverage in Nidderdale AONB in 2019¹³

Ancient Woodland type	Coverage (ha)	% of AONB cover	Average size (ha)
Ancient Woodland (All)	1245	2	7.6
Ancient and Semi-Natural Woodland	451.62	0.75	6
Ancient Replanted Woodland	793.47	1.3	9

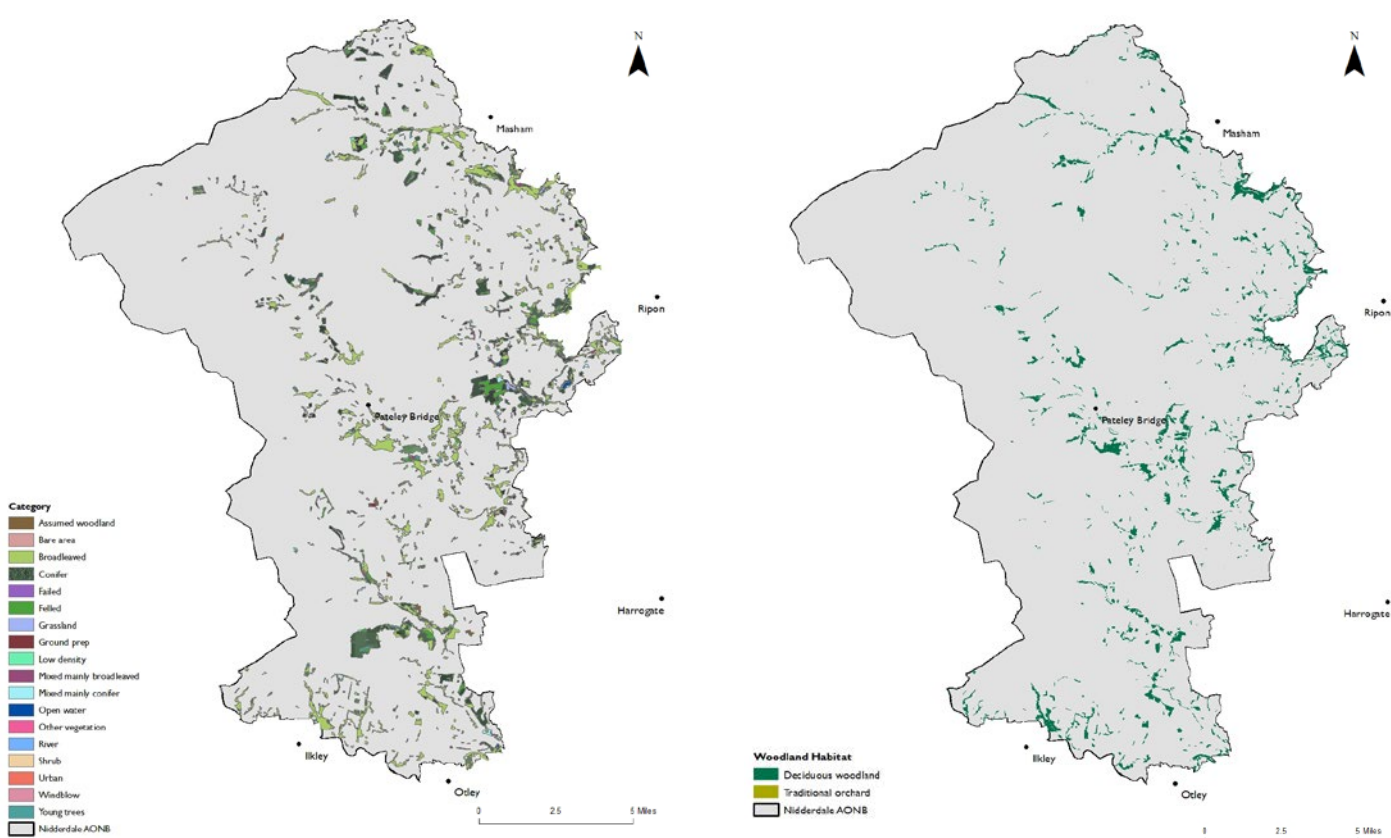


Fig. 50. National Forest Inventory 2018¹⁴

Fig. 52. AONB woodland priority habitat map¹⁶

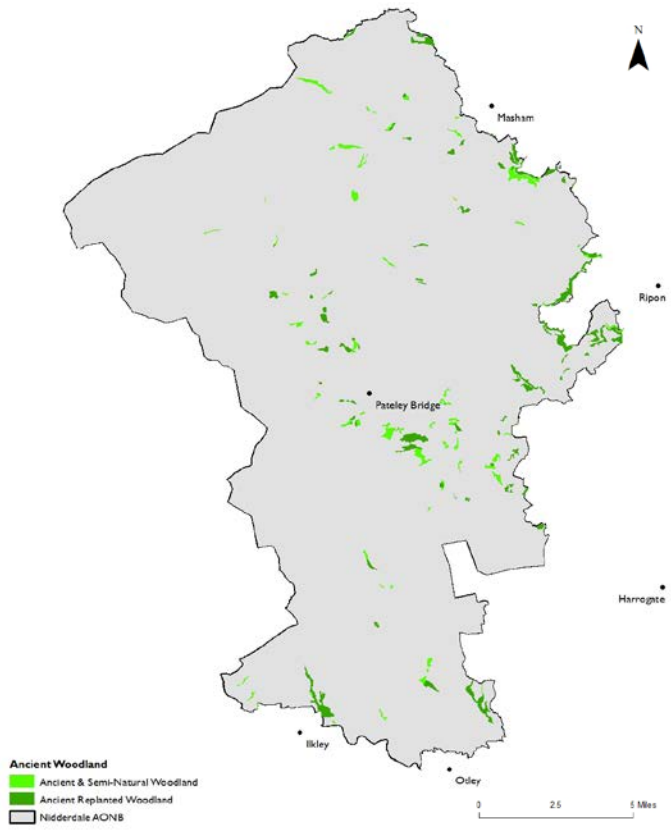


Fig. 51. Ancient woodland¹⁵

Table 17. Priority woodland habitat coverage in Nidderdale AONB in 2018¹⁷

Priority Habitat	In SSSI (ha)	In Higher Tier / HLS Outside SSSI (ha)	Outside SSSI Not in Higher Tier / HLS (ha)	Total (ha)
Deciduous woodland	248 (11%)	182 (8%)	1,746 (80%)	2,175 (100%)
Traditional orchards	0	0.31 (9%)	3.24 (91%)	3.55 (100%)
Total	248	182.31	1749	2179



Most of Nidderdale AONB’s priority woodland habitat lies outside of the protected areas – see *Table 17 on page 79*, with only 5% of all the AONB’s woodland within protected areas. However some woodland is protected in three SSSIs, designated principally for their woodland – Brimham Rocks, Hackfall Wood, Cow Myers, and there are also areas of woodland within the East Nidderdale Moors and West Nidderdale Moors SSSIs – see *Tables 18 - 20*.

Table 18. Woodland habitat in designated ‘woodland’ SSSIs in Nidderdale AONB

Designated site	Key habitats
Brimham Rocks SSSI	Upland woodland and dwarf shrub
Hackfall Wood SSSI	Upland woodland
Cow Myers SSSI	Lowland woodland and fen

Table 19. Areas of woodland habitat in moorland SSSIs in Nidderdale AONB

Designated site	Areas of woodland
East Nidderdale Moors SSSI	Woodale Arnigill Birkgill Grimes Gill Gill Beck Colsterdale Skelgill
West Nidderdale Moors SSSI	Guiselcliffe Wood Harden Gill

Table 20. Condition of priority habitat within SSSI

Priority Habitat	Condition	In SSSI (ha)
Deciduous woodland	Favourable	72.49 (29.28%)
	Unfavourable Recovering	172.16 (69.54%)
	Unfavourable No Change	2.91 (1.17%)

Woodland habitats are well represented in Nidderdale AONB’s SINC’s (see *Table 6 on page 52*). Sites include Backstone Gill Wood, Braisty Wood, Bryan’s Wood, Catstone Wood, Cow Close Wood, Deepgill Wood, Dob Park Wood, Fishpond Wood, and High Thrope Wood. SINC status only protects habitats through the planning system and gives no control over management, although at present we believe our woodland SINC’s are generally well managed from a conservation perspective. Voluntary 10 year management plans for various woodland SINC sites were produced in 2010 and will come to an end in 2020. Tree Protection Orders protect trees of amenity value. Figure 53 show the trees across the AONB that have Tree Protection Orders. Figure 54 shows the area of Nidderdale AONB’s woodland under management through various grant schemes in 2017.

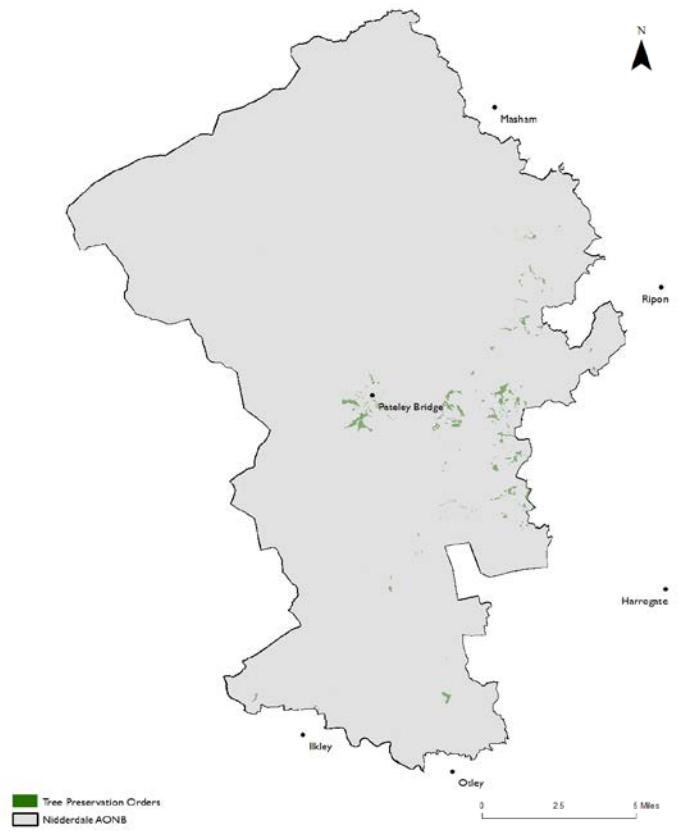


Fig. 53. Tree Protection Orders¹⁸

5,007 ha
total area of woodland
in Nidderdale AONB:

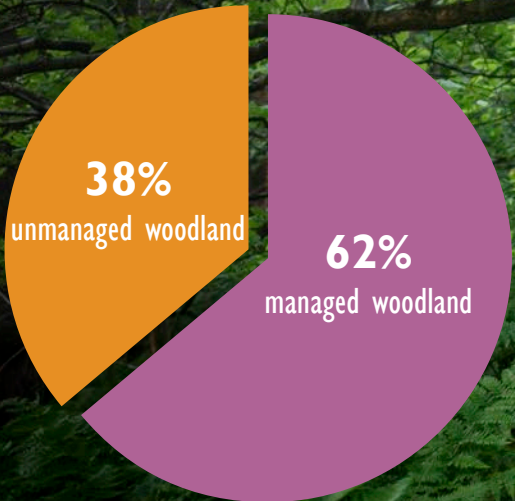


Fig. 54. Area of Nidderdale AONB’s woodland under management in 2018



In 2006 we commissioned a woodland opportunity map for Nidderdale AONB to identify priorities for new native woodland in the AONB and this guided our woodland planting advice. In the intervening period tree planting/woodland cover has been given increased priority, including helping manage flood risk – see Figure 55. In this new context, we are currently working on an updated woodland opportunity map – see case study below.

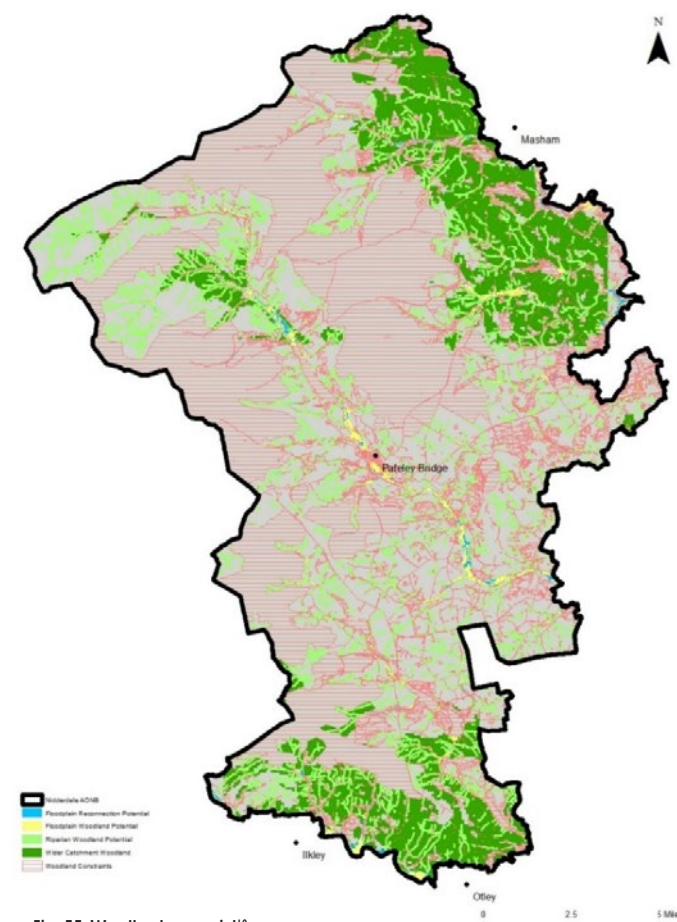


Fig. 55. Woodland potential¹⁹

Species

Nidderdale AONB's woodlands are important for nature conservation, providing a rich habitat for plants, animals, birds, and insects.

Ash

The damage to trees, woods and forests from insect pests and organisms such as bacteria and fungi is significant²⁰. Ash dieback, also known as chalara (caused by the non-native invasive fungus *hymenoscyphus fraxineus*), is now widespread across

the whole of the UK – presenting a threat to the UK's treescape on a scale not seen since the Dutch Elm disease epidemic of the 1970s. It has been estimated that ash dieback could kill up to 95% of ash trees in the UK and cost British society £15 billion, as well as changing the appearance of the landscape and threatening many species which rely on ash²¹, including some species that are entirely reliant on ash trees.

Since 2014 ash dieback has been confirmed as present in approximately two-thirds of the Nidderdale AONB area – see Figure 56. The overall density of ash in woodland, hedgerows and individual trees is shown in Figure 57. However, it is not all bad news. Initial findings suggest that there might be some ash trees tolerant to the disease, meaning the population could eventually recover over time. This is why we are also encouraging the retention of as many ash trees as possible and suggesting the tree be able to decline naturally (where it is safe to do so), in the hope that these dieback-tolerant trees can be identified and their seed allowed to naturally regenerate²².

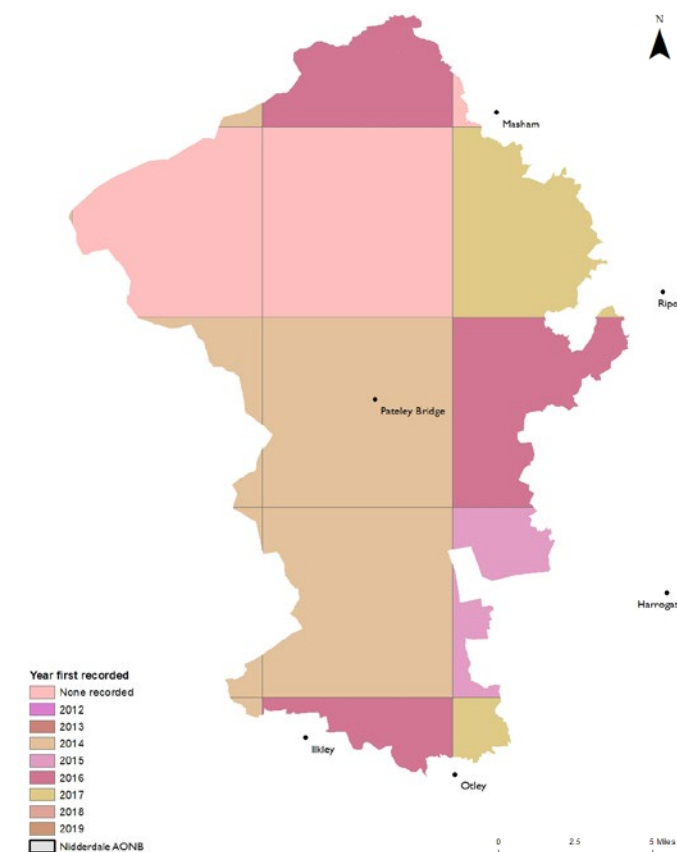


Fig. 56. Confirmed presence of ash dieback per year²³

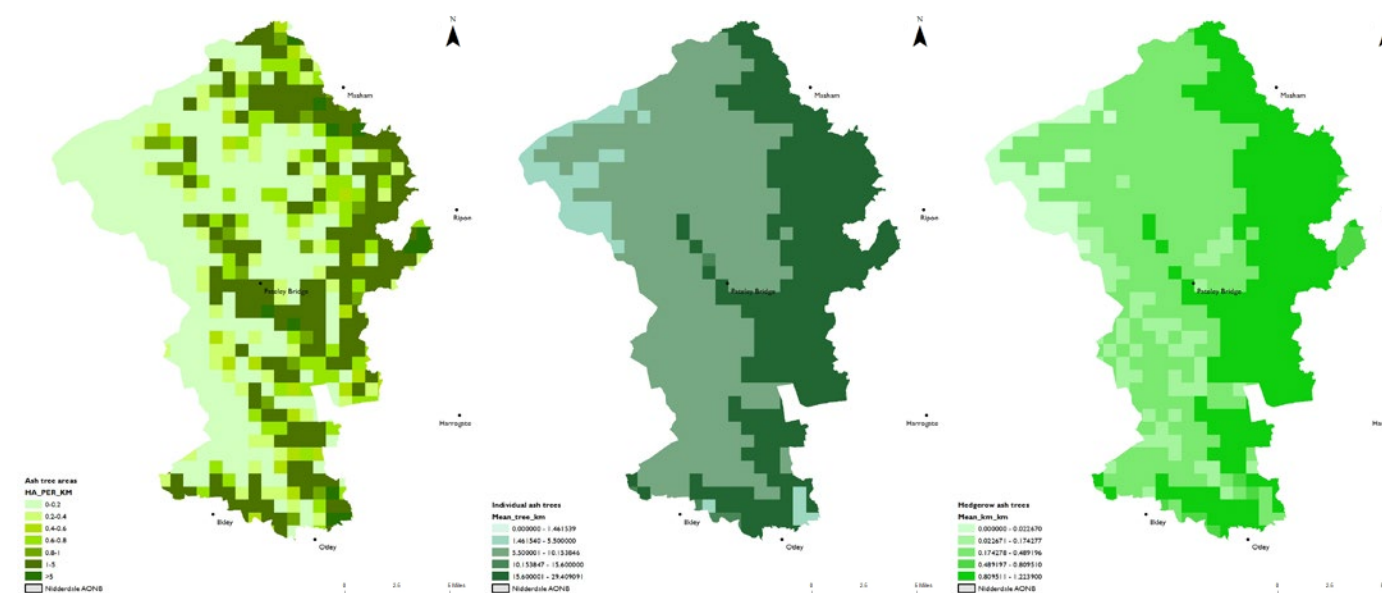


Fig. 57. Density of ash in woodland (ha per km²), hedgerows (km per km²) and individual trees (trees per km²)²⁴

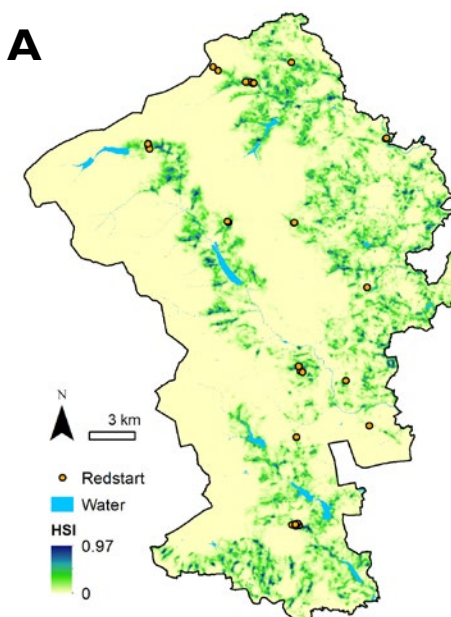
Woodland birds

Target areas for woodland bird assemblages have been identified for Countryside Stewardship Schemes. In Nidderdale AONB priority areas include Colsterdale, Upper Nidderdale, Grantley, Sawley, and the Pateley to Otley area²⁵.

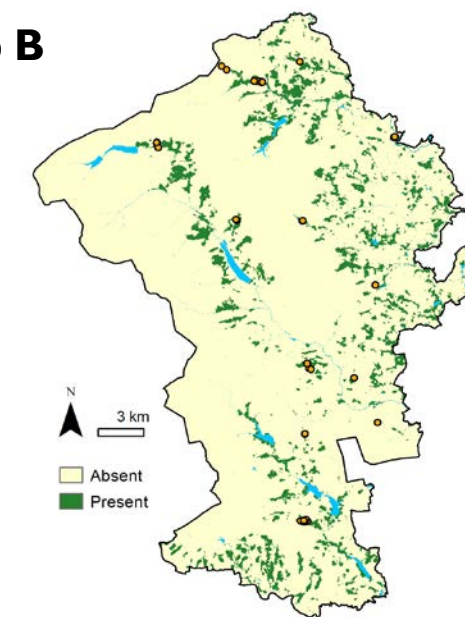
As part of The Wild Watch we have been collecting data on a number of woodland birds – tree pipit,

wood warbler, spotted flycatcher, pied flycatcher, lesser spotted woodpecker and red start. The new data has been used to produce a Habitat Suitability Model for red start. Habitats for redstart were found in lowland areas of the AONB in proximity to woodland – see Figure 58, with woodland cover, density of woodland edge and proximity to water courses having a positive effect on habitat suitability.

Map A



Map B



Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of redstart according to the tenth percentile occupancy threshold.

Fig. 58. Habitat Suitability Maps for redstart²⁶

Case Study Yorkshire Water's Ancient Woodland Restoration

Philip Tennyson and Geoff Lomas, Yorkshire Water

As Yorkshire's second biggest landowner, Yorkshire Water's landholding contains an extensive range of habitats. Widely recognised as the most irreplaceable of all, ancient woodlands are wooded areas that have persisted in the landscape since 1600 or earlier. Left to develop without disturbance from humans, these areas support a myriad of birds, plants, fungi and are home to more threatened species than any other habitat in the UK. All ancient woodlands in the UK have been mapped by Defra and can be identified by 'indicator species'. These include bluebell, wood anemone, primrose, wild garlic and small-leaved lime.

In the Nidderdale AONB, Yorkshire Water own seven sites identified as ancient woodland totalling 132ha. To reflect differences in their land management to date, these ancient woodlands have been classified as either semi-natural ancient woodland, meaning they are ancient woodland sites which have been managed for timber or other industries, or plantation on ancient woodland sites, meaning they been planted with trees (often coniferous) for forestry and industry.

Over the past 10 years, Yorkshire Water have enhanced and restored these sites, undertaking works such as felling non-native trees allowing the native trees and flora to grow. We have also controlled invasive non-native species (INNS), such as Himalayan balsam that are threatening the woodland biodiversity. Where necessary, we have planted native trees to replace felled conifers and removed conifer trees that threaten to kill ancient and existing native trees where it was not advisable to fell the conifer plantation around these key trees.

The woodland management we've undertaken has increased the volume of standing and lying deadwood which is invaluable habitat for all kinds of insects, birds, and bats which rely on the softer dead wood. We have also increased the ground

flora diversity by increasing light through the canopy and removing INNS. On one site, this led to an increase from 45 ground flora species to 70, representing a 64% increase in diversity. Over time, the woodland restoration will help return these ancient woodland sites to their former glory to support a wide range of our native wildlife.

Case Study Hackfall Wood, ancient semi-natural woodland SSSI

Hackfall appears today to be a natural wood, a 'beautiful wilderness' to quote one of the 19th century writers who thought Hackfall Wood one of the most beautiful places in the country. In fact it is very much a landscape moulded by people.²⁷

The landscape that can be seen today is largely attributed to the Aislabies. John Aislabie, already famous for his landscaping works at nearby Fountains Abbey and Studley Royal, bought Hackfall for £906 in 1731. It is John's son, William that was responsible for its landscaping in the style of the picturesque, building follies, and grottos, and creating surprise views, waterfalls, and a fountain. During the 19th century under the ownership of Lord Ripon, visitors paid to visit the popular woodland gardens.

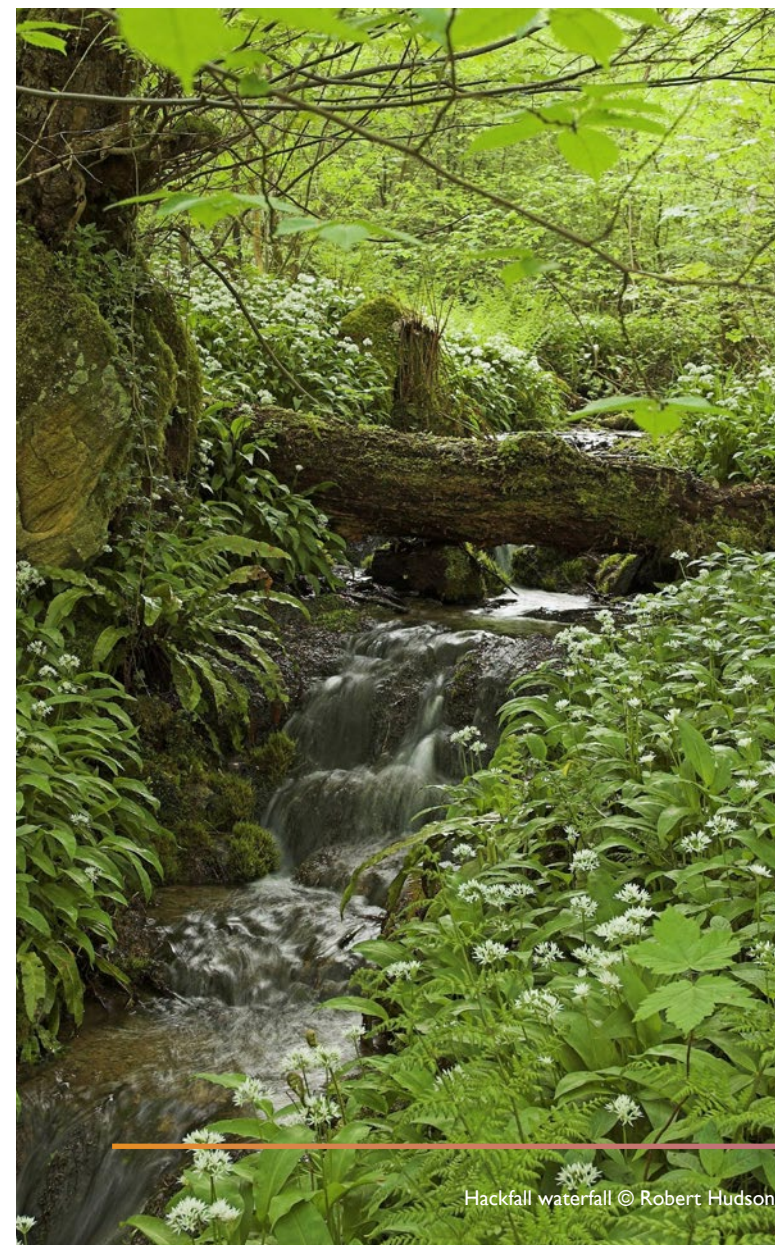
Hackfall has inspired writers and artists including Turner (1816) and gets a brief mention in William Wordsworth's 'A Guide through the District of the Lakes' published in 1835:

"There are three approaches to the Lakes through Yorkshire ; ... The second road leads through a more interesting tract of country, beginning at Ripon, from which place see Fountain's Abbey, and thence by Hackfall, and Masham, to Jervaux Abbey, ... and up the vale of Wensley ; ..."²⁸

Hackfall went through a long period of decline and in the 1930s it was sold to a timber merchant who felled it. It subsequently fell into neglect. In response to a threat from commercial development, the Hackfall Trust was formed

in 1987 to safeguard the wood. In 1989 the Woodland Trust acquired the site on a 999 year lease with grant aid from various bodies including the Hackfall Trust and English Heritage. That same year, Hackfall was designated a Site of Special Scientific Interest (SSSI) and a site of ancient semi-natural woodland²⁹.

Together the Woodland Trust and Hackfall Trust restored the site and the wood is now a Grade I listed garden and a number of its built features listed at Grade II and II*. In 2007, a major restoration project was funded principally by the then Heritage Lottery Fund, now National Lottery Heritage Fund. This enabled the restoration and preservation of the buildings, the dredging and restoration of water features, further improvement of the footpaths, and opening up of the vistas.



Hackfall waterfall © Robert Hudson

Case Study Bank Wood³⁰

Helen Neave, Founder and Director, Make it Wild Ltd

We were looking for some land to buy, to manage for nature. How delighted we were when we found Bank Woods in 2017 – we could see it was exactly right! Not only is it set in stunningly beautiful Nidderdale, but it had been farmed in a 'benign' way. The grass doesn't look as green as the neighbours', through less use of chemicals, and there are many more trees and woodland. The undulating land is blessed with four blocks of ancient woodland, containing some beautiful old trees, babbling brooks, and evidence of historic human activity. It varies from richer grazing nearer to the river, via scrub and woodland to a more 'upland' area around a beautiful veteran beech tree at the top.

It has a wide variety of habitats, and we are sure that with some help, it could become a haven for a wide variety of wildlife. We know that even beautiful countryside can be lacking biodiversity, and it is our intention to do everything we can to give this space back to nature!

We have reduced the number of sheep grazing the land to a bare minimum and have bought a small herd of belted Galloway cattle. Their role as our conservation grazing team has already shown great results, and we had many more wildflowers in the fields this year, compared to last year; curlews and lapwings have returned in greater numbers too. We are erecting a deer fence around the ancient woodland, to allow natural regeneration. This should be completed next year, and it will be interesting to see how taking the browsing pressure off will allow tree seedlings to grow. With help from the AONB we have taken the first step in restoring a hay meadow, and we are looking forward to spring, when we will see what new wildflowers we have. But the most noticeable change we have made is the planting of 5,000 trees. We previously planted 20,000 on our land at Kirk Hammerton, and the explosion in biodiversity was stunning. We hope to see the same thing here!



We were thrilled that a survey of flora this summer revealed over 70 species, with several unusual ones. As a result, Bank Woods is a candidate for designation as a Site of Importance for Nature Conservation – and we couldn't be more thrilled!

encouraging a variety of plants – this helps to supports a wider range of wildlife.

The estate is within a priority area for woodland creation and woodland bird assemblages identified by Defra, and has embarked on a large tree planting project, planting 65,000 trees to date. As well as increasing woodland cover, this will provide new habitat for woodland birds, help improve water quality, and help reduce the incidence of flooding by slowing the flow of water to the river. The tree planting has imitated a natural approach, designed to benefit the farming and sporting interests of the estate. Small blocks of woodland have been planted at different densities, using species typical of upland oak woodland, such as birch, rowan, hazel for ground cover alongside holly and some conifer, which benefits the estate's pheasants.

The moorland is changing too, species-poor grassland and bracken have been cleared and then re-seeded with heather and cotton grasses – the estate is aiming to increase dwarf shrub cover from 300ha up to 500ha. Fifty small bird boxes have been installed alongside three bat boxes and three kestrel boxes. These were supplied by Nidderdale Birdwatchers. Five pairs of pied flycatchers, a globally threatened red listed bird, are also known to be in residence.

This work has been led by the Estate Manager, Roy Burrows, the tree planting was developed in conjunction with Tilhill Forestry.

Case Study Woodland Creation on the Summerstone Estate, Upper Nidderdale

Roy Burrows, Summerstone Estate Manager

The Summerstone Estate, a 1,500 acre Upper Nidderdale sporting estate, had historically been intensively grazed until it was taken over by its new owners four years ago. We have a vision to make the estate better for wildlife and have kicked this off by planting trees, sowing wildflowers, reseeding hay meadows, and restoring blanket bog and heather.

To encourage ground nesting birds such as lapwing, curlew and redshank The Estate reduced grazing. Over the last few years sheep numbers have been reduced and there is now a small flock of native Swaledale sheep alongside a herd of belted Galloways. Belted Galloway cattle and Swaledale sheep eat more scrub, such as bramble and hawthorn, than many other cattle and sheep types. This helps to remove some of the coarser grasses and scrub, keeping areas open and

Case Study Ancient and veteran trees

Nidderdale AONB has more than 1,200 recorded veteran and ancient trees. The exact age at which a tree is called 'ancient' depends on a number of factors including the species and the type of site where the tree is growing. This means that a birch tree could be considered ancient at 150 years old, an oak tree at 400 years, and a yew at 800 years. Three key features of an ancient tree are a low, fat and squat shape, a wide trunk compared with others of the same species, and hollowing of the trunk (which may not always be visible). A veteran tree shows ancient characteristics but can be any age – its characteristics could be the result of natural damage, management, or the tree's environment, as well as its age. So all ancient trees are all veterans, but not all veterans are ancient!³¹

Between 2006 and 2010 we undertook a survey of our veteran trees, recording precise locations, trunk girth, estimated height, and condition. As the map shows there are key clusters of trees in the south and east of the AONB, as well as around Pateley Bridge and Gouthwaite Reservoir. There are almost 50 veteran trees in the areas of Fountains Abbey and Studley Royal and Dob Park.

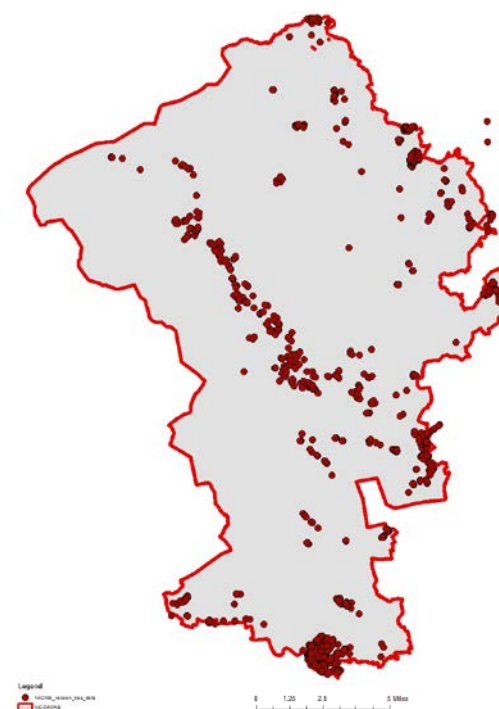


Fig. 59. Ancient and veteran trees

Case Study Woodland Opportunity Planning

Kelly Harmar, Biodiversity Officer, Nidderdale AONB

We are excited to be producing a new Woodland Opportunity Plan for our area. Our current Woodland Opportunity Plan is 12 years old and the context for woodland planting has changed significantly in this time; there is renewed impetus for woodland planting from The Northern Forest initiative and for climate change mitigation, and our current plan pre-dates the arrival of ash dieback. Woodland cover also appears to have fallen slightly in the AONB from 2012 to 2018 and a new Woodland Opportunity Plan will help stabilise and reverse this trend.

Our new plan will be based on new woodland opportunity maps created within a GIS (Geographic Information System). This system allows us to merge multiple layers of mapped data, each layer representing a single benefit or constraint to woodland planting, to help identify areas where tree planting will have the greatest benefits and cause the least damage. The plan will prioritise areas where tree planting can deliver multiple benefits, maximising the value of any new planting.

The new plan will help us to:

- Understand the extent and distribution of our current tree cover and how this relates to national tree planting targets.
- Agree sensitive areas where tree planting would not be supported, providing clear justification for exclusion.
- Prioritise areas for future tree planting, concentrating on areas where tree planting would have multiple benefits.
- Identify a first tranche of sites for landowner liaison, site appraisal and woodland planting.

The opportunity plan is being produced in collaboration with The Woodland Trust, The Forestry Commission, Harrogate Borough Council's arboriculture department and local forestry consultants, and is supported by funding from The Woodland Trust.

Recommendations/future actions

AONB plans/commitments

We are:

- Working with landowners to help them access the wide range of government woodland grants currently available³² for tree planting and woodland management as well as through the Northern Forest, Woodland Trust, Forestry Commission, and other funding opportunities. We will also support landowners as the new Environmental Land Management System is developed and implemented.
- Providing advice about appropriate planting schemes.
- Providing supervised volunteer groups for tree planting projects and woodland management.

In particular by 2024 we will:

- Increase active management of the AONB's woodland to improve the landscape and wildlife value of semi-natural ancient woodland and plantations on ancient woodland sites by working with The Forestry Commission and The Woodland Trust.
- Significantly increase the amount of woodland cover at a locally appropriate scale which will help meet the targets of the White Rose Forest (part of the Northern Forest) and also the government's aim for 12% woodland cover across the UK. Increases in woodland cover contribute to natural flood management, mitigate carbon emissions and increase the AONB's capacity for carbon storage, we will identify new, appropriate areas for woodland expansion and creation in our new woodland opportunity plan.
- Increase awareness of the impact of ash dieback to promote the benefits of woodland management in responding to threats from pests and diseases.
- Help to improve the resilience of our woodlands to future diseases and climate change by using a wide mix of native species when planting new woodlands, and managing the spread of other diseases and pests by carrying out biosecurity measures.

What can you do?

- Landowners can contact us for advice about whether you may be eligible for a grant to help create a new woodland.
- Seek advice from us before starting a planting project.
- Join a volunteer group and help us plant some trees!
- Take biosecurity measures – cleaning your shoes and bike wheels before and after visiting a woodland, and avoiding taking plant material or cuttings to or from the countryside.



Water and wetlands

Headlines

- Water is a key feature in Nidderdale AONB – in rivers, streams, ponds and the AONB's 11 reservoirs.
- The current status of Nidderdale AONB's rivers is variable with the majority of the area assessed as of moderate ecological, chemical and overall status by the Environment Agency.
- Threats to Nidderdale AONB's water and wetlands include pollution, physical modifications of water courses, and invasive non-native species (INNS).
- Most of our water and wetlands are outside designated sites, with only Gouthwaite Reservoir, which is important for its breeding wader assemblage and non-breeding mallard and teal, designated as a SSSI. Water and wetland habitats are better represented in SINCs, but information about the current management of these is limited.
- We have developed Habitat Suitability Maps for dipper and grey wagtail which we will use to target conservation action.
- Otter are present throughout the AONB and are increasing in number, but water vole appears to have suffered large declines.
- Nidderdale has a large number of ponds, a small number of which tested positive for the presence of great crested newt.
- Positive actions include controlling invasive non-native plants, taking climate change adaptation measures by facilitating implementation of Natural Flood Management (NFM) measures on the AONB's river catchments, including helping landowners' access water grants and providing Catchment Sensitive Farming advice, working with partners including Environment Agency, Natural England, Yorkshire Water, Yorkshire Dales Rivers Trust and National Trust.

National context

The national State of Nature reports show that over the long-term 53% of freshwater and wetland species have declined, with 51% having declined over the short-term and that 13% are threatened with extinction in Great Britain¹. Many of the pressures affecting the distribution and quality of freshwater habitats relate to historical land drainage and land management practice. UK biodiversity indicators show that the breeding water and wetland bird indicator fell by 6% between 1975 and 2017, but over the short-term has increased by 3% – see Figure 60.

The Water Framework Directive (2000)² committed Member States to achieving good chemical and ecological status of all water bodies by 2015. However, despite this there has been a slight decline in the percentage of water bodies with 'good' or

'high' ecological status to 35% in 2018 from 36% in 2009 and 37% in 2013³. Of the UK's waters, rivers appear to be facing the most pressures. Diffuse pollution from agriculture remains a key issue⁴. Physical changes to rivers, lakes and estuaries, such as flood defences and weirs, affect the ecology of over a third of UK waters, preventing them from functioning naturally. Further pressures come from climate change and INNS.

Interestingly, modelling work suggests that the distribution of freshwater invertebrate (stoneflies, caddisflies, aquatic bugs, dragonflies, mayflies and freshwater molluscs) is improving – see Figure 61. The drivers for this recovery are not fully understood, but the Water Framework Directive (WFD) requirements, Catchment Sensitive Farming (CSF) and peat restoration are likely to be

improving water quality and use of resources such as fertilisers, herbicides and pesticides.

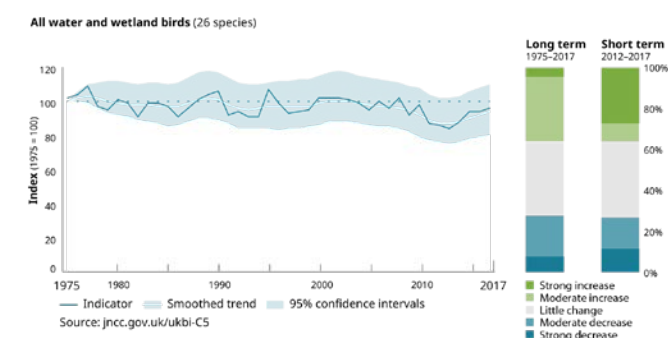


Fig. 60. Breeding water and wetland birds the UK, 1970 to 2017⁵

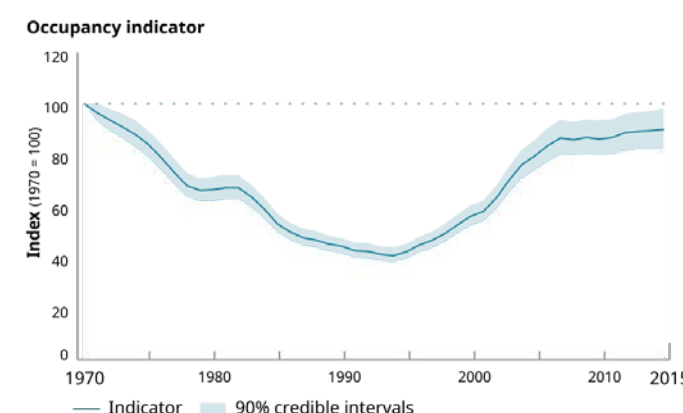


Fig. 61. Change in distribution of freshwater invertebrate species, 1970 to 2015⁶

Habitats

The many streams, and of course the River Nidd, both shape and define Nidderdale AONB, but equally important are the reservoirs which dominate the upper part of Nidderdale, the upper reaches of the River Burn, and the Washburn Valley. Clean flowing water is the lifeblood of the AONB, and watercourses of all sizes support many different plants, insects and animals both in and alongside the water.

Natural England, the Environment Agency and Nidderdale AONB work to conserve and improve the water catchment areas of the AONB's rivers through schemes such as Catchment Sensitive Farming. Improving water quality and flood prevention are the result.

Gouthwaite Reservoir's purpose is to act as a top-up water source for the River Nidd to help maintain a constant flow. Today, it is a nature reserve and is particularly important for both water and woodland birds.

Lindley Wood, Swinsty, Fewston and Thruscross Reservoirs in the Washburn Valley, Roundhill and Leighton near Masham, and Angram and Scar House in Upper Nidderdale were built in the late 19th and early 20th centuries to supply water to the growing industrial populations of Bradford and Leeds. The majority of the AONB's moorland forms a significant proportion of the watershed and feed into these reservoirs. The reservoirs are a haven for wildlife and vital for the flocks of migrating wildfowl (ducks and geese) that use them as stop off points and for breeding.

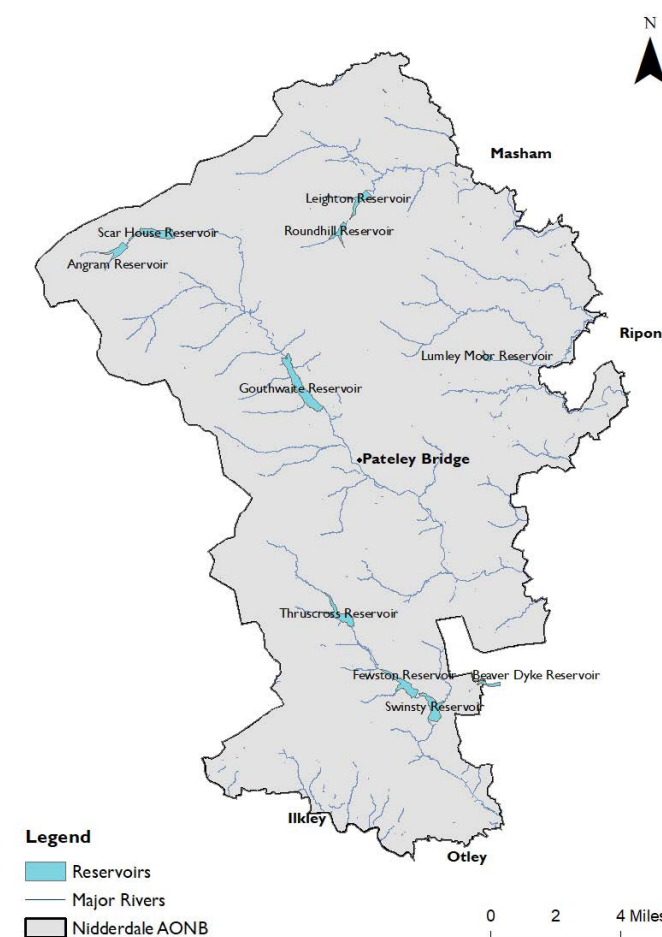


Fig. 62. Rivers, streams and reservoirs

The majority of Nidderdale AONB's rivers are of moderate WFD ecological river status – see Figure 63. As this figure also shows, this ecological status contributes to the overall status of the vast majority of the AONB's rivers being classified as moderate. Figure 64 summarises the reasons for AONB rivers not achieving good status.

Some of our rivers fail to meet good status due to their chemical status for heavy metals – a legacy of the AONB's history of lead mining and this could be having a knock on impact on the invertebrates and fish, as seen in Figure 64.

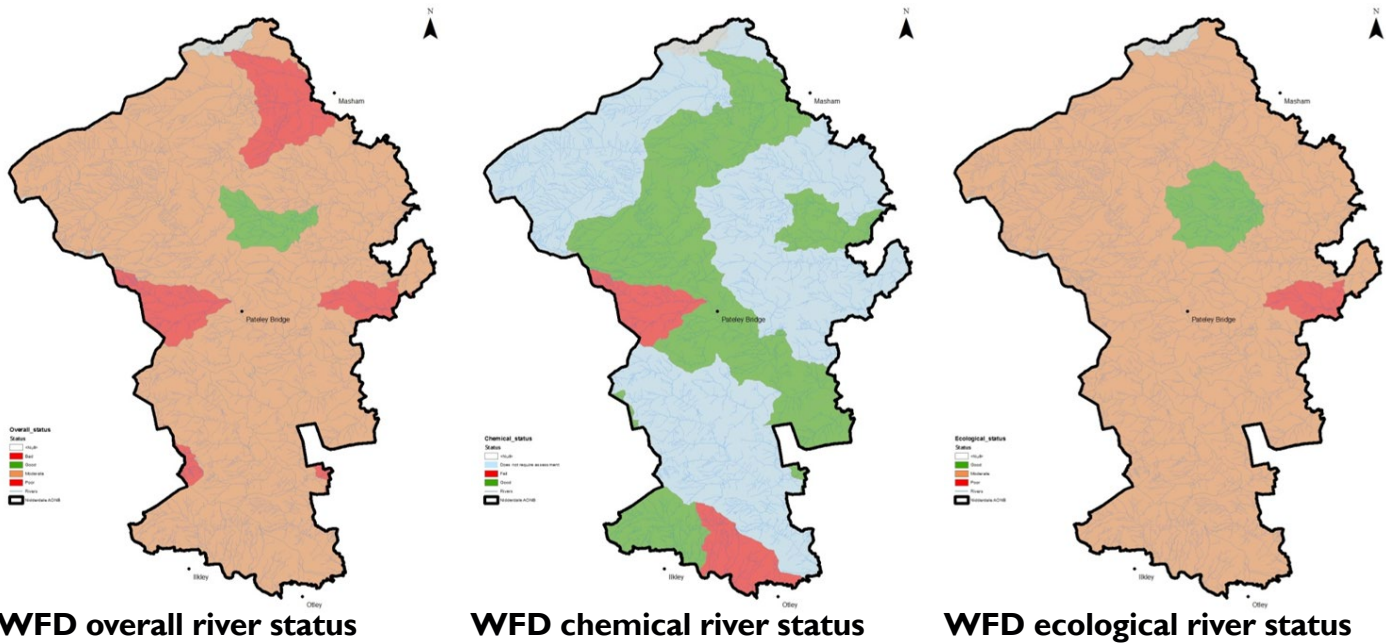


Fig. 63. Water Framework Directive river status⁷

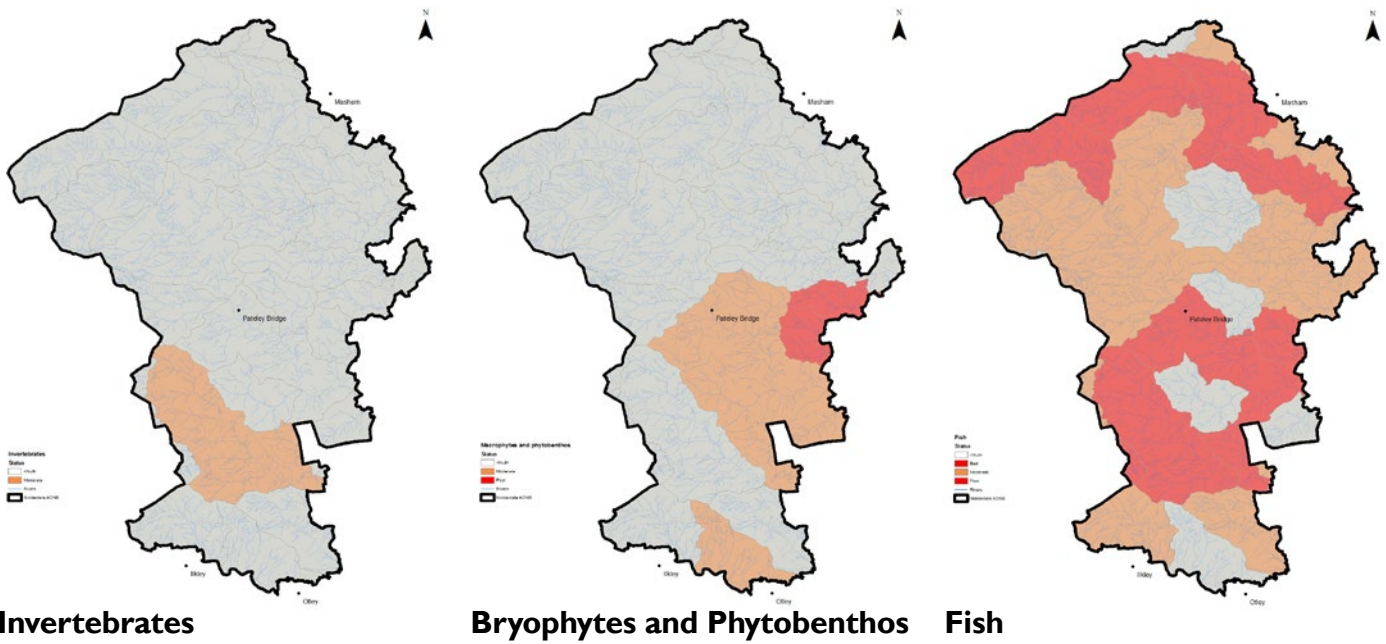


Fig. 64. Water Framework Directive reasons for not achieving good status⁸

Only a small part of Nidderdale AONB's water and wetland is priority habitat – coastal and floodplain grazing marsh, see Table 21 and Figure 65, and most of Nidderdale AONB's water and wetland habitat is outside protected areas, except Gouthwaite Reservoir SSSI – see Tables 22 and 23. This SSSI is currently considered as being in favourable condition although there have been some issues with non-native *Crassula helmsii* – see *Gouthwaite Reservoir case study* on page 27.

Table 21. Water and wetland priority habitat coverage in Nidderdale AONB in 2018^{9,10}

Priority Habitat	In SSSI (ha)	In Higher Tier / HLS Outside SSSI (ha)	Outside SSSI Not in Higher Tier / HLS (ha)	Total (ha)
Coastal and floodplain grazing marsh	0.02 (0.02%)	18.10 (16.39%)	92.27 (83.58%)	110.40 (100%)
Lowland fens	1.68 (0.64%)	42.38 (15.98%)	221.04 (83.38%)	265.10 (100%)
Total	1.7	60.48	313.31	375.5

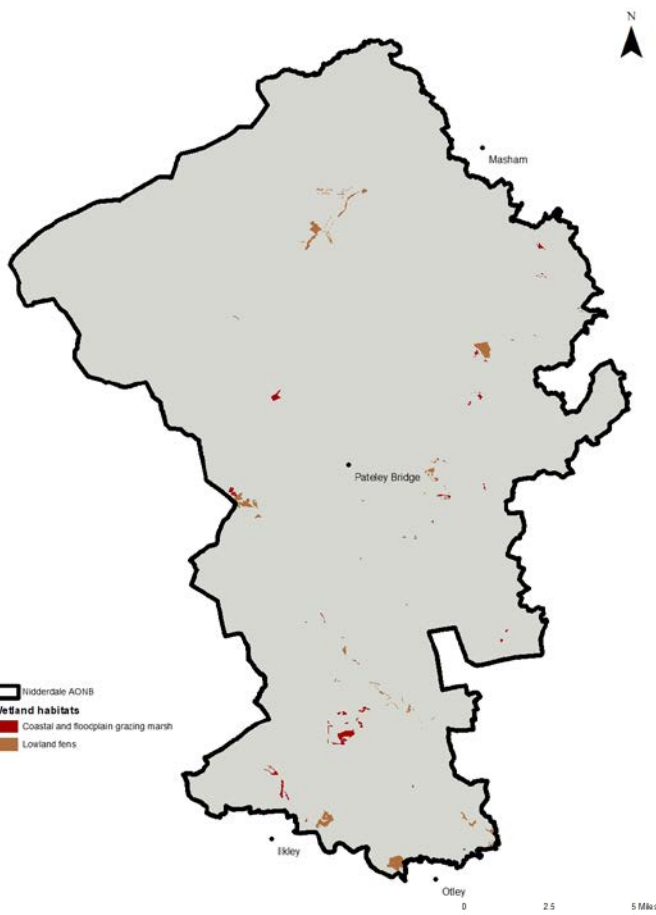


Fig. 65. AONB wetland priority habitat map¹¹

Table 22. Condition of Priority Habitat within SSSI

Priority Habitat	Condition	In SSSI (ha)
Coastal and floodplain grazing marsh	Unfavourable Recovering	0.02 (100%)
Lowland fens	Unfavourable Recovering	1.68 (100%)

Table 23. Water and wetland habitat in SSSIs

Designated site	Total area (ha)	% of AONB area	Key habitats	Key species
Gouthwaite Reservoir SSSI	150	0.25%	Open water	Assemblages of non-breeding birds – mallard and teal. Assemblages of breeding birds of lowland open waters and their margins.

Water and wetland habitats are well represented in Nidderdale AONB's SINC's. Sites include Beaver Dyke Reservoir, Fewston/Swinsty Reservoirs, Leighton and Roundhill Reservoir, Lindley Wood Reservoir Complex, Lumley Moor Reservoir, and River Ure (Masham to Mickley). Unfortunately, our information about current management of many of the water and wetland SINC sites is limited. We do know that the former Beaver Dyke Reservoir is not currently under positive management and the AONB is working with Yorkshire Water and other partners to develop a project in the area around Beaver Dyke Reservoir to enhance valuable habitats, secure their sustainable management for the long-term, and involve people.

Species

Nidderdale AONB's large expanses of water are important for birds, and wetland areas and ponds provide a perfect environment for dragonflies and damselflies. Otters are regularly recorded alongside rivers and streams and river lampreys are widespread.

The Wild Watch River Bank Transects

During the 2017, 2018 and 2019 survey seasons The Wild Watch carried out surveys along watercourses within the AONB. Each transect was 1km long and transects covered primary, secondary and tertiary rivers and the shores of some reservoirs. Surveys were carried out by trained volunteers and professional ecologists.

The species surveyed were: otter, water vole, dipper, kingfisher, grey wagtail, golden ringed dragonfly, Himalayan balsam, Japanese knotweed, giant hogweed. The azure damselfly was also included in the first year but proved too difficult to identify so this was removed from the target species list.

Access was difficult for some sites but with the enthusiasm and dedication of the survey volunteers a total of 378 transect walks were carried out, recording 362 occurrences of species on The Wild Watch target species list.



Fig. 66. River bank transects surveyed

Habitat Suitability Modelling for river birds

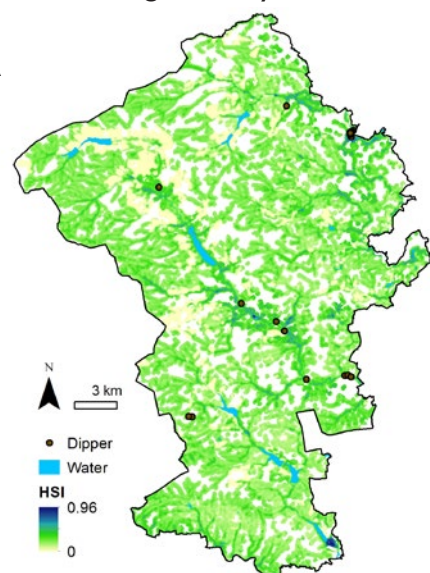
Data was gathered for kingfisher, dipper and grey wagtail. From the results gathered there were enough records to carry out Habitat Suitability Modelling for both dipper and grey wagtail.

For dipper, both regional and local scale variables were relevant for predicting their presence. Although the results of the model should be treated with some caution given the model was built with a low number of records, dipper preferred areas with mixed woodland, a high density of watercourses and

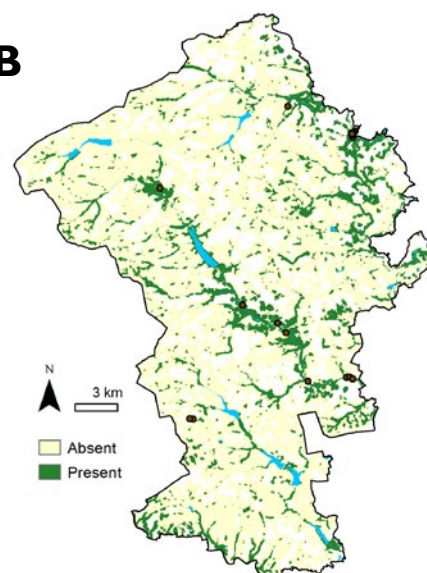
soil types typically found in broadleaved woodlands and upland bracken and gorse communities – see Figure 67.

For grey wagtail, only local scale variables contributed to the final model, although the effects were small. Slowly permeable seasonally wet acid loamy and clayey soils were preferred, and the density of watercourses (within 100m) and cover of mixed woodland (within 500m) had a positive effect on habitat suitability – see Figure 68.

Map A



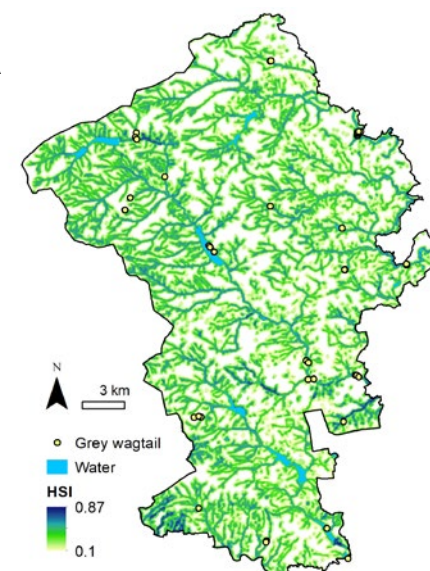
Map B



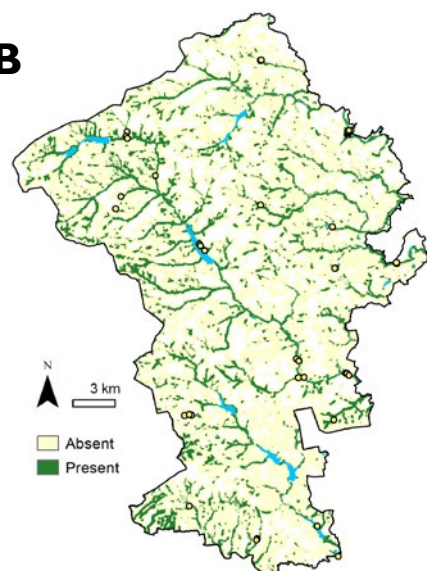
Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of dipper according to the tenth percentile occupancy threshold.

Fig. 67. Habitat Suitability Maps for dipper¹²

Map A



Map B



Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted presence or absence of grey wagtail according to the tenth percentile occupancy threshold.

Fig. 68. Habitat Suitability Maps for grey wagtail¹³

Otters

Over the last few decades otters have been gradually increasing across the UK. The national otter survey found that the Yorkshire region has shown a major increase both in positive sites and in otter distribution since the final survey in 2009–2010. Fast forward another seven years and The Wild Watch otter survey suggests that the distribution has been maintained and, in some areas, increased.

In 2017, The Wild Watch embarked on another survey of the AONB's rivers looking for signs of otter – spraint, tracks, holts etc. Otters are nocturnal and often difficult to see as they are so secretive. They are territorial, using spraints to mark territory at prominent places such as under bridges or on large stones, providing a relatively easy way to spot the presence of otters and carry out a survey. The Wild Watch ran several training courses with ecologists from a local consultancy firm, Haycock and Jay, training 56 volunteers on how to look for signs of otters. Volunteers were assigned 1 km stretches of waterway and asked to visit twice between April and September, with visits one month apart. Throughout the survey periods Haycock and Jay were on hand to answer queries and look at any spraints if identification was uncertain. The survey was repeated during 2018 and in 2019. In 2019 the survey transects were moved to new stretches of rivers and streams, to widen the search area.

Figure 69 shows the 1,977 results from the national otter survey. Within the AONB, otters were only found at one site, despite surveying over thirty sites. Moving onto the 2010 survey, the results are very different with the majority of sites showing signs of otter. Sites with no otter signs were mainly restricted to minor headwaters. During The Wild Watch survey volunteers found 70 indicators of otter activity across 13 different survey transects. Signs of otters can now be found near Angram Reservoir – an area where signs of otters were not seen during the national otter survey.

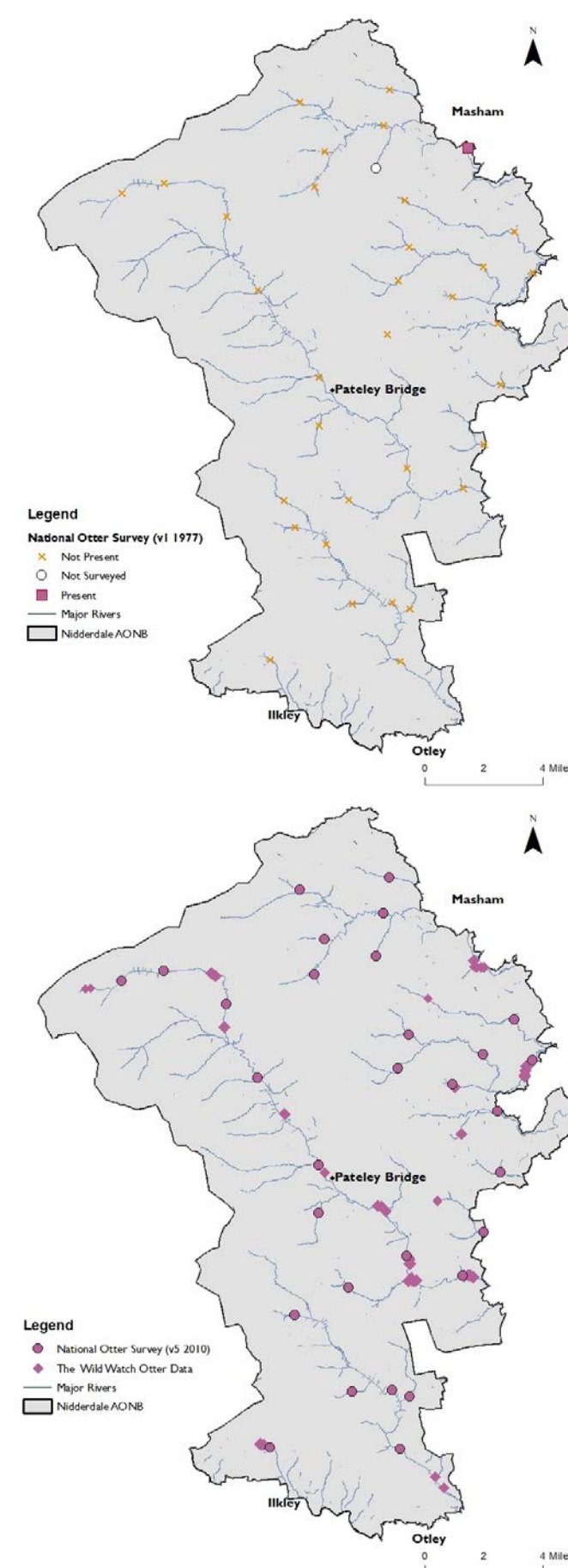


Fig. 69. Otter in Nidderdale AONB, 1997–2019

Water voles

Water voles have declined by 30% in the last 10 years alone¹⁴, they are Britain's fastest declining mammal species and have disappeared from many parts of Britain. Key factors include intensification of farming, loss of habitat, and predation by American mink.

Historical records showed that the water vole was once found across the AONB at several different locations. The Wild Watch river bank surveys included water voles on the target species list and surveys commenced in June 2017. Sites were visited twice as a minimum by volunteers and signs of water voles recorded (such as droppings, feeding sites, burrows, footprints etc.). A proportion of the river bank survey routes were also visited by a professional ecologist.

Signs of water vole were tentatively found at four sites by volunteer surveyors and at none of the survey sites by the professional ecologist. The initial findings of both the trained survey volunteers and the professional ecologists indicate that water vole has suffered severe declines in the area. However further survey is recommended before confirming presence or absence of this species within the AONB.

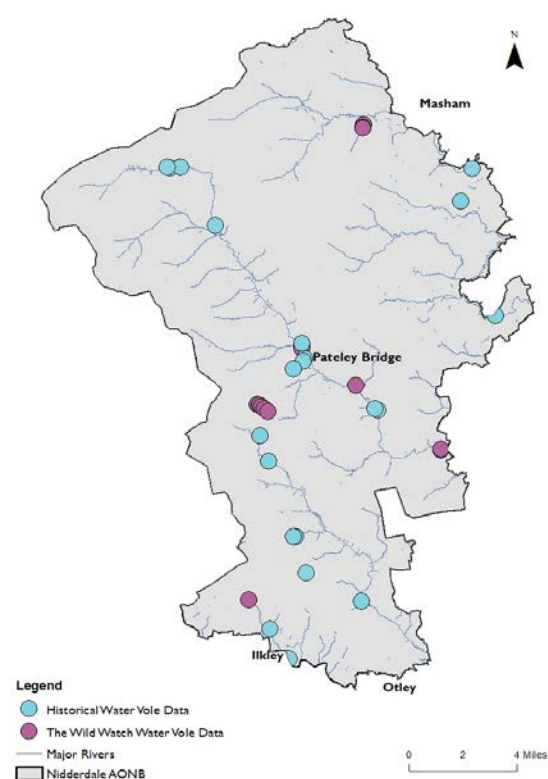


Fig. 70. Water vole in Nidderdale AONB



WaterVole © PeterTrimming CcBy2.0

The Wild Watch pond surveys – eDNA and the great crested newt

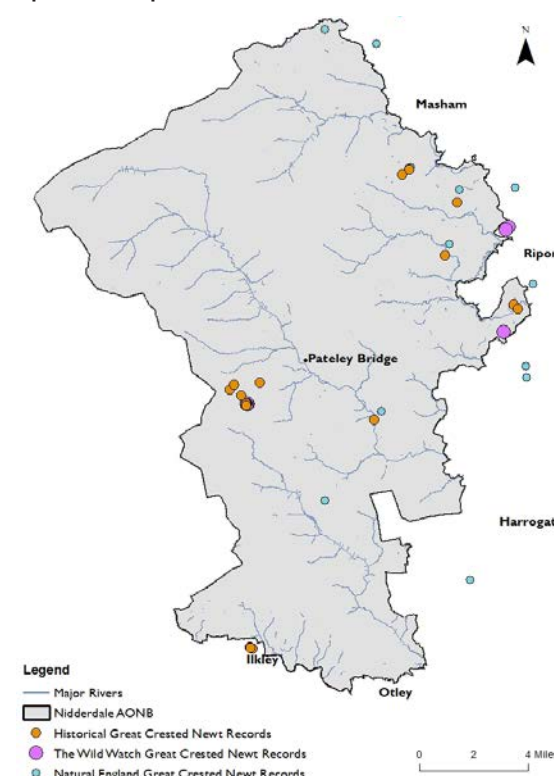
Recent advances in survey techniques means it is possible to identify the presence of great crested newts (GCN) by analysing pond water for the presence of their DNA. Environmental DNA (eDNA) is nuclear or mitochondrial DNA that is released from an organism into the environment – this might be from secreted faeces, mucous, gametes, shed skin, hair and carcasses. In aquatic environments, eDNA is diluted and distributed in the water where it persists for 7–21 days, depending on the conditions.

The advantages of using this method, especially for volunteer surveyors, are that only one site visit is required and samples can be gathered at any time of day. A licence also isn't required to take the water sample as disturbing the animals is not required (if we had been using the information to support a licence application we would have need to use a licenced ecologist to do this). This methodology is widely regarded as a highly effective and reliable way of checking whether or not GCNs are present¹⁵

Between 1st May and 30th June 2019 The Wild Watch volunteers tested 46 ponds within Nidderdale AONB. Pond selection was based on an equally distributed selection of grid squares to ensure an even coverage of the AONB as well as avoiding sampling bias. Volunteers were trained to carry out correct sampling techniques by an Officer from the Freshwater Habitats Trust and then pairs of volunteers were allocated ponds within the AONB. A great deal of effort was put in by the volunteers

– particularly as many of the ponds sampled were a long walk from the nearest parking place.

Five of the ponds sampled tested positive for the great crested newt DNA, two were indeterminate and the rest were negative. With eDNA detection it is generally accepted that a negative result is a strong indication that the newts are not present. Under normal, more traditional sampling methodologies several visits are required to confirm absence. However, we recommend further survey at these ponds before ruling out the presence of such an important species.



eDNA Pond Survey Results

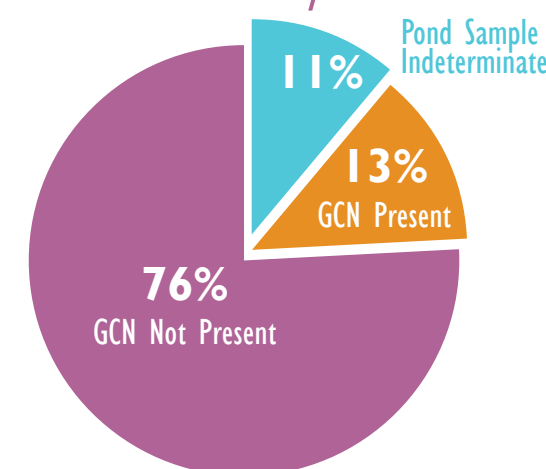


Fig. 71. Great crested newt records for Nidderdale AONB

Note: Data sources The Wild Watch, NBN Atlas and Natural England.

The results from The Wild Watch eDNA surveys were in line with recent results from a Natural England Yorkshire-wide survey to gather data for Habitat Suitability Modelling for great crested newt across North Yorkshire. In both sets of data, great crested newts were not found in the higher moorland ponds tested. It is thought that on the moorlands, as well as the natural geology, a combination of high rainfall, low nutrient status and development of peat contributes to the acidity of the water of the moorland ponds. GCNs tend not to favour ponds in dense woodland with high shade and lots of leaf litter. These factors could well be controlling the population within Nidderdale AONB, although further research would be needed to confirm this¹⁶.

A key finding to emerge during the survey was that the AONB has a surprisingly high number of ponds, particularly when compared with the neighbouring Yorkshire Dales National Park. This is due to the difference in the bedrock geology, with impermeable sandstone and gritstone covering most of the AONB in comparison to the permeable limestone of the National Park. Until the GCN survey was carried out, the extent of the pond resource was not known. It is clear that further work on ponds is needed to find out more about the ponds, raise their profile, and improve their management.

Case Study The Washburn Valley and its birds

Peter Riley, President, Wharfedale Naturalist's Society¹⁷

I have been undertaking regular long walks in the beautiful Washburn Valley north of Otley since 1997, both to observe and catalogue the birdlife and get some regular exercise. There have been some very clear trends that have emerged from my data that have led me to conclude that significant changes have been taking place and I am reinforced in this belief by comparing my conclusions with national trends, particularly the Breeding Bird Survey (BBS) which has been run by the British Trust for Ornithology since 1995. So which birds are up and which are down?

Table 24. Bird population increases

Species	BBS trend for period 1995–2014	Washburn Valley trend
Red kite	Over 10,000%	First seen in 2003. Exponential increase
Common buzzard	+172%	First seen in 1995. Exponential increase
Pheasant	+31% but over twice that in Yorkshire	Large increase due to pheasant rearing activity
Curlew and lapwing	-46% and -45% but no significant decline in Yorkshire	No significant decline. Breeding habitat in Washburn is moorland and fringe habitats
Jackdaw	+42%	Clearly higher
Carrion crow	+24%	Very prevalent
Blackcap and chiffchaff	+115% and +90%	Clear increase
Willow warbler	-37% but no significant decline in Yorkshire	Shallow decline
Common redstart	+27%	Common as ever
Song thrush	+10%	Doing well after dearth in mid 1990s
Tree sparrow	+77%	Bouncing back. First seen in 2003
Grey wagtail	-5%	Thriving
Goldfinch	+106%	Very obviously more common

Table 25. Bird population decreases

Species	BBS trend for period 1995–2014	Washburn Valley trend
Grey partridge	-55%	Very marked decline. Now struggle to get one record per annum
Common sandpiper	-36%	Somewhat reduced
Cuckoo	-68%	Decline with fewer sightings year on year
Little owl	-55%	Substantial decline in excess of BBS trend
Swift, house martin and swallow	-41%, and -27%	Clearly declining
Swallow	+27%	Decline
Rook	-13%	Decline
Whinchat	-38%	Almost extinct as breeding bird
Spotted flycatcher	-61%	Declines but hanging on in several Washburn locations
Starling	-60%	Numbers in breeding season definitely reduced
linnet	-27%	Declining, really difficult to see in breeding season
Greenfinch	-29%	Clearly down

One other trend is revealed from my statistics, namely that the number of species seen/heard per walk has been going down in the last few years. The Washburn Valley remains for the moment a wonderful place for watching birds but it is certainly not immune from wider bird population trends. As each generation passes we lose our collective memory of what it used to be like and think that what we are seeing and hearing is the norm which is, of course, far from the truth. Whilst not optimistic I can only hope that eventually we will grasp the nettle and work to make our environment more wildlife friendly.



Case Study Safeguarding the River Washburn

Ben Aston, Technical Specialist (Ecology, Biodiversity and Invasive Species), Yorkshire Water

Yorkshire Water manage a series of reservoirs on the River Washburn, with Thruscross being at the head of the chain. The company relies on the water resources generated in the catchment to supply Leeds and Bradford, but recognises the reservoir also provides a valuable resource for kayakers and other users, who take advantage of organised flow releases for sporting activity.

To ensure that the company could continue to provide both water resource and recreational requirements without causing undue impact on the river itself, a series of long term investigations took place in collaboration with Hull University and the Environment Agency. Brown trout were caught and tagged under licence from Defra, to help understand how they responded to the high flow events needed for kayaking. Invertebrate and electric fishing sampling baselines were created, before new, more natural flow release profiles were developed to benefit ecology without compromising recreational use. Subsequent post intervention surveys have indicated a beneficial outcome. To further improve resilience of the river, Yorkshire Water worked with British Canoeing and the Washburn Canoe Committee, to install biosecurity facilities at the site to help mitigate the spread of invasive species at this nationally used facility.



Brown trout caught and tagged on the River Washburn © Tim Stone

Case Study Yorkshire Water's water vole reintroduction at Timble Ings Woods

Philip Tennyson, Yorkshire Water

Timble Ings Woods, owned and managed by Yorkshire Water, sits within the catchment of Fewston Reservoir, between Otley and Pateley Bridge. The woodland is mixed age coniferous and broadleaf trees, managed sustainably to FSC certification standards. The area provides invaluable habitat for a variety of wildlife, which is the reason why it is designated as a Site of Importance for Nature Conservation (SINC).

Part of the management regime for the site is to manage the vegetation around the riparian zones to keep them mostly free of trees to allow light availability for the ground layer. The vegetation acts as a trap for leaf litter and sediment, improving water quality and soil structure. Due to the availability of riparian habitat and the number of interconnected ditches and ponds across the site, it was identified that the site could provide great habitat for water voles. Water voles are believed to be the fastest declining mammal in Britain, losing 97% of their former geographical range. This is largely due to habitat loss and the release of American mink. Mink were brought to England in the 1920s for fur farming and colonised the country following the collapse of the fur trade.

Following guidance from Derek Gow Consultancy, who breed water voles in captivity for release, Yorkshire Water surveyed the watercourses for habitat suitability. These surveys were used to inform the number of water voles which should be released to create a sustainable population based on the habitat availability.

Before a release can go ahead, the presence of mink must be monitored. Jim, a volunteer at Yorkshire Water's Tophill Low Nature Reserve, constructed six floating clay rafts which were placed in ponds and watercourses across Timble Ings Woods. Between the months of July and October 2019, only grey squirrel, rat and one dog's prints were observed on the clay cartridge.

This didn't come as much of a surprise as the watercourses running through the site have a stone dam below and a moorland keeper above, meaning mink populations have been kept very low.

In Spring 2020, Yorkshire Water will be placing the clay rafts back into position to check for any mink ingress over winter. If no mink are detected, Yorkshire Water and Derek Gow Consultancy are hoping to release around 300 water voles into the woodland in July 2020. We look forward to establishing this species at Timble Ings.

Case Study River Laver Restoration Project¹⁸

Nidderdale AONB and Yorkshire Dales Rivers Trust

The aim of this project, which ran between 2014–2015, was to remove physical barriers to the migration of fish and carry out habitat improvements on the River Laver and Kex Beck. The project removed a weir near Laverton that had been identified by the Environment Agency as an obstruction to fish migration, and the AONB helped farmers on land bordering the river with six projects designed to improve the ecological health of the aquatic environment.

Case Study Catchment Sensitive Farming

River Nidd Catchment Partnership

The objective of the CSF partnership, which is administered by Nidderdale AONB, and involves Natural England, Environment Agency, Yorkshire Dales Rivers Trust and Yorkshire Water, is to reduce diffuse water pollution from agriculture. Work has been ongoing since 2009. The area covered by the River Nidd Catchment Partnership includes the Rivers Nidd, Laver, Skell and Burn within Nidderdale AONB and the River Nidd to the confluence of the Ouse which

is outside Nidderdale AONB. The catchment partnership has 505 farms and covers 550km² of North Yorkshire, part of the Nidd, Ure and Upper Ouse catchment that subsequently enters the Humber and the North Sea. Roughly half of the Nidd catchment is upland. Several water bodies in the catchment fail to meet WFD good ecological status. The River Nidd, Howstean Beck, Fell Beck, Darley Beck and River Laver and Skell all have moderate status, Thornton Beck, Grundifs Beck, the Crimble and Park Beck have poor status, and Ashfoldside Beck bad status.

Key objectives of the CSF work are to:

- Reduce sediment and soil phosphate loss from agriculture, by encouraging better soil husbandry, and to improve water quality in the whole area.
- Improve manure management and integration of the timing and spreading of manures with fertiliser inputs to reduce nutrients entering all waterbodies to help achieve WFD good ecological status.
- Reduce the direct access by livestock to open streams and rivers to prevent sediment loss and reduce phosphate within watercourses.
- Reduce the connectivity between land and surface water by encouraging uptake of water grants for yard infrastructure improvements.
- Raise awareness of pesticide failures within the drinking water protection area and reduce pesticide drinking water standard exceedances failures.
- Raise awareness of WFD reason for not achieving objectives in the focus water bodies and the key farming measures needed to address these.

The overall CSF approach is to prioritise working with farmers whose uptake of CSF measures would reduce water pollution from agriculture most effectively. Specialist one to one advice and support is provided to priority farmers. Group events and newsletters are also provided. Priority issues for the partnership are reducing dissolved organic carbon and colour, sediment and phosphate, and nitrate within Darley Beck and Nitrate Vulnerable Zones; metaldehyde and drinking water protection zones in the lower catchment; and protection of the UNESCO World Heritage site on the River Skell.

Recommendations/future actions

AONB plans/commitments

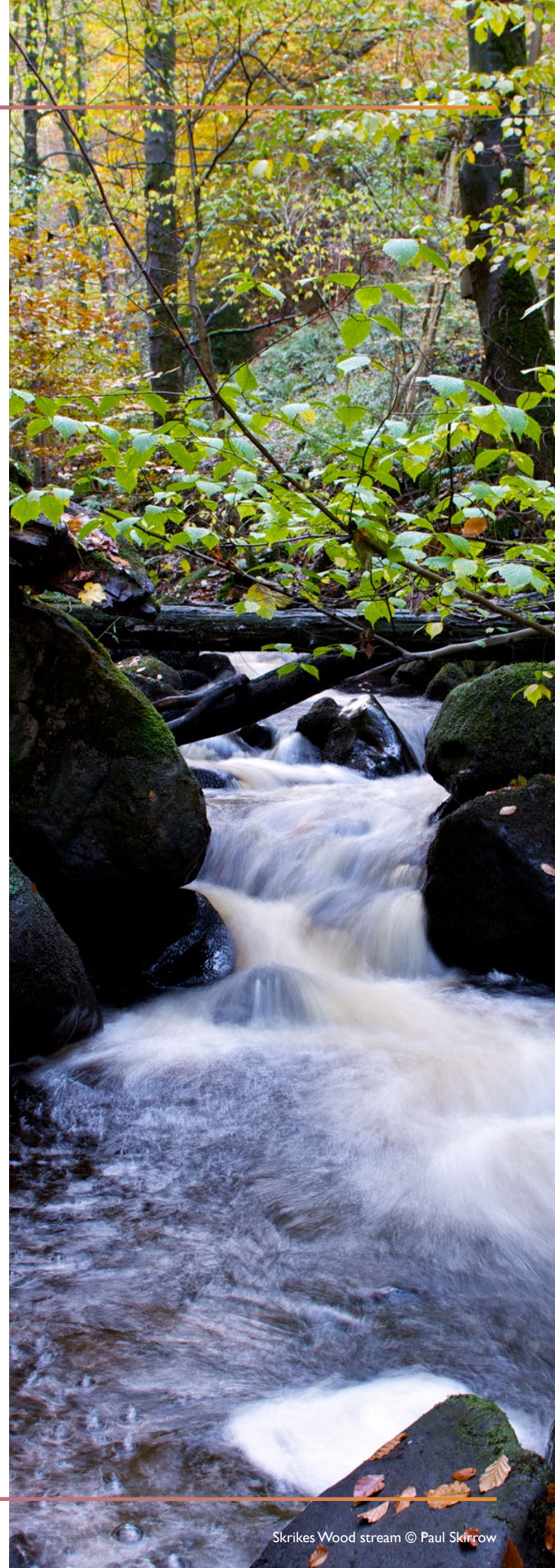
Taking climate change adaptation measures by facilitating implementation of Natural Flood Management (NFM) measures on AONB's river catchments, including helping landowners access water grants.

Conserving, enhancing and restoring aquatic and riparian habitats by:

- Implementing water quality and NFM measures on the Crimble/Park beck catchments.
- Implementing actions contained in the River Nidd Catchment Sensitive Farming programme.

What can you do?

- Landowners can contact us for advice about eligibility for a grant to help implement water quality and NFM measures.
- Report sightings of Himalayan balsam in the Upper Nidderdale catchment to us.
- Take biosecurity measures cleaning your shoes before and after visiting water and wetland areas, and avoiding taking plant material or cuttings from the countryside.



Skrikes Wood stream © Paul Skirrow

Species

Headlines

- Nidderdale AONB is home to important populations of species.
- The Wild Watch has helped us collaborate with others and collect new information on a large number of species including reptiles, owls, hedgehogs, invertebrates and flowering plants.
- There are still data gaps and species we haven't looked at so the AONB will continue collecting information, including through our Citizen Science initiatives.
- We have developed Habitat Suitability Maps for barn owls and tawny owls which we will use to target conservation action.
- Positive actions include continuing to raise awareness of the value of our wildlife species through events, working with others on actions for curlew and adder, supporting our volunteers to collect further information, and collaborating with local naturalist groups.

Introduction

Nidderdale AONB is home to important populations of species. The Government has pledged to improve Britain's most threatened wildlife through in Defra's 25 year plan and the forthcoming Environment Bill. The species selected are referred to as Section 41 (NERC Act) species. A diverse range of these species can be found in Nidderdale AONB including adder, up to 10 species of bats, curlew, lapwing, and hen harrier, to name a few, as well as invertebrates like *Pyropterus nigroruber* and the big blue pinkgill fungus (*Entoloma bloxamii*).

Lesser-spotted woodpecker, yellow wagtail, wood warbler, twite, and hawfinch have probably been lost from the AONB in recent years. Black grouse became extinct historically but birds re-introduced as part of a project lead by the Game and Wildlife Conservation Trust and shooting estates have started to lay the foundations for a new population in recent years (see *Moorland* section starting on page 53).

Some species (Biodiversity 2020 species and wider) are closely associated with a particular habitat and these have been assessed in preceding chapters. Others range more widely across habitat types and some of these are discussed in this chapter.



Red grouse © Kelvin Smith

Bats

Nidderdale AONB is home to eight to ten of the UK's 17 species of bat. Common and soprano pipistrelles are present in high numbers, and both species greatly outnumber all other the bat species combined. With the possible exception of Daubenton's bat and the brown long-eared bat, all others could be described as rare in the AONB.

Case Study Bats in Nidderdale AONB

John Altringham, Emeritus Professor, University of Leeds and The Wild Watch Patron

In the summer of 2013, transects were walked across Nidderdale AONB to measure bat activity based on recordings of their echolocation calls. The data were used to develop Habitat Suitability Models (HSMs) for the more common species of bat¹. The methods used were developed by Bellamy, Scott & Altringham (2013)² and have been the template for HSMs developed by The Wild Watch for a broader range of animal and plant species. HSM maps show the suitability of all locations for a species across the entire map and tell us what habitat features are important. They are based on the statistical strength of associations between species presence and habitat characteristics at the survey locations.

HSMs were produced for common and soprano pipistrelles, noctule bat, Daubenton's bat and whiskered/Brandt's bats (these two species cannot be reliably separated by their calls). Natterer's bats and brown long-eared bats were also recorded, but too few were recorded to produce reliable HSMs. In addition, it is probable that Leisler's bat and Nathusius' pipistrelle are present in the AONB in small numbers, based on their known UK distribution.

Figure 72 shows the predicted number of species across the AONB. Only the five modelled species are included in the map. Other bat species are likely to have similar distributions. Put simply, bats of all species are most likely to be found in

low elevation, riparian habitat – trees and water provide roosts and invertebrate prey in relatively warmer and more sheltered environments, meaning that the east of the AONB is a key area for bats.

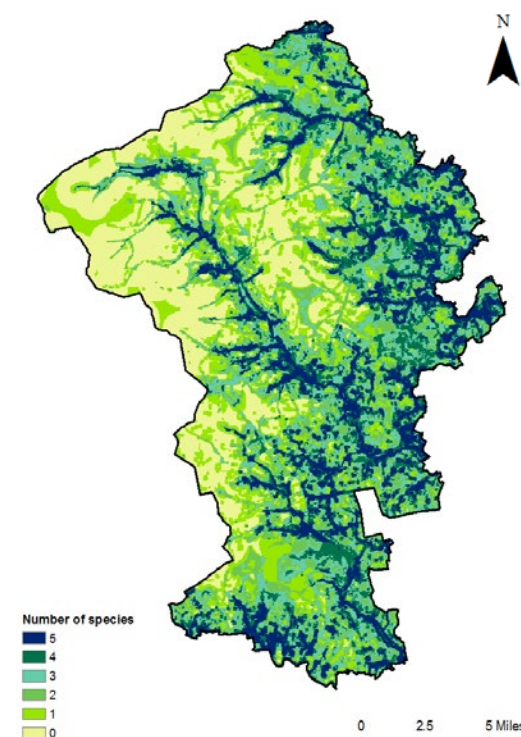


Fig. 72. Predicted number of species across Nidderdale AONB

Some bats, most notably common pipistrelles, will feed on higher ground on warmer, stiller summer nights. Upland habitat could be more suitable for most bats if tree planting/natural regeneration was extended into sheltered dales/gills, especially if these linked up to existing woodland/shrubby patches along watercourses.

The HSM maps refer specifically to summer foraging habitat. In winter, bats hibernate. Noctules prefer hibernating in deep holes in mature trees, pipistrelles make use of a very wide range of sites, including trees and the cooler parts of buildings. Survey of such sites is very difficult and little is known. All other species most commonly hibernate underground, in natural caves, disused mines and smaller structures such as icehouses and lime kilns. The disused mines around Greenhow and the caves of the Manchester Hole/Goyden Pot area have been surveyed for autumn swarming (mating) activity^{3,4}. Activity was found at all sites surveyed

and many are likely to be locally important swarming and hibernation sites. However, the relatively small size of most of the mines and the frequent flooding of the caves suggest that they will not be more than locally significant. We can say little about population sizes or trends, either in absolute terms or in relation to the national picture. Strong but anecdotal evidence points to a huge decline in bat numbers nationally during the last century. The National Bat Monitoring Programme suggests that across the UK most species are now relatively stable, albeit at low levels.

Reptiles

The Wild Watch carried out surveys for reptiles within the AONB in 2018. Twenty volunteers were trained to carry out reptile surveys, using The Wild Watch survey methodology.

Refugia (1 m² pieces of roofing felt) were placed every 100m, in sunny locations within a range of habitats, along specified survey transects. As reptiles are 'ectothermic' they tend to bask in warm places to help raise their body temperature. They are often found underneath objects that absorb heat. It was hoped that these artificial refuges would heat up quickly compared to the surrounding environment and attract nearby reptiles. Each survey route was walked three times between April and September and any reptiles observed were recorded. Target species were the two species of snakes found in Yorkshire, adder and grass snake, alongside common lizard, and slow worm.

Our results were disappointing and whilst reptiles were recorded at a few known sites, adder records were scarce – positive records were found at three sites only. A key reason for this was the unusually hot summer of 2018 that meant that rather than basking, adders and other reptiles had retreated into the shade, making detection difficult. The deliberately randomised transect section required for Habitat Suitability Modelling also meant that key sites known for their adder populations were not surveyed. As a result we generated fewer than expected records.

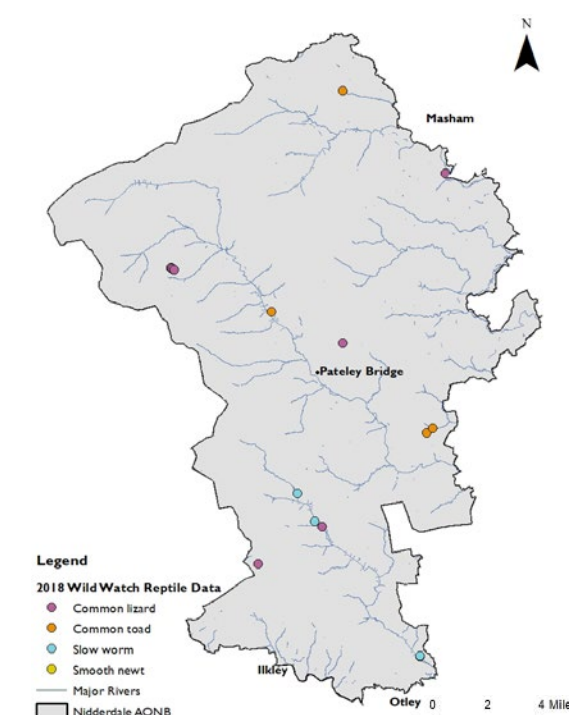


Fig. 73. The Wild Watch reptile records (excluding adder)

Adders

The adder (*Vipera berus*) is one of our three native snake species, most often found on heaths, moors and coastal areas. It has a secretive nature and cryptic markings mean it often goes unnoticed. A recent report from Make The Adder Count⁵ has painted a stark picture for adders. Changes in status derived from biological recording data indicate adder numbers in the UK have been in decline since the 1930s⁶. Make the Adder Count began in 2005 as a national surveillance programme, collecting standardised counts of adders lying-out after emerging from hibernation. Data from 260 sites confirm a significant decline, on average, across sites with small populations, while the few with large populations (less than 10%) are show a slight increase. If these trends continue then within 15-20 years, adders will be restricted to a few large population sites, significantly increasing the extinction risk for this priority species in the UK⁷. Adder data is limited for the AONB (see Figure 74 on page 108) but by pooling several data sources we can see there is a reasonably broad distribution across areas of suitable habitat in the AONB, largely tallying with the adder's preferred habitats of woodland, heathland and moorland. However much of this data is historical, with few records from the last 10 years.

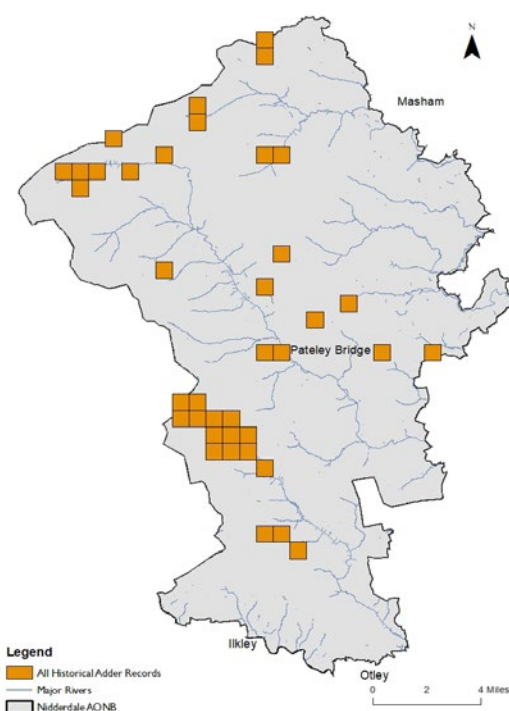
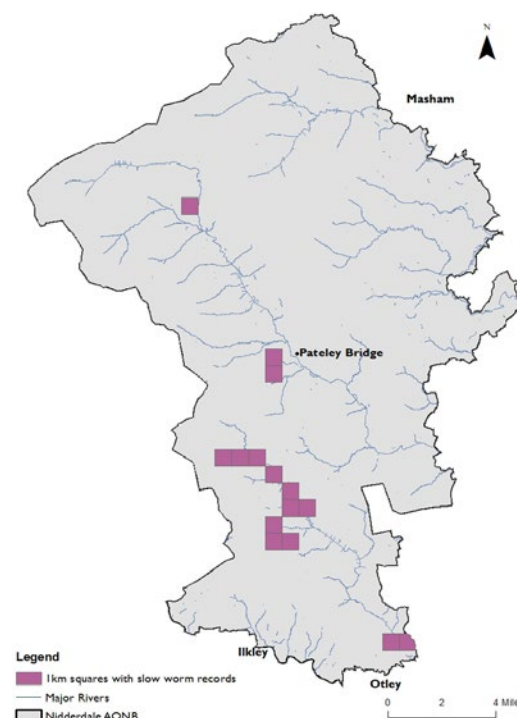


Fig. 74. Historic adder records for Nidderdale AONB

Slow worm populations are known in the AONB but detail about distribution and populations was sparse. As a result they were included on The Wild Watch species list and were a target species during the reptile surveys in 2018.

Fig. 75. 1km grid squares with slow worm records
Data sources: The Wild Watch, NEYEDC, NBN Atlas

Due to its scarcity and the lack of recent data the adder was selected as a target species and in 2018 we carried out a systematic survey for them following The Wild Watch survey methodology.

To build on the data and volunteer skills developed during The Wild Watch, we will carry out further adder surveys during 2020 and subsequent years. Using the methodology outlined in Make the Adder Count, The Wild Watch survey volunteers will be trained to enable them to undertake similar surveys across the AONB. Surveyors will visit known hibernacula, recording the number of adult snakes observed basking after emergence from hibernation. This will enable us to determine whether or not adder populations still exist at known sites and also estimate population size and track changes in the population. All results will be fed into Make The Adder Count.

Slow worms

Often mistaken for snakes, slow worms (*Anguis fragilis*) are a type of lizard without legs, with smooth golden-grey skin. They like to bask in the sun and are usually found in heathland, tussocky grassland, woodland edges/ridges, and feed on invertebrates.

Case Study Slow worm at Lindley Wood Reservoir

**Gordon Haycock, Secretary,
Wharfedale Naturalist Society**

Records of slow-worm *Anguis fragilis* are regularly made in the Washburn Valley, and there may well be a meta-population of slow-worm from the moorland fringe at Humberstone Bank (where they were recorded in 2017) down to Lindley Wood Reservoir as there is connecting semi-natural habitat suitable for slow-worm. Following the construction of the dams in the Washburn Valley, suitable habitat for slow-worm was accidentally created on the south-west facing slope above the spill-way for the reservoir wall (see Figure 76). This was recorded in the 1980's as open grassland with scattered gorse and proved an ideal place for slow-worm.

Wharfedale Naturalists Society records indicate that a population was extant at this location in 1986, and a series of 'tins' were placed at the site and checked each year. Slow-worm have subsequently been recorded at this location with a maximum of seven individuals in 2010, and photographs have been taken of mating pairs and young. Most recently, six individuals were recorded in June 2018, however, at the time 'tins' were also placed at other locations on the dam wall, but no slow-worm (or other reptiles) were recorded.

Over the years, gorse, hawthorn scrub and bramble have increased on the slope in spite of occasional work parties to remove the scrub. Yorkshire Water maintain a strip of grassland approximately 1.5m wide from the top of the spill-way for access. This continues to be species rich grassland and slow-worm continued to be recorded in this zone up until 2018.

In 2018 a request was made by Harrogate Borough Council for a meeting on site to discuss works to the spill-way proposed by Yorkshire Water. I met with the project ecologists and Harrogate Borough Council on site. We inspected the slow-worm habitat, and discussed proposed mitigation to ensure slow-worm were not harmed during the operation. It was proposed that a raised walkway be constructed over the grassland where the slow-worms live for the duration of the project. Works began in 2019 and no access to the site has been allowed whilst the works are taking place.

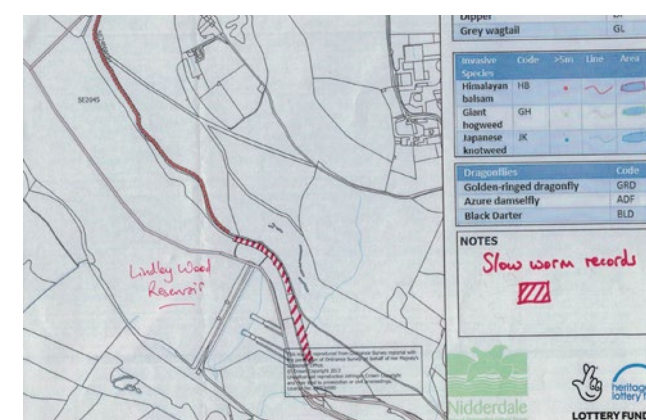


Fig. 76. Area of slow worm habitat

Nocturnal Birds

In March 2018, as part of The Wild Watch, 'Owl Watch' was launched, asking people to tell us when they saw or heard a barn owl, tawny owl, little owl, long-eared owl or short-eared owl. There was a fantastic response to the campaign, with 670 record sent in. The records have been collated and the results have been used for Habitat Suitability Modelling.

Owls recorded March 2018 to January 2020

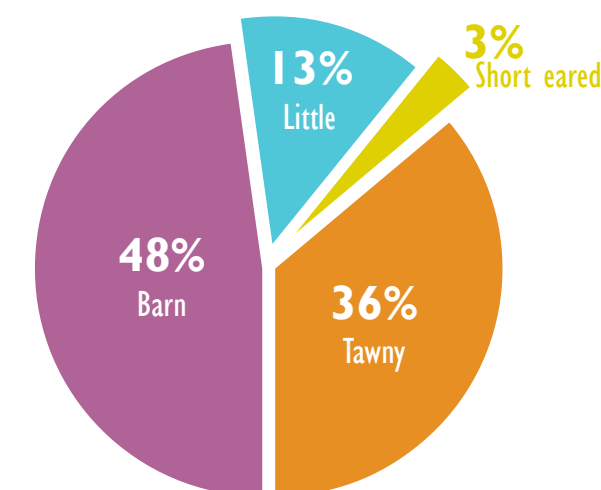


Fig. 77. Owl records logged with The Wild Watch between March 2018 and January 2020 including a summary of species

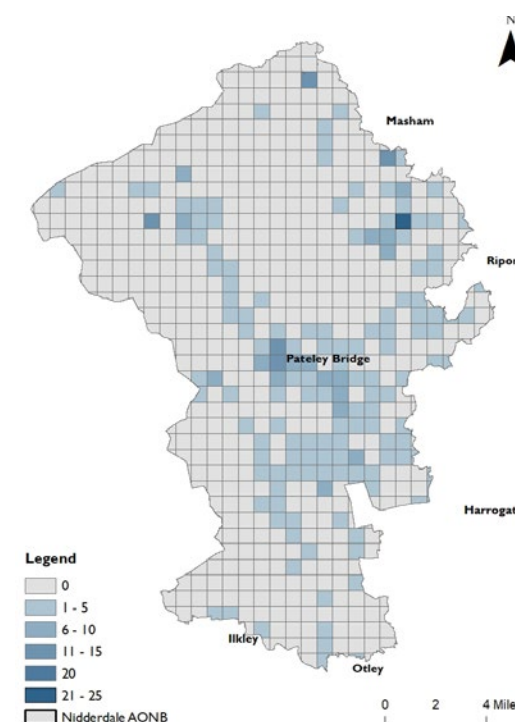
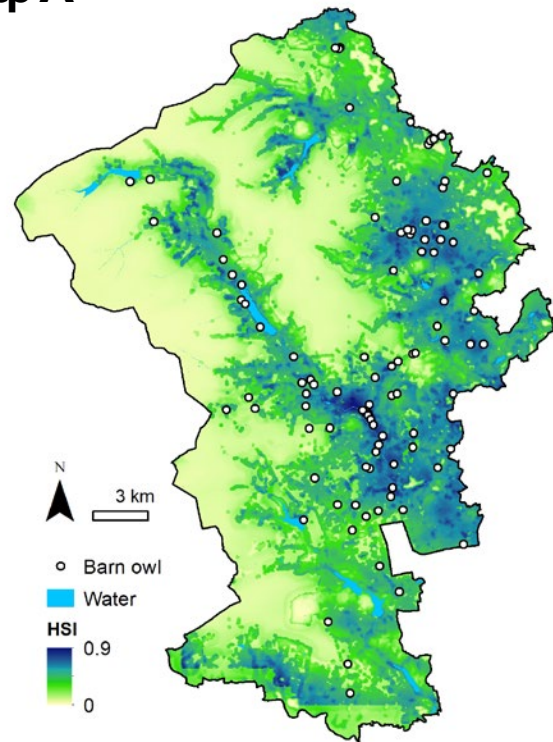


Fig. 78. Number of owl records per 1km² for Nidderdale AONB

Habitat Suitability Modelling for Barn Owl and Tawny Owl⁸

The modelling gave mixed results. Whilst some of the habitat associations made sense and fit previous work, others were inconsistent. Examples where the modelling 'fit' includes barn owls that preferred low altitude areas with a low density of trees and avoided improved grassland and arable land. This fits with previous research showing a preference for open habitats with scattered trees and unimproved grassland in lowland areas^{9,10}. Tawny owl, by contrast, preferred areas with a higher density of trees and some grassland cover, which fits with previous research showing that tawny owl hunt from, roost and nest in trees and prefer woodland and grassland habitats^{11,12}.

Map A

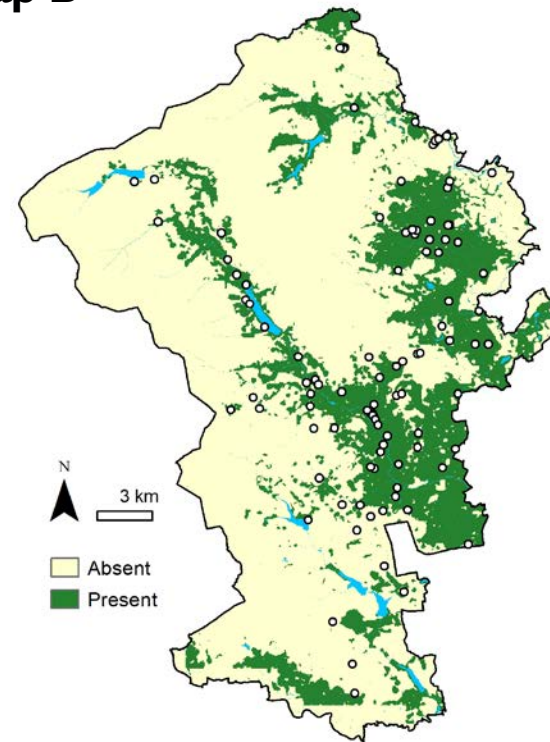


Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted absence of barn owl.

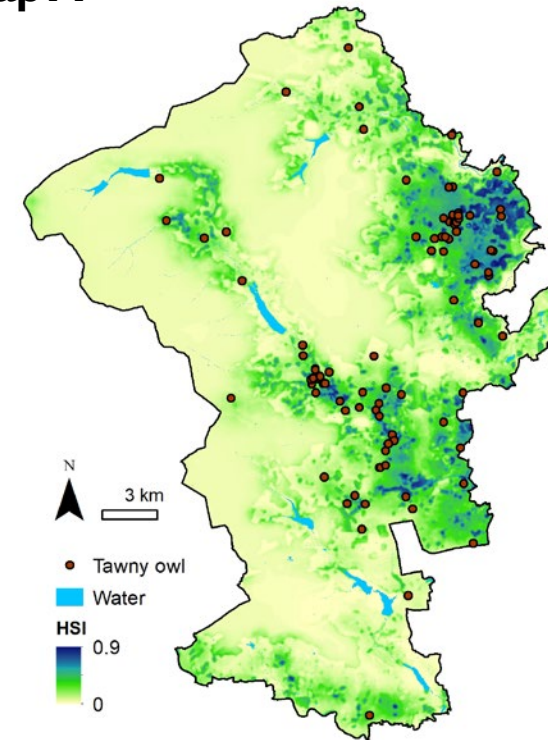
Fig. 79. Habitat suitability maps for barn owl

Examples of predictions that showed inconsistencies included tawny owl where some of the habitat variables have confounding effects at different spatial scales and there are sharp changes in habitat suitability in the predictive maps. This could be because the models are built from anecdotal evidence rather than a systematic survey. Collection bias may have influenced the outcome and, due to the species we were looking at, it was hard to exclude the bias of observation being made close to building or roads as barn owls may roost and hunt in and around buildings. There may also be fine-scale habitat associations that it isn't possible to capture within the models. For example, barn owls often forage along field margins and ditches, and prefer rough tussocky unimproved grassland, which supports a high density of their small mammal prey^{13,14}.

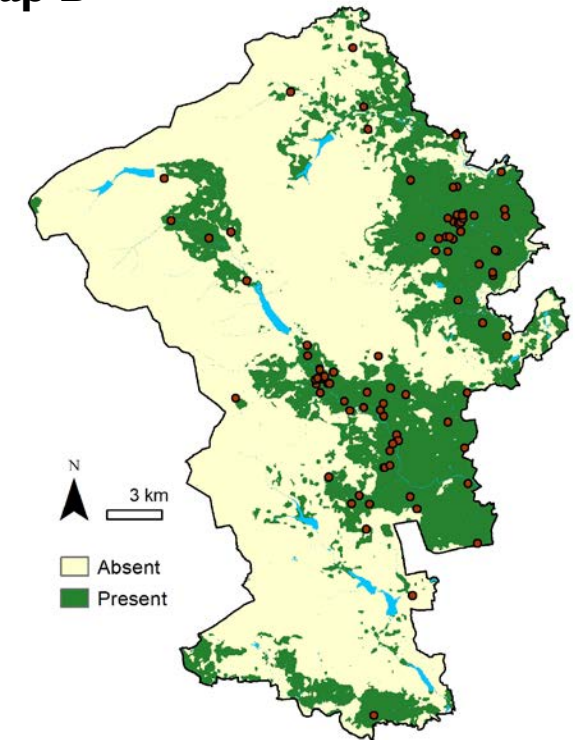
Map B



Map A



Map B



Map A shows continuous habitat suitability indices (HSI) ranging from 0 (low suitability, yellow) to 1 (high suitability, blue). Map B shows predicted absence of tawny owl.

Fig. 80. Habitat suitability maps for tawny owl



Hedgehogs

Hedgehogs live in most parts of Great Britain and are expected to be found widely across Nidderdale AONB. In rural areas, hedgehogs live along woodland edges, hedgerows in meadowland, and rough pasture. In towns, they make use of gardens and amenity grassland, as well as other green spaces. Between November and the end of March, when food is scarce, hedgehogs hibernate to conserve energy, remaining largely inactive. During the rest of the year, they are mostly nocturnal, moving over areas of 10–50ha during the summer, and 1–2km in a single night¹⁵.

It is estimated that there are about 1.5 million hedgehogs in Britain^{16,17} although we don't currently have a reliable estimate of the population within the AONB. However, across Britain there is strong evidence that hedgehogs are in decline and that there are big differences between rural and urban populations, with rural populations in greater decline than their urban counterparts.

To find out more about hedgehogs in the AONB, in March 2019 The Wild Watch launched 'Hedgehog Watch' where people were asked to let The Wild Watch team know if they had seen a hedgehog. Records were added to a database and their distribution was mapped. This would provide a baseline for future monitoring. So far there has been a great response. Figure 81 shows the known distribution of hedgehogs within the AONB, including The Wild Watch records.

In rural areas, between 2002 and 2017, counts of hedgehog road casualties recorded in People's Trust for Endangered Species' Mammals on Roads Survey fell by between a third and a half across Great Britain¹⁸. The BTO/JNCC/RSPB Breeding Bird Survey where sightings of live hedgehogs are recorded, also showed a decline across rural areas. Contrastingly, in urban areas, hedgehogs are being recorded in fewer places but these populations are increasing.

Looking at UK-wide trends, the wide distribution is likely to mask population declines. Due to the length of time the survey has been running it is also not possible to monitor population size at this stage. However everyone can take steps at home to make

gardens more hedgehog friendly and help reverse these declines.

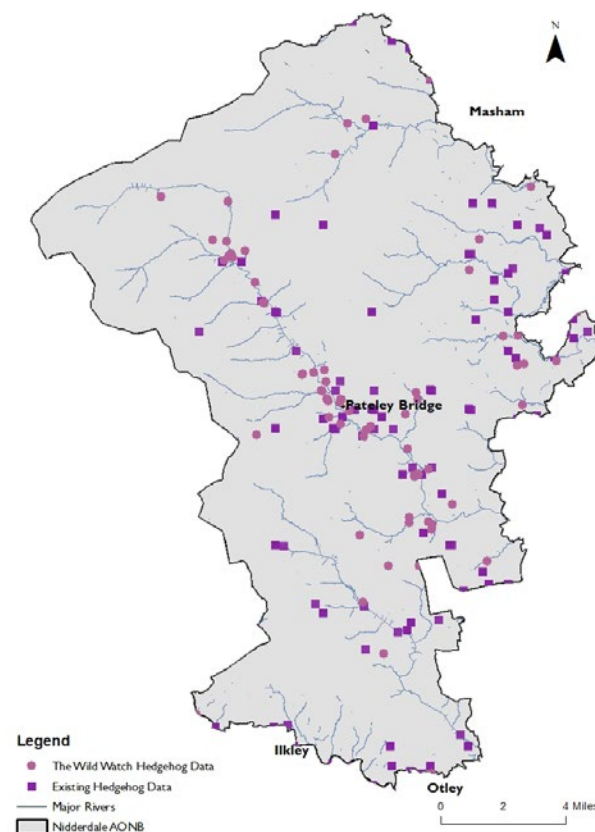


Fig. 81. Hedgehog records in Nidderdale AONB
Data sources: TWW, NEYEDC, NBN Atlas, Mammal Society

Case Study How to make your garden hedgehog friendly

- Create hedgehog homes by stacking up logs or piling up leaves and brash.
- Cut a hole the size of a CD case in the bottom of your fence or wall to create a hedgehog highway. If we link up surrounding land then we can increase the connectivity of hedgehog populations and increase their numbers.
- Put out water and food for hungry hedgehogs coming out of hibernation – they like cat food.
- Check thoroughly for hedgehogs before using power tools in the garden or lighting bonfires.
- Slow down on roads, especially between dusk and dawn when hedgehogs are active.
- Visit hedgehogstreet.org for plenty of useful resources.

Invertebrates

The Wild Watch volunteers carried out invertebrate surveys during the 2018 and 2019 survey seasons. Each volunteer was allocated a survey transect and required to walk it three times between April and September.

The target species were:

- **Bumblebee** – Garden bumblebee (*Bombus hortorum*), Mountain bumblebee (*Bombus monticola*)
- **Butterflies and day-flying moths** – Wall (*Lasioommata megera*), Green hairstreak (*Callophrys rubi*), Small heath (*Coenonympha pamphilus*), Emperor Moth (*Saturnia pavonia*), Speckled Yellow (*Pseudopanthera macularia*), Clouded Buff (*Diacrisia sannio*), Mother shipton (*Euclidia mi*)
- **Beetles** – Green tiger beetle (*Cicindela campestris*), *Carabus nitens*
- **Dragonflies** – Golden ringed dragonfly (*Cordulegaster boltonii*), Black darter (*Sympetrum danae*)

The project was fortunate to work with professional entomologists Steven Falk, Andrew Grayson and Andrew Godfrey, all carrying out a number of surveys for the project, recording all species encountered rather than the target species list.

Beetles

During the invertebrate surveys none of the target beetle species were recorded. However, *Pyropterus nigroruber* was recorded. This is a species of net-winged beetle belonging to the family Lycidae. This is an interesting find as in the UK it has a restricted and fragmentary distribution; it is locally common in the East Midlands around Lincolnshire and Nottinghamshire. There are local populations in the Caledonian Pine forests of Inverness and in Southern Ireland there are two populations in old oak woodlands of Kerry and Sligo. The typical habitat is open established and humid woodland of all kinds with plenty of decaying wood and vegetation.

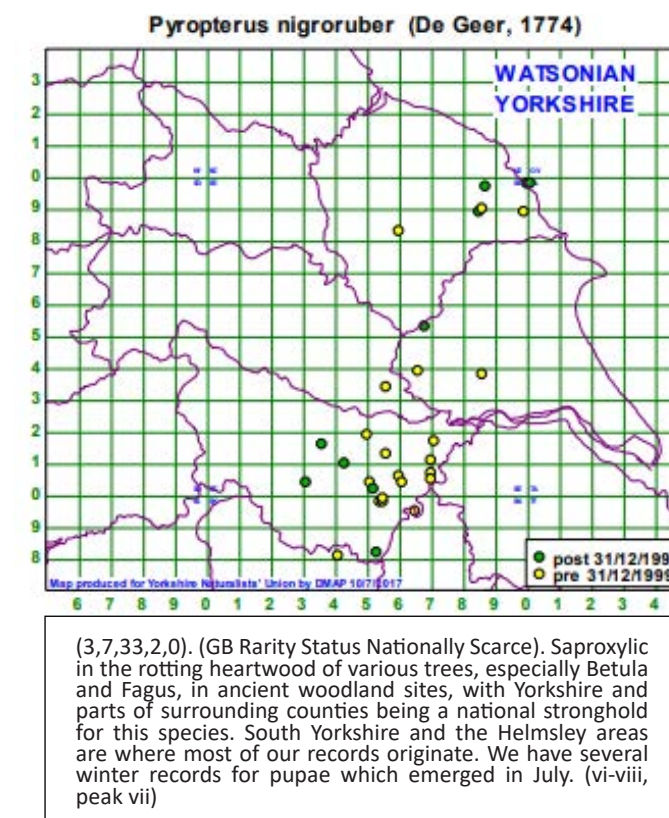


Fig. 82. Yorkshire records of *Pyropterus nigroruber* ¹⁹



Green tiger beetle © Steven Falk



Bumblebees

The Wild Watch invertebrate surveys, where volunteers were asked to record occurrences of both mountain or bilberry bumblebee and small garden bumblebee, were carried out in 2018 and 2019. Whilst the surveys ran for two years, uptake by volunteers was lower than for other surveys resulting in fewer surveys.

The bilberry or mountain bumblebee (*Bombus monticola*) is a beautifully banded bumblebee, with bright yellow bands on the thorax and a rich orange-red tail covering around two-thirds of the abdomen. They are a localised and declining species, found almost exclusively on moorland. As its name suggests, bilberry is an important if not crucial part of the diet for queens in spring and they also like the blossom of willows and sallows. Workers forage on a variety of flowers including heathers, clovers, brambles, bird's-foot-trefoils, self-heal, cinquefoils and thistles, and will take honeydew from shrubs like juniper²⁰.

The Wild Watch also recorded the garden bumblebee which is one of the 'Big 7' widespread and abundant species. Despite being found in a wide range of habitats across the UK and often frequent in gardens, where it is one of two common species found visiting foxglove, only a few sightings were recorded under The Wild Watch within the AONB.

Bumblebee Conservation's BeeWalk concluded that 2018 was a difficult year for bumblebees. The cold weather of the 'Beast from the East' in late February and early March pushed the start of the season back, and most species only really got going with a spell of good weather in mid-April. Bumblebees are also known not to do well in hot, drought conditions so it is perhaps unsurprising to see that the year was a poor one for the group as a whole²¹.

This may well have had an impact on The Wild Watch surveys but it is clear that the surveys significantly increased the number of records for this species. The BeeWalk survey methodology was followed for the survey, although there is not enough data to analyse population trends for the area. The Wild Watch data has been submitted to the BeeWalk project.

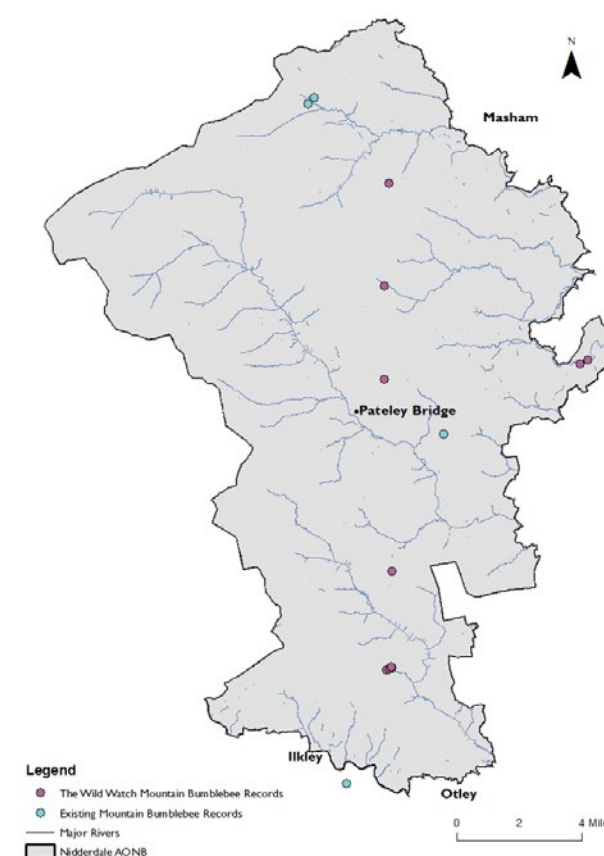


Fig. 83. Map showing existing and TWW records for mountain bumblebee
Data sources: TWW, NEYEDC, NBN Atlas

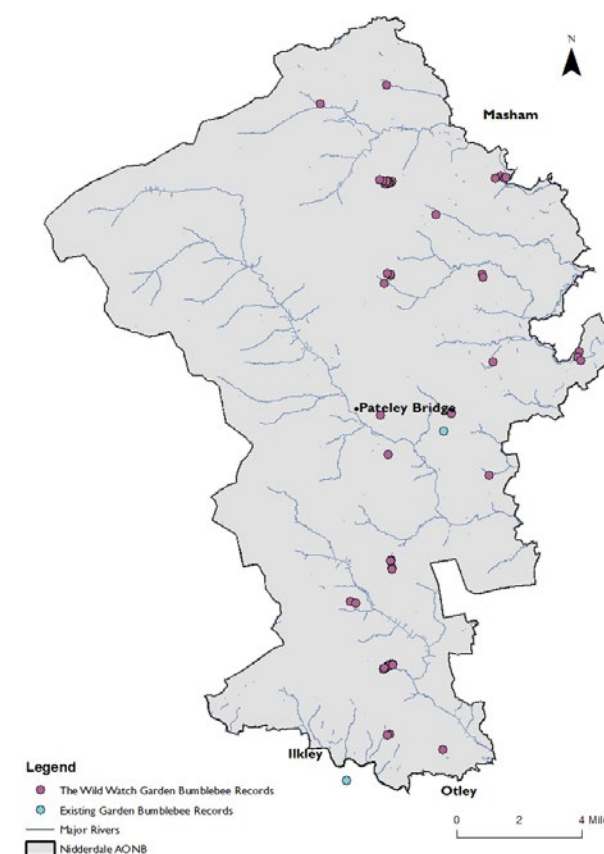


Fig. 84. Map showing existing and TWW records for garden bumblebee
Data sources: TWW, NEYEDC, NBN Atlas

Moth surveys in Nidderdale AONB

A number of moth species were on The Wild Watch target species list. Due to the complex logistics around systematically moth trapping across the AONB, and the difficulties of moth identification, The Wild Watch worked with a small number of moth specialists: Charles Fletcher (Yorkshire Naturalist Union macro-moth recorder), Jill Warwick (Harrogate District Naturalist Society macro-moth recorder) and Andrew Godfrey (professional ecologist), rather than with volunteers, to carry out systematic moth trapping across the AONB. The surveys were supplemented with public trapping sessions run by Charles Fletchers and Jill Warwick.

Before carrying out surveys, sample grid squares were pre-selected following The Wild Watch survey site selection methodology to identify the land transect locations. In many cases it was possible to moth trap on or near where land transects were located. In other cases, where access with moth survey equipment was difficult, or there were other access issues, locations as close as practicably possible were selected instead.

Case Study Moths: Searching for Bilberry Pug

Charles Fletcher, Yorkshire Naturalist Union macro-moth recorder

Pugs are troublesome moths inspiring negative emotions in many moth trappers because of difficulties in identification. Whilst many are obscurely marked, others are more distinctive and cause few problems. One of these is Bilberry Pug *Pasiphila debiliata* which is an attractive moth when fresh, but as the scientific name *debiliata*

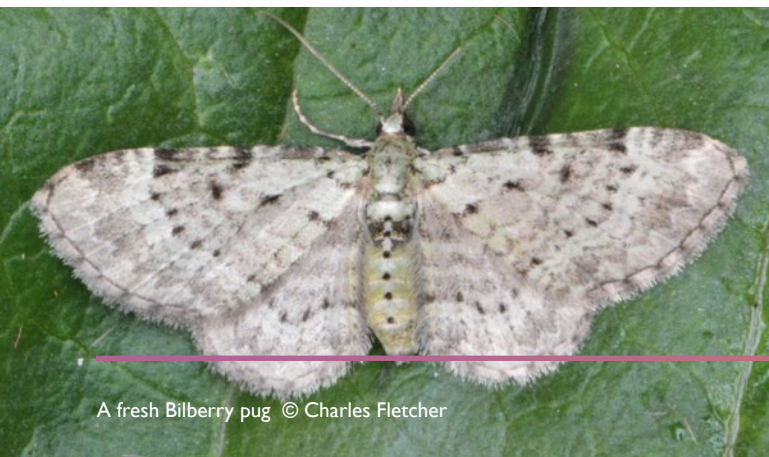


A worn Bilberry pug, Guisecliffe © Charles Fletcher

(from the Latin *debilis* meaning 'weakened') suggests, its fresh green colour quickly fades to greyish white as it ages. It is designated Nb, meaning that it has been recorded in 31 to 100 10km squares in Great Britain since 1st January 1980. Most of these squares are in the south and west of the country with no records in Yorkshire, so it was a surprise when a larva was found on bilberry near Halifax in 2016.

The Wild Watch project spurred us on to see whether Bilberry Pug lurked undetected in the AONB. The best habitat is bilberry growing in open woodland with conifers – not unusual in the Nidderdale area. The moth is most easily found by looking for the adult at dusk rather than using light traps. The Washburn Valley seemed a good place to start searching and suitable habitat was found at Beecroft Moor Plantation near Fewston. A visit in late June 2017 at dusk was immediately successful with a fresh adult being netted half an hour after sunset. Some other sites in the area were searched in 2018 with no success, in particular woodland above Pateley Bridge at Guisecliffe which looked to be ideal habitat. In mid-July 2019 a moth trapping session was organised here, rather late in the season for Bilberry Pug. The weather was poor with persistent drizzle but the moths did not seem to mind and in a good catch there were two worn Bilberry Pugs, proving that it did in fact occur there.

In a short space of time we had been rewarded with the second and third county records. We have no idea how long this species has occurred in the area. As it is unlikely to appear in garden moth traps, it has to be actively looked for. Targeted searching has found it to be more common than expected in some of our neighbouring counties and it is likely that there are many more sites in our area where it might occur.



A fresh Bilberry pug © Charles Fletcher

Species Report Nidderdale AONB moth summary 2017–2019

Charles Fletcher Yorkshire Naturalist Union macro-moth recorder

Overall 658 species of moths recorded during the first two years of The Wild Watch project and when all the 2019 records are submitted the total is likely to be about 670.

The project provided the opportunity to:

- trap in upland sites and other sites in the AONB where little moth trapping has historically taken place.
- see how common some of the upland species really are. The submission of records currently reflects the sites of gardens of moth enthusiasts so doesn't give us the full picture.

Over 650 species of moth were recorded over the three years and collated from some 7,700 individual records.

Organised public trapping sessions were:

- 2017: Druid's Temple/Leighton Reservoir Thruscross Reservoir
- 2018: Scar House Reservoir Thruscross Reservoir
- 2019: Brimham Rocks Guisecliffe

Some infrequently-recorded moths in the area appeared in good numbers:

- Grey Scalloped Bar at six sites (usually 2–3 records in the whole of Yorkshire per year).
- Scarce Silver Y noted at nine sites (normally 10–12 records in the whole of Yorkshire per year).
- Angle-striped Sallow, Barred Chestnut, Fen square-spot and Red Carpet all noted at several sites. All these species are probably under-recorded in the county.

Some declining moths across the country still have populations in the AONB:

- V-moth doing well in the Grewelthorpe area and also seen at Healey.
- Figure of Eight still has a small population in the east of the AONB.

Some unexpected rarities turned up:

- Bilberry Pug, second and third Yorkshire

records at Beeston Moor Plantation and Guisecliffe.

- Beautiful Snout found for the first time in the area at Guisecliffe.
- Devon Carpet found for the first time in the area at Sawley.

Some other unexpected new species for the AONB

- Nut-tree Tussock at Beeston Moor plantation. Well away from the usual populations.
- Thyme Pug at Duck Street Quarry – the only Yorkshire record away from the Ingleborough area.
- *Eana penziana* at Duck Street Quarry also the only Yorkshire record away from the Ingleborough area.
- *Clepsis senecionana* found at Guisecliffe.
- Elms at Hackfall are supporting good quantities of Blomer's Rivulet and Clouded Magpie, both rare in the area. This site also produced *Lampronia corticella* (Raspberry Moth) at its only site in the AONB and the bracket fungus-feeding *Triaxomera fulvimitrella* which is new for the AONB.

Other interesting records

- Silver Hill (Pateley) turned up Galium Carpet, Golden-rod Brindle and Hedge Rustic. All uncommon in the AONB.
- Northern Rustic appeared in good numbers at Duck Street Quarry.
- Small Argent and Sable was again found in the upper Washburn Valley
- Druid's plantation turned up Grey Mountain Carpet and also *Monochroa cytisella* which was new for the area VC65.

Several species of leaf mining species were found as new for either VC64 or 65*:

- Woodland at Leighton Reservoir: *Stigmella glutinosae* mines on alder new for VC65.
- Woodland at Swinton Castle: *Stigmella ruficapitella* mines on oak new for VC64.
- Brimham Rocks: *Stigmella roborella* mines on oak new for VC64 and *Ectoedemia heringi* mines on oak new for VC64 and for North Yorkshire.
- Fountains Abbey: *Ectoedemia louisella* mines on field maple keys new for VC64.

Note: * For information on recording areas used by YNU, see yorkshiremoths.info/portal

Flies

Fifty-nine species of fly (diptera) were recorded during The Wild Watch surveys. Although many of these species are common, they have not been recorded in the area before – either due to low invertebrate recording activity or not of interest when noted. Several species of note have cropped up. These are detailed below:

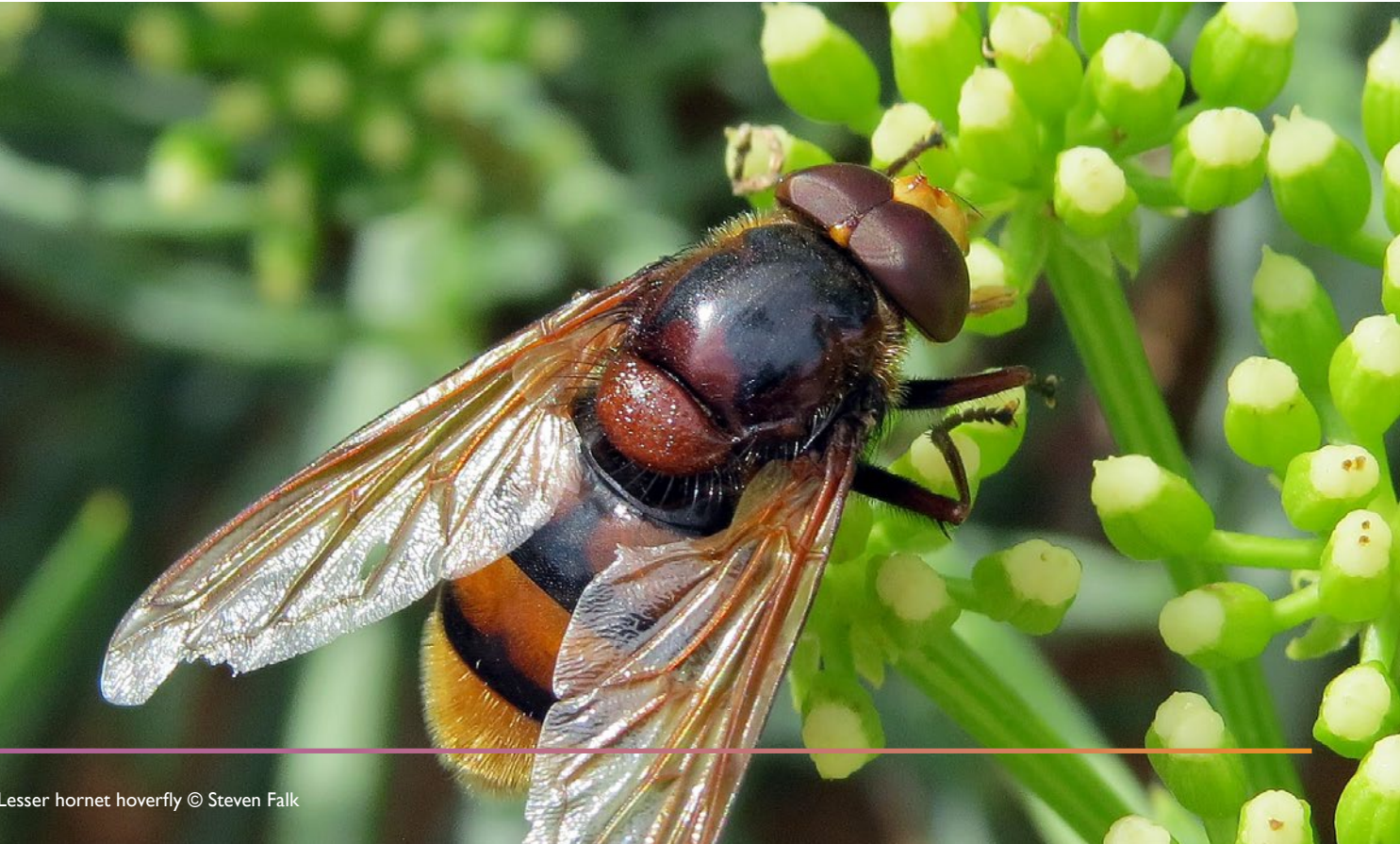
Late bear hoverfly (*Arctophila superbiens*)
A large bumblebee mimic that flies late in the season, peaking in September. *A. superbiens* typically occurs in and around wet, peaty, base-poor woodland, particularly in the north and west of Britain. The larvae are presumed to develop in wet peat or shallow peaty pools like those of other *Sericomyia* species. Adults are usually seen visiting the flowers of devil's-bit scabious²².

Dimorphic bear hoverfly (*Criorhina berberina*)
A widespread but localised species of ancient woodland and other places with old trees. Two very different colour forms exist, the darker 'type' form with a white tail and broad buff collar (a superb mimic of the Tree Bumblebee, *Bombus hypnorum*) and the all-buff form 'oxycanthae' (a mimic of carder bumblebees such as *B. pascuorum*).

C. berberina adults fly from April to September but are most often seen in May and June visiting the flowers of Hawthorn, brambles and Hogweed. Females can also be seen flying slowly around stumps and the bases of old trees in shaded locations. They give a superb impression of a small bumblebee looking for its nest. The larvae develop in wet decaying tree roots and old rotten stumps, typically of broadleaved species, though coniferous species can apparently be used abroad²³.

Lesser hornet hoverfly (*Volucella inanis*)
A large hoverfly that looks more wasp-like than hornet-like. This is essentially a southern species, though it is currently expanding north and has become fairly frequent in the Midlands in recent years²⁴. The larvae develop as scavengers and larval predators in the nests of social wasps, perhaps especially the German Wasp *Vespula germanica* and to a lesser extent Common Wasp *V. vulgaris*. Consequently, the fly is frequently seen in suburban locations such as gardens and waste ground where such wasps have good populations, though it also turns up in a variety of habitats away from settlements.

Adults like bramble, thistle and umbellifer flowers in summer, but can also be found visiting, snowberry and devil's-bit scabious into autumn²⁵.



Lesser hornet hoverfly © Steven Falk

Flowering plants

Surveys for flowering plants were carried out by The Wild Watch in 2018 and 2019. For the volunteers involved training sessions were run at the start and middle of each survey season by Dr Judith Allinson. Volunteers were allocated a 1km survey route which was walked twice, once during May/June and once in July/August, and then 10 quadrats placed along the route and the target plants recorded. This enabled a more detailed survey to be carried out.

The species list (see Table 26) was drawn up in association with Botanical Society for the British Isles (BSBI), linking into their National Plant Monitoring Scheme (NPMS). The NPMS uses an indicator species approach, whereby volunteers record changes in the abundance of species selected by us as indicative of positive or negative changes in habitat condition. The scheme seeks to be attractive to recorders at all skill levels, this requires the inclusion of some easily identifiable indicators that can be recognised by less experienced botanists²⁶.

In consultation with BSBI, The Wild Watch selected species from a range of local habitats, that were relatively easy to identify and occurred in the AONB. If the survey is continued regularly, the use of indicator species would allow change in the countryside to be monitored.

Table 26. Species list for The Wild Watch flowering plant surveys

Invasive Species	Species Code
Giant hogweed	GH
Himalayan balsam	HB
Japanese knotweed	JK
The presence of New Zealand willowherb and Cotula was also noted.	

Flowering plant surveys	Broad habitat found in
Betony (<i>Stachys officinalis</i>)	Heathland, grassland
Bluebell (<i>Hyacinthoides non-scripta</i>)	Woodland, grassland
Bog asphodel (<i>Narthecium ossifragum</i>)	Wetland
Bog rosemary (<i>Andromeda polifolia</i>)	Bog
Bogbean (<i>Menyanthes trifoliata</i>)	Wetland
Climbing corydalis (<i>Ceratocarpus claviculata</i>)	Woodland
Cloudberry (<i>Rubus chamaemorus</i>)	Heathland - high
Common spotted orchid (<i>Dactylorhiza fuchsia</i>)	Grassland
Common sundew (<i>Drosera rotundifolia</i>)	Bog
Cranberry (<i>Vaccinium oxycoccos</i>)	Bog
Cross-leaved heath (<i>Erica tetralix</i>)	Wetlands
Crosswort (<i>Cruciata laevipes</i>)	Grassland
Crowberry (<i>Empetrum nigrum</i>)	Grassland, heathland, bogs
Devil's bit scabious (<i>Succisa pratensis</i>)	Heathland, grassland
Hare's-tail cottongrass (<i>Eriophorum vaginatum</i>)	Bogs
Marsh cinquefoil (<i>Potentilla palustris</i>)	Wetland
Meadow saxifrage (<i>Saxifraga granulata</i>)	Grassland
Mountain pansy (<i>Viola lutea</i>)	Grassland
Mouse ear hawkweed (<i>Pilosella officinarum</i>)	Grassland
Pale forget-me-not (<i>Myosotis stolonifera</i>)	Wetland
Ragged robin (<i>Lychnis flos-cuculi</i>)	Wet grassland
Spring sandwort (<i>Minuartia verna</i>)	Rocks and scree
Wild thyme (<i>Thymus polytrichus/pulegioides</i>)	Heathland, grassland
Wood sage (<i>Teucrium scorodonia</i>)	Woodland
Woodruff (<i>Galium odoratum</i>)	Woodland

Over the two years 52 transects were walked across the AONB. Along the survey transects 520 quadrats were also surveyed by volunteers. This has led to 283 species records from within The Wild Watch target list being gathered.



Fig. 85. Example of plant survey result for a Wild Watch survey transect

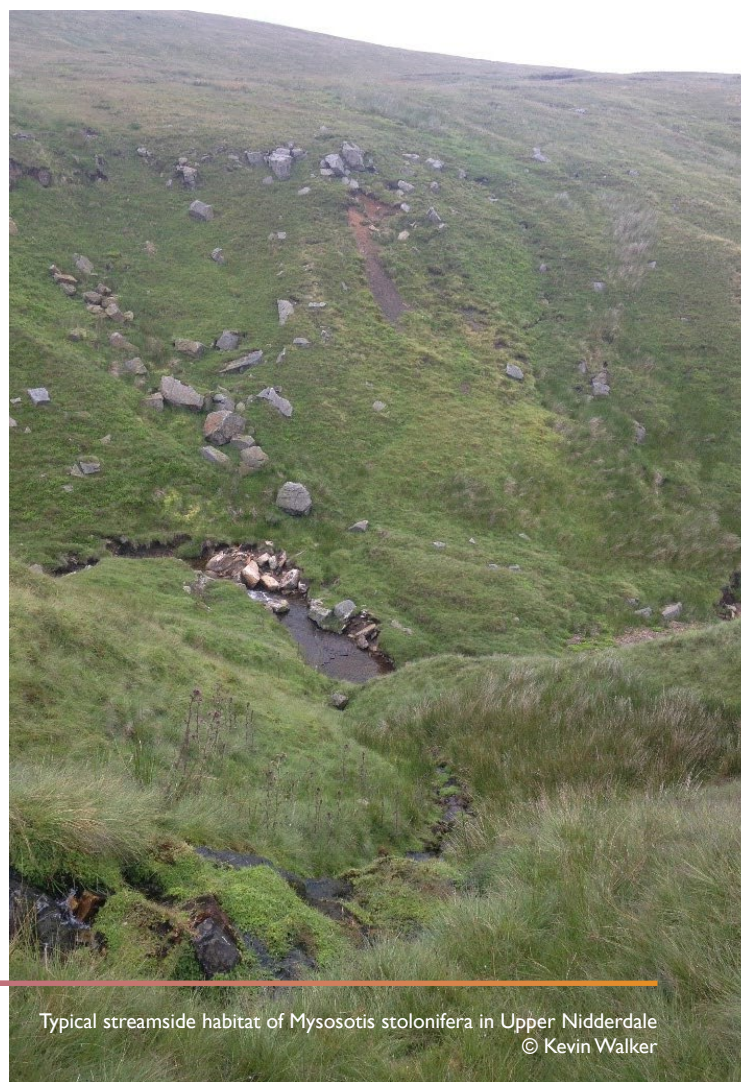
Figure 85 shows the results from one survey route. The surveyor has identified several areas of bluebell along the route. Although not clear on the map above the area either side of the stream is woodland. Some plant species, such as bluebell, are a good indicator of ancient woodland (land wooded for at least 400 years) and have been listed as 'ancient woodland indicator plants'. Ancient woodland indicators should always be considered alongside other evidence, such as historic maps, land features, and other indicator species²⁷. They can also flag up, at an early stage, that the ecological history of a site should be investigated further.

On The Wild Watch transect the woodland is also identified as woodland on historic maps but not on the ancient woodland inventory. If significant change was proposed for this land in the future the presence of bluebell at this site shows that further work would be required to establish if this woodland was ancient woodland or not.

Case Study Pale Forget-me-not *Myosotis stolonifera* a globally restricted species in Nidderdale

Kevin Walker, Head of Science, Botanical Society for the British Isles

Pale Forget-me-not is a montane plant with a highly restricted global distribution (northern Portugal, Spain and Great Britain). British populations, which are confined to the upland regions of northern England and southern Scotland, are therefore of global importance. Unlike most other rare plants of upland habitats it is almost entirely restricted to acidic rather than calcareous habitats – typically occurring along the margins of acidic rills, spring-lines and flushes and streamsides in upland areas, often growing in a very species-poor community dominated by mosses, with a few higher plants such as blinks (*Montia fontana*), opposite-leaved golden-saxifrage (*Chrysosplenium oppositifolium*) and bog stitchwort (*Stellaria alsine*).



Typical streamside habitat of *Myosotis stolonifera* in Upper Nidderdale
© Kevin Walker

Nidderdale AONB is an important area for the species with around 15 populations currently known, especially along the upper reaches of the Nidd below the summit of Great Whernside. It is extremely localised elsewhere in the AONB although it is almost certainly under-recorded, especially in the less frequented moorland areas, where its habitat is very localised but widespread. Recent recording for the Botanical Society of Britain and Ireland's Atlas 2020 project, for example, has led to the discovery of many new populations in areas that are unlikely to have been visited by botanists in the past. Very little is known about the ecology of this little known species. It is a perennial plant which, as its common name suggests, spreads vigorously by long leafy stolons, that root precariously within spongy mats of bryophytes, within streams, flushes and rills. Its main means of regeneration is unknown; it flowers prolifically in most years although seed production appears to be relatively low suggesting that its main means of dispersal may be the spread of vegetative fragments along watercourses. Recently, it has been shown to hybridise with creeping forget-me-not (*M. secunda*) with which it often occurs within acidic upland habitats. This hybrid, *M. x bollandica*, is known from the Forest of Bowland and may well occur within the AONB. It does not appear to be under any immediate threat in the AONB although like many other species of acidic upland habitats it would benefit from more sympathetic management of moorland habitats including the restoration of blanket bogs and reductions in intensity of grazing and burning as well as more general reductions in atmospheric pollution.

Fungi

The Mid-Yorkshire Fungus Group (MYFG) visits various sites in Yorkshire for the purposes of finding, identifying and recording fungi. Two in particular, Swinsty Reservoir and Fountains Abbey, have been visited regularly over a period in excess of 10 years; both these sites are within the bounds of the Nidderdale AONB.

Case Study Fungal surveys of two sites in Nidderdale AONB

Peter Duffy, Mid-Yorkshire Fungus Group

Fountains Abbey

Fountains Abbey and Studley Royal (FASR) was purchased by the National Trust from North Yorkshire County Council in 1983. The Abbey is one of the most famous and spectacular Cistercian ruins in Europe, and its adjunct, Studley Royal Park, with its exquisite landscaping and water features, is hardly less renowned. The site was designated a UNESCO World Heritage site in 1986. MYFG have been visiting Fountains Abbey at least once a year, usually during October, since 2009. We usually meet at the lakeside car park and enter via the rear gate; we then follow the same route each year, turning left towards the bridge over the lake, crossing the bridge, and then up through the tunnel and along the High Ride. We then make our way back along the lakeside path, and up towards the Banqueting House, and finally back out the way we came. From a mycological point of view, the route offers a wide variety of habitats and substrates, including both coniferous and broadleaf woodland, and (mostly improved) grassland. The High Ride in particular produces a rich crop of different species – although over the last few years, it has not been as fruitful as previously. This may have been due to a number of exceptionally dry summers, and possibly climate change; there also appears to have been some ground and drainage works done in the area, which also may have affected the fungi. The area in front of the Banqueting House also regularly produces interesting finds – one of the most spectacular is the big blue pinkgill (*Entoloma bloxamii*), which is exceptionally rare: we have found this on at least three occasions at this site.

Swinsty Reservoir

Swinsty is one of the group of several large reservoirs in the Washburn Valley which supply the water needs for large areas of Yorkshire. The reservoir is surrounded by woodlands, and a path which enables circular walks around the entire reservoir. The site is extremely large and offers a wide variety of potential habitats for

fungi; there are extensive areas of woodland, mostly coniferous, and there are several areas of minimally-improved grassland, which often produce interesting finds. MYFG have been visiting the site since 2008, originally once a year in the autumn; over the last few years, further visits have been introduced at other times of the year. We usually assemble in the car park to the south of the main dam between Fewston reservoir and Swinsty, and then follow a route up through the woods to the south of the car park, making our way anticlockwise towards the bottom dam. We then cross the dam and explore the tree-clustered lawn to the north of Swinsty Cottage (this regularly produces interesting finds, including the uncommon Copper Spike (*Chroogomphus rutilus*) and the even scarcer and more spectacular Golden Bootleg (*Phaeolepiota aurea*)). We also explore the area of grassland to the south of the dam – this often produces large fruitings of waxcaps, including the most photogenic of fungi, the Pink Waxcap or Ballerina (*Hygrocybe calyptriformis*: this was formerly on the Red Data list, but was found to be somewhat less rare than was feared). We then return across the dam and via the track past Swinsty Hall to the car park.

Conclusions

The MYFG records for Fountains Abbey and Swinsty reservoir tend to reflect the general distribution of woodland and grassland fungi which might be expected at such sites. Recently, there have been several exceptionally dry summers and autumns, and at the forays at Fountains and Swinsty during those years, it was noted that several fungi previously recorded at the sites did not put in an appearance. However, this could simply mean that the fungi happened not to be fruiting on the dates that we visited the sites – it does not necessarily mean that the underlying organisms had expired.

The effect of climate change and global warming on fungi is the subject of much research, but few conclusions have as yet been reached. Fungi are great opportunists, and it has been noted in recent years that a number of species previously confined to southern Europe have appeared in the UK. One effect which we ourselves have

noticed is a tendency for the fruiting season to extend: fungi which previously would only be expected to fruit in September to November often now seem to appear much earlier or later.

MYFG

The Mid-Yorkshire Fungus Group was formed in 1993 as a result of an initiative by the British Mycological Society to encourage local mycologists to try to organise enthusiasts into more formal groups, which it was hoped would attract more people to the study of their local fungi. Since then, the group has built up a thriving membership and a large database of fungal records; each year, it runs a series of forays at sites in Yorkshire and indoor meetings at which finds are discussed.

For more information about MYFG, please see the website at myfg.org.uk. A longer case study and detailed information about the species recorded by MYFG is available on the AONB website at nidderdaleaonb.org.uk/stateofnature

Recommendations/future actions

AONB plans/commitments

We are committed to improving the condition of the AONB's priority species by:

- Continuing to collect information about populations of wildlife species targeted by The Wild Watch (see *Further data and monitoring section starting on page 135*).
- Continuing The Wild Watch Citizen Science initiatives.
- Continuing to raise awareness of our wildlife through outreach events engaging young people and families in wildlife.
- Using the outputs of the HSM maps to plan on the ground conservation action for key species and inform development of our Nature Recovery Network Strategy.
- Working with the NUC LNP on actions for curlew.
- Undertaking regular adder surveys of known hibernation sites.
- Supporting work to reduce the impact of INNS (see *Why is nature changing? section starting on page 17*).

What can you do?

- Participate in our citizen science initiatives.
- Join one of the local naturalist groups.
- Submit casual species records, for example records of bird species can be shared with us, sent to Nidderdale Birdwatchers or entered on-line at the local biological record centre at neyedc.org.uk
- Attend one of our events.



Natural capital, ecosystem services and economic benefits

Headlines

- Nidderdale AONB has a very significant stock of natural capital, which delivers vital ecosystem services and provides economic benefits. Provisioning services such as drinking water and food production; regulating services such as carbon storage and natural flood management; and cultural services such as recreation opportunities.
- This report provides an initial assessment of our natural capital, the ecosystem services it provides and the economic benefits derived from these. We would like to analyse this further and better understand the link between our landscapes and Yorkshire's economy.

Natural Capital

In early 2018, the Government published 'A Green Future: Our 25 Year Plan to Improve the Environment'¹. It sets out the Government's objectives for improving the environment, within a generation. The Environment Plan recognises that difficult choices are inevitable, but that decision making should take account of the full value of benefits derived from the environment by adopting a natural capital approach.

Natural capital is 'the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and seas. These are all elements of nature that directly or indirectly bring value to people and the country at large'. As described in earlier chapters, the AONB has large stocks of natural capital such as peat, woodland and clean water.

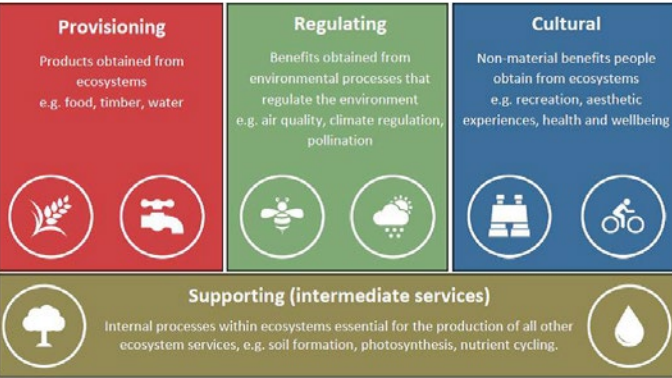


Fig. 86. Key types of ecosystem services²

Land managers have a vital role in maintaining the AONB's stock of natural capital. They pass on the benefits to people across the region, including carbon sequestration, drinking water, and high quality food. These benefits, which are called Ecosystem Services, make a significant contribution to the quality of life for people living in urban areas surrounding the AONB and to the wider rural community. There is growing evidence that human health and well-being is linked to a rich and diverse historic environment as well as an environment that is full of wildlife.

Ecosystem Services

The 2001 Millennium Ecosystem Assessment identified four categories of ecosystem services:

- Provisioning services (e.g. water, food, fuel and genetic resources)
- Regulating services (e.g. flood alleviation and carbon sequestration)
- Cultural services (e.g. heritage and recreation)
- Supporting services (e.g. soil formation and nutrient cycling)

For more information on the Millennium Ecosystem Assessment see millenniumassessment.org/en/index.html

To provide an indication of the ecosystem services provided by Nidderdale AONB we have undertaken a basic qualitative assessment based on our detailed knowledge of the area, and in particular the habitat types across the area – see Table 27³. There is very significant delivery of:

- Provisioning services – drinking water, food production.
- Regulating services – carbon storage and sequestration, water flow (flood regulation).
- Cultural services – aesthetic experiences, recreation.

Economic benefits

To date, there has been no detailed economic analysis of the economic value of Nidderdale AONB, but we know that:

- In the last five years the Nidderdale AONB team have secured £3.4 million in external grants, which have been invested to protected the AONB's special landscape, including the Upper Nidderdale Landscape Partnership⁴.
- Since 2006 we estimate that over £10 million of conservation grants have been negotiated by Nidderdale AONB staff for farmers and invested to protect the AONB's special qualities.
- Nidderdale AONB volunteers put in approximately 850 work days a year, worth £128,000.
- Nationally 156 million people visit AONB's annually spending in excess of £2 billion and supporting thousands of jobs and businesses. Tourism brings many visitors to the Nidderdale AONB area, estimated for 2017 to be more than 134,000 people who stay in the area (in B&Bs, holiday cottages, caravans, etc.) and over 1,256,000 day visitors. These visitors bring important economic benefits to the area. In 2017 it was estimated that their spending was £60.5 million, directly supporting 874 Full Time Equivalent (FTE) jobs and indirectly supporting a further 300 jobs⁵.

Going forward we may look to undertake a more detailed analysis of Nidderdale AONB's natural capital, flow of ecosystem services and economic benefits.

Table 27. Ecosystem services provided by the Nidderdale AONB area

Ecosystem service category	Final services	Baseline service provision*
Provisioning	Food provision: crop and livestock production	+++
	Timber provision: wood/wood fuel	++
	Biomass provision	+
	Drinking water	+++
Regulating	Carbon sequestration and storage	+++
	Filtration and accumulation (air quality regulation)	++
	Soil erosion control	++
	Water flow (flood regulation)	+++
	Pest and disease control	+
	Pollination	+
	Water quality regulation	++
	Soil quality regulation	++
	Climate regulation	++
	Habitat and population maintenance	++
Cultural	Aesthetic experiences	+++
	Education, training and scientific investigation, and cultural heritage	++
	Health and wellbeing	+
	Recreation	+++
	Biodiversity (existence value)	++
	Spiritual and cultural experiences	++

*Key: + delivery; ++ significant delivery; +++ very significant delivery



Case Study **Connecting landscape and economy in Yorkshire – the case for doing business with Yorkshire’s landscapes⁶**

Yorkshire’s landscapes have a material impact on the success of Yorkshire’s economy and yet few businesses in the region have practical options for influencing and optimising that relationship. This initiative is about forging those links; creating business value from healthy landscapes, and at the same time driving investment in healthy landscapes by mobilising their value to business. It’s based on an approach called ‘Landscape Enterprise Networks’ (LENs). Developed by 3Keel in partnership with Nestle, LENs builds a system of ‘collaborative value chains’, where groups of businesses work together to invest in landscape outcomes in which they have a common interest.

The first step is understanding the connections between landscape and business. This study focused on two target areas one of which was Ripon and Fountains Abbey, where it found there may be opportunities to build business links between hospitality and heritage interests and traditional estate landscapes. It also identified the opportunity for potential commercial relationships to businesses in the wider region, with a particular nexus in York.

Case Study **Health and well-being: study finds a two-hour ‘dose’ of nature significantly boosts health^{7,8}**

Research has found that a two-hour ‘dose’ of nature a week significantly boosts health and wellbeing, even if you simply sit and enjoy the peace. The finding was based on interviews with 20,000 people in England about their activity over a week. Of those who spent little or no time in nature, a quarter reported poor health and almost half said they were not satisfied with their life, a standard measure of well-being. In contrast, just one-seventh of those who spent at least two hours in nature said their health was poor, while a third were not satisfied with their life.



“What really amazed us was this was true for just about every group we could think of,” said Dr Mathew White, at the University of Exeter Medical School, who led the study. “The benefits of a two-hour dose were the same for both young and old, wealthy and poor, and urban and rural people”, he said.

The researchers were also surprised that it did not matter whether the two hours in nature were taken in one go or in a series of shorter visits, or whether people went to an urban park, woodlands or the beach.

The research used data from a Natural England survey^{9,10}, the world’s largest study collecting data on people’s weekly contact with the natural world. The study did not attempt to find out why being in nature was so beneficial, but Dr White suggested a sense of tranquillity could be the key, also that the richness in biodiversity of a setting seems to be important, as people get more stress reduction if the location was an area of high biodiversity such as an AONB or SSSI.

Case Study **York, North Yorkshire, East Riding and Hull Natural Capital Investment Framework and Data Assessment¹¹**

Matt Millington, North Yorkshire and York Local Nature Partnership / Hull and East Riding Local Nature Partnership

The Directors of Development across the geography of York, North Yorkshire, East Riding and Hull, including the Yorkshire Dales and North York Moors National Parks, have agreed to develop a natural capital investment framework and mapping exercise. This is seen as crucial to underpinning good growth and developing business resilience and to improving the lives of communities across the sub-region. The work is being led by the North Yorkshire and York, and Hull and East Yorkshire Local Nature Partnerships (LNPs).

The Project Vision:

To understand North and East Yorkshire’s natural capital assets to inform local and regional decisions, and maximise social and economic benefits through investment in the environment.

Goals and objectives:

- Agreed natural capital definition, including the strands being covered by this framework.
- Mapping locations and value of natural capital and providing datasets on a single platform. This will include a natural capital asset risk register and valuation methodology.
- Measure changes in natural capital from an established baseline to allow reporting and actions to improve its quality and extent.
- Provide a framework for planning functions to consider natural capital in development control and forward planning.
- Inform and direct funding through both the Local Enterprise Partnership and via an environmental investment framework to ensure decisions consider the natural capital approach.
- Active engagement and connection of people to their environment, ranging from local businesses to community groups.

This project commenced in 2018 and is expected to conclude in 2020.

To support development of the natural capital investment approach NYCC funded a natural capital data assessment¹² to:

- Identify and analyse the range of natural capital data sets; and
- Investigate the feasibility of establishing a regional natural capital data hub.

The analysis suggested a range of potential hub options, but highlighted a range of issues around using national natural capital data at a local level. Regardless of which hub option is selected, the study suggested there would be value in first undertaking an initial preparatory exercise: LNPs could start by exploring how to improve baseline habitat data across the region e.g. via remote sensing. Then a sub-regional natural capital asset register (an inventory of indicators of the extent and condition of natural capital), can be developed, which is the first step of a natural capital account.

Methods and data sources

Headlines

- A wide range of data sources were consulted for this report, this included national, regional and local data sets.
- A key part of the Wild Watch project was using new data gathering and analysis techniques. This included remote habitat sensing, habitat suitability modelling and eDNA surveys. These were run alongside more traditional wildlife survey techniques.

UK wildlife data sources

We collected data from as many data sets as possible to support the production of this report. National data sets included:

- Natural England – Monitoring Environmental Outcomes in Protected Landscapes (MEOPL) data, Priority Habitat Inventory, Ancient Woodland Inventory, National Character Areas, designated sites (SPA, SAC and SSSI)
- Environment Agency – WFD
- National Biodiversity Network
- Forestry Commission – National Forest Inventory (NFI), England Managed Woodland Performance Indicator
- JNCC – UK Biodiversity Indicators
- National Census
- Centre for Ecology and Hydrology

Regional/local data sets included:

- Wildlife site (SINC) data from North Yorkshire County Council
- Planning data from Harrogate Borough Council.

Species Data

Species data within Nidderdale Area of Outstanding Natural Beauty was obtained from the following data sources:

- The Wild Watch
- North and East Yorkshire Ecological Records Centre
- NBN Atlas (multiple data sources)
- Yorkshire Mammal Group
- Yorkshire Moths

The analysis was done through Microsoft Excel and ArcGIS 10.4.1. In many cases, whilst The Wild Watch has significantly increased the level of data available for the AONB, it was not possible to present trends on species abundance and distribution due to the type of data available.

All maps produced in this report are © Crown copyright and database rights 2020 Ordnance Survey 100019628.



Data Techniques

National Vegetation Classification

The National Vegetation Classification (NVC) is a standardised way of classifying types of habitat by grouping the plants that they contain, covering all natural, semi-natural and major artificial habitats in Great Britain. This level of information about an area can be hugely valuable but NVC maps are usually created through on the ground survey and mapping which is often prohibitively expensive.

Over the last few years methods to create detailed habitat maps from aerial or satellite imagery has been developing. Using methods similar to the ones used for the successful modelling of NVC communities within the Yorkshire Dales National Park¹, The Wild Watch has developed an NVC map for the whole of the AONB.

Very simply this methodology used remote sensing, known environmental variables (e.g. elevation and aspect) and on the ground surveys to develop detailed habitat map of the Yorkshire Dales National Park, with an accuracy of between 87–92% for 24 NVC communities within the National Park.

With some modifications to the methodology a detailed habitat map was compiled for Nidderdale AONB. The map contains information on NVC levels 2 and 3, and the data will be converted into UKHab map in the coming months. The detailed habitat information has been fed into the Habitat Suitability Modelling to improve their accuracy and performance. Long term the information will also significantly improve habitat knowledge for the AONB.

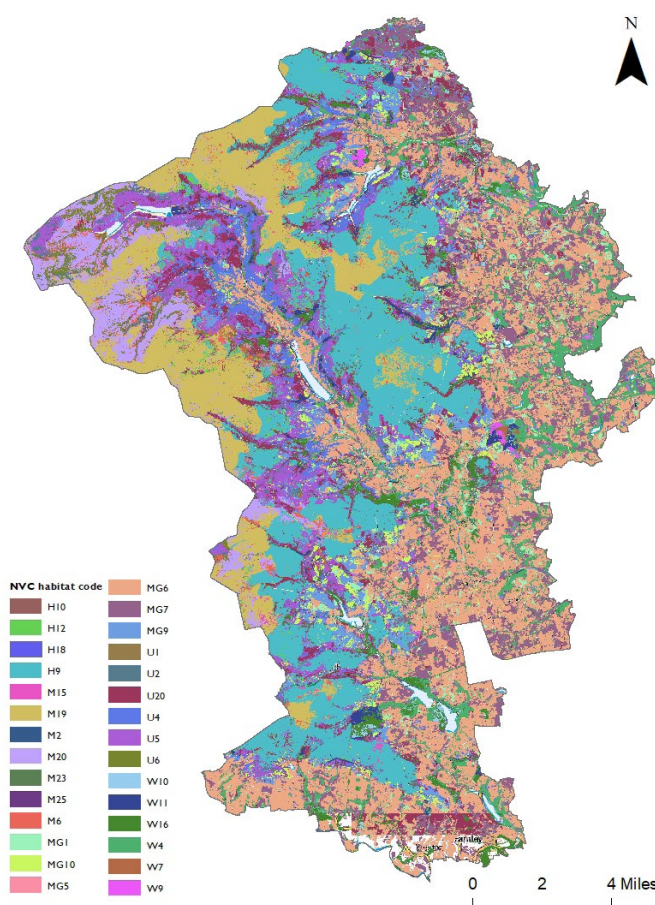


Fig. 87. Overview of the NVC level 3 classification for Nidderdale AONB

Habitat Suitability Modelling (John Altringham)

Habitat Suitability Modelling is a technique used to provide a detailed assessment of the ecological value of habitats across large areas – like the whole of Nidderdale AONB. The model uses Geographic Information Systems (GIS) to look for relationships between a species and the detailed environment around it.

Knowing where an important and vulnerable species lives is a good start, but we also need to know why it is there. If we can identify the features of the habitat that are important to it, we can manage the habitat to make sure these features are maintained, or even improved and extended. On a simple level, we know that some species depend upon woodland, others on rivers or moorland. We know that providing nesting sites can help some species, and so on. But the information is often simplistic and incomplete. Ideally, we'd like more detail.

By collecting lots of records for a species, with accurate grid references, and by searching all the habitats it might be found in, we can get that detail. This has been made possible because of the explosion in digital mapping and the development of powerful mathematical tools in ecology. Digital maps are available for many of the habitat features that are important to wildlife and increasingly accurate maps are being made available all the time.

Computer modelling of the habitat around tens or hundreds of locations where a species has been found is used to predict where else a species might then occur across the entire AONB. The map and underlying ecology also tell us a great deal about the habitat requirements of each species. For every dot on the map for a species, we can use GIS digital maps to describe in enormous detail the environment around the animal or plant, altitude, slope, aspect, habitat, land use, vegetation type, soil type, climate, and so on. We know how far it is to the nearest stream or wood. We know the length of stream in a 1 km circle around the species, the area, edge length and patch size of woods and the distances between them – the available information on habitat is huge and growing.

If we know all this for lots of points we can look for patterns, comparing the habitat around an animal with that at places where the species is not found. To cut a long story short, after a great deal of number crunching we can produce new maps, based on mathematical Habitat Suitability Models (HSMs) that predict just how good the habitat is for a species – for every 50m or 100m square of land in the AONB. After testing the accuracy of these maps with new data collected at new sites we have a valuable conservation tool. We not only know where a species is found, but why it is there. We know why a location may not be suitable for a species, and if appropriate, what we can do to make it better. The maps identify possible new locations for a rare species, targeting survey and conservation work. HSMs are a valuable addition to our conservation toolbox, helping us to use our resources wisely.

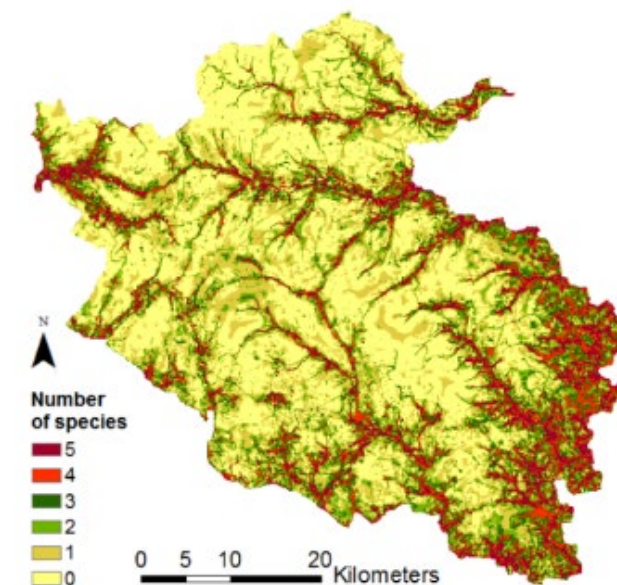


Fig. 88. An example of a HSM map

The maps really help us to make decisions about where efforts to conserve species should be targeted and where we can improve or create habitat to help our wildlife to flourish. This might be by enlarging existing areas or connecting small fragments of suitable habitat together. These models have been successfully used in conservation projects globally and by the University of Leeds for bats and wading birds across northern England (including Nidderdale).

E-DNA

Recent advances in survey techniques means it is possible to identify the presence of great crested newts (GCN) by analysing pond water for newt environmental DNA (eDNA). eDNA is nuclear or mitochondrial DNA that is released from an organism into the environment – this might be from secreted faeces, mucous, gametes, skin, hair etc. In aquatic environments, eDNA is diluted and distributed in the water where it persists for 7–12 days, depending on the conditions.

Advantages of using this method include an easier way to sample, and pond samples can be gathered at any time of day. GCNs can be cryptic and hard to spot using more traditional methods of sampling. A licence isn't required to take the water sample



as disturbance is not required. However if the information was going to be used to support a licence application, a licenced surveyor would be required. It is also regarded as a highly effective and reliable way of checking whether or not GCNs are present.

Between 1st May and 30th June 2019, 46 ponds within Nidderdale AONB were tested. Figure 89 shows the distribution of the ponds tested. Results are discussed in the *Water and wetlands* section starting on page 90.

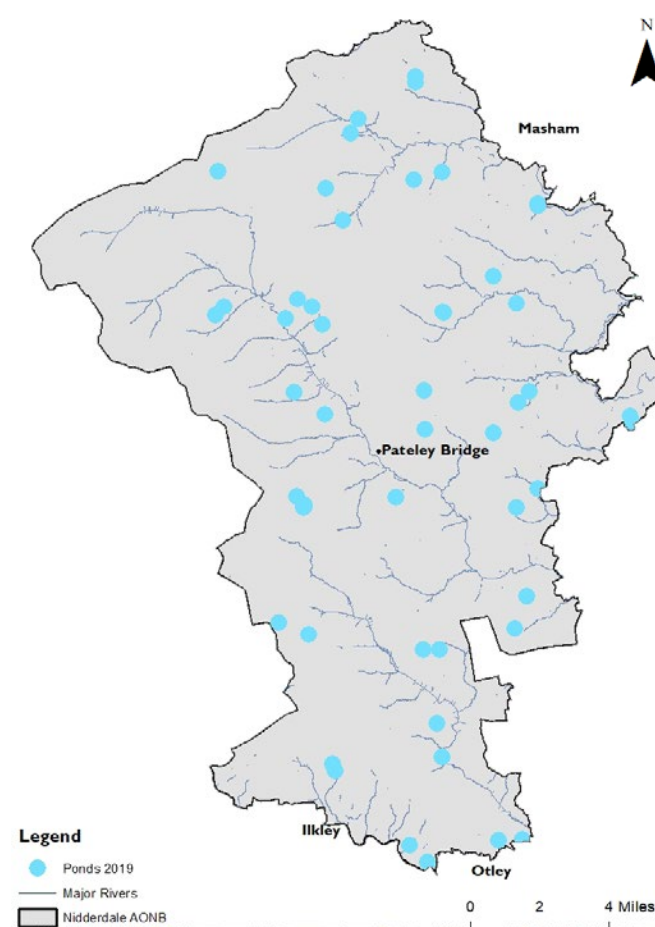


Fig. 89. Approximate locations of The Wild Watch eDNA surveys

Citizen Science

The aim of The Wild Watch was to enable people to conserve Nidderdale's natural heritage by helping them to acquire the natural history skills they need to collect data on threatened species of wildlife in Nidderdale.

The project used volunteers to help gather data on wildlife within Nidderdale AONB in a number of different ways. The citizen science approach to data

collection was taken as not only is it a cost effective way to gather data it is also an excellent tool for engagement, increasing local people's knowledge and awareness of wildlife in Nidderdale. An initial review of citizen science activities was carried out to inform planning of our activities, see *Annex 4* on page 152.

Volunteers were allocated a 1km survey route that they were required to walk a certain number of times during a survey season, noting down species on The Wild Watch target species list. Opportunities for error were minimised by running specific training for volunteers, linking volunteers with a professional ecologist for help and advice during surveys, and requiring volunteers to assign confidence to their species records. Professional ecologists were also used for surveys to increase the amount of data collected and also as a checking mechanism for survey routes.

Postcard campaigns were run asking members of the public to notify the AONB when they saw certain species. Quality of records was harder to ensure but this was accounted for during any data analysis. It was also found that for unusual records for example an unexpected species of owl, a photograph usually accompanied the record.

The Wild Watch data collection

The specific survey methods for each survey group were developed by reviewing existing survey guidelines and recommendations, and adapting these for the purpose of this project based on experience and ecological knowledge. Survey methods are appropriate to the species within each survey group but are generally based on collecting data along walked transects or at fixed points or plots.

The specific methodologies developed were:

- River Bank Survey Methodology
- Reptile Survey Methodology
- Pond Survey Methodology
- Invertebrate Survey Methodology
- Botany Survey Methodology
- Bird Survey Methodology
 - Non Waders
 - Waders in Upland Landscapes

For full details of these methodologies, see *Annex 5* on page 156.

The Wild Watch survey site selection

Data collection was underpinned by a systematic sampling design. This is a commonly used sampling strategy in ecology in which survey sites are evenly and regularly distributed across the area to be studied. This provides good coverage of the whole study area and makes the data more suitable for modelling.

A grid of 25km² squares was aligned with the Ordnance Survey grid. At the centre of each grid, a 1km² square was selected as the survey site. This results in 24 independent survey sites across Nidderdale AONB that are 5km apart (centre to centre). Each survey site was visited multiple times (depending on the species being surveyed) over the three years of the project to conduct surveys for each survey group. It was considered that this number of sites and surveys should provide sufficient data and a representative sample across the whole AONB.

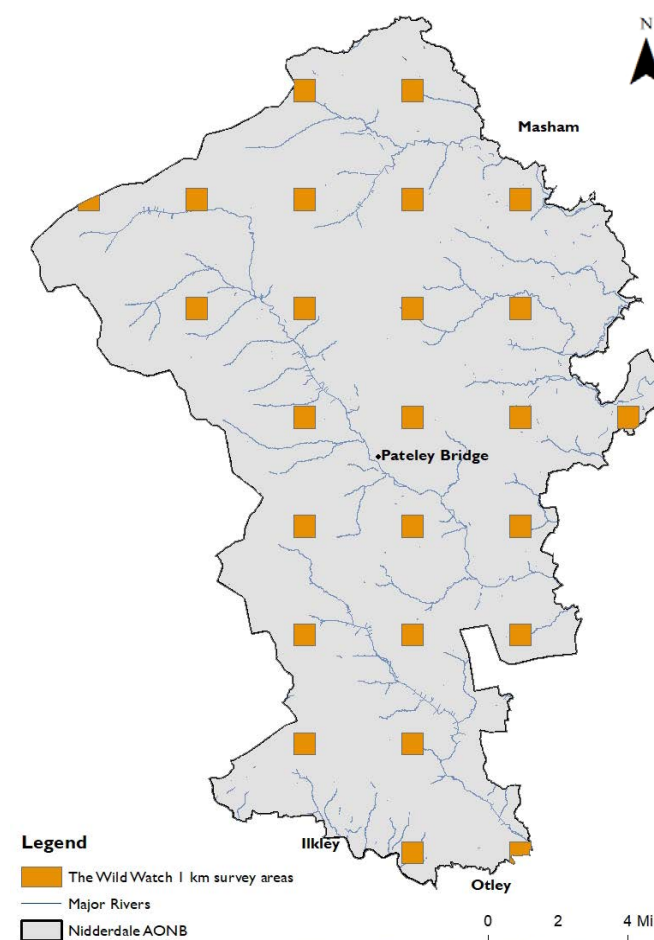


Fig. 90. Approximate location of the land survey transects

Within each survey square, individual surveys were carried out for each of the 13 survey groups that were subject to systematic survey. Specific methods and survey locations were appropriate to each survey group. Survey sites were repositioned in some cases, for example to avoid access problems, or if the original square did not contain appropriate habitat, or was outside of the range of the survey species. In these cases, the neighbouring square immediately to the north of the original square was checked for suitability, followed by the next neighbouring square to the north-east, moving clockwise around the original square until a suitable study site was located.

Case Study The Wild Watch methodology: pros and cons

Alice Crosby, The Wild Watch Project Officer

The Wild Watch was a ground-breaking project for Nidderdale AONB, which enabled people to play an active part in conserving Nidderdale's natural heritage by helping them gather natural history data that will be used to improve habitats for wildlife. The project combined the power of citizen science, a dynamic partnership approach and the latest research to gather natural heritage records, reconnect communities to their local natural heritage and pioneer a new way of delivering conservation action on a landscape scale.

A key part of the project was gathering data to be used for Habitat Suitability Modelling. These data needed to be gathered in a scientifically robust way. For this reason the project used a systematic sampling design. The aim was to survey as many sites as possible, ensuring a good geographical spread across the study area and a range of habitats. Whilst this was to ensure survey effort was even and check that species information was available for all habitats, in reality this often meant that no species were recorded along a survey route – sometimes making it difficult to maintain volunteer enthusiasm.

Survey approach

For the more mobile species such as birds and otters, the survey system has worked well. These species tend to be found over larger areas of habitat, can be seen from a distance, and are often easier to identify. As a result only a small proportion of transects recorded few or no species.

Some species, such as mountain bumblebee or the flowering plants, have specialist habitat requirements and the spread of the randomised survey transects meant that often the species were not recorded as the required habitat was not met along a survey route. It was difficult to keep volunteers motivated in this situation and identification skills improved less as species were not encountered at the same level.

In a citizen science project volunteer morale is really important. Volunteers have given over 4,500 hours of time to this project and it is absolutely clear that without this time the project would not have been so successful.

Volunteer training

Professional ecologists were used to run volunteer training courses on species identification and survey methodology. Each trainer was then on hand for the duration of the survey season, answering questions and queries that had arisen once the volunteer were out in

the field. Volunteers often took photos of anything they were unsure about and the trainer was able to offer advice remotely. For the adder and bird surveys this was extended, with the professional ecologist carrying out a proportion of survey transects too. This worked really well as the ecologist understood any difficulties with the survey routes and could provide tailored advice to volunteers.

Engagement

A central part of The Wild Watch was engaging people with the wildlife of Nidderdale AONB. The project offered a range of ways that people could get involved, aiming to offer something for all skill levels and levels of engagement. The Wild Watch ran events throughout the project, from training courses, to events in schools to evening interest talks. These were variable in success and some of the events required high levels of promotion which was resource intensive. Over the course of the project a total of 143 events were run with 6,427 people attending.

The postcard citizen science campaigns for owls and hedgehogs were extremely successful, with 100s of postcards being returned. There was even enough owl data to run Habitat Suitability Modelling (for full details see *Species section starting on page 105*).

Further data and monitoring

UK wildlife monitoring

There is a vast amount of data about the UK's biodiversity. Although some of this data is collected by professional scientists and conservationists a huge amount of the information comes from the recording and monitoring of wildlife carried out by volunteers. It has been estimated that 18,700 volunteers are involved in structured monitoring schemes that cover bats, birds, butterflies and plants; and that as many as 70,000 volunteers submit 'unstructured' records to national and local records centres. The financial value of volunteers' time contributions is immense, estimated at £20.5 million per annum for the structured monitoring schemes alone¹.

Monitoring is important as it builds our knowledge of the natural world and underpins our efforts to conserve it. Looking at trends can enable us to prioritise species for action and assess responses to conservation actions. The information collected through The Wild Watch and collated in this report will enable us to better understand Nidderdale AONB's nature and plan actions including development of a Nature Recovery Network Strategy, targeting of grant schemes, and responding to planning proposals. Our proposed key indicators for assessing changes against the baseline set out in this report are included in *Annex 7 on page 161*.

AONB survey legacy

To put in place a long term monitoring strategy for Nidderdale AONB would require a considerable amount of resource – to recruit, train and motivate volunteers, as well as preparing survey maps and processing the data. Any data gathered should be scientifically rigorous and fit for purpose. Without the continuation of The Wild Watch project staff it is not possible to do this effectively.

The Wild Watch has assessed this and come up with the following plans to capitalise on the volunteer survey skills developed during the project and the anticipated future resources within the AONB so we can carry on collecting additional data.

- **Adders** – Plans have been put in place to monitor adder populations across the AONB. (For details see *Methods and data sources section starting on page 129*.)
- **Botany** – The botany volunteers have now received considerable training and are becoming skilled botanists. A programme to regularly survey the AONB's Sites Importance for Nature Conservation (SINCs) will be implemented. Volunteers have been trained in this survey methodology already and will be able to use the skills gained throughout The Wild Watch. Volunteers will be able to assist with surveying potential SINC sites as well as re-surveying and re-assessing existing SINCs on a rolling basis.
- **River banks** – To maintain skills developed during the river banks surveys, volunteers will be given the opportunity to continue walking their 1km² river bank survey transect following the river bank survey methodology.

Volunteers will also be encouraged to join national monitoring schemes to help build up data for both these schemes and Nidderdale AONB – for example Bumblebee Conservation's BeeWalk scheme and British Trust for Ornithology national monitoring schemes.



References

Background to the Nidderdale AONB State of Nature report

1 Burns, F *et al* (2013) *State of Nature*. The State of Nature partnership. Available from https://www2.rspb.org.uk/Images/stateofnature_tcm9-345839.pdf

2 Hayhow, DB *et al* (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>

3 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

4 Hayhow, DB *et al* (2019) *State of Nature 2019*, as above

5 Hayhow, DB *et al* (2019) *State of Nature 2019*, as above

6 Hayhow, DB *et al* (2019) *State of Nature 2019*, as above

7 UK Biodiversity Indicators. Available from <https://jncc.gov.uk/our-work/uk-biodiversity-indicators>

8 Hayhow, DB *et al* (2019) *State of Nature 2019*, as above

9 Hayhow, DB *et al* (2019) *State of Nature 2019*, as above

10 Lawton, J,H *et al* (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra. Available from <https://webarchive.nationalarchives.gov.uk/20130402170324/http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

11 Defra (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*. Available from <https://www.gov.uk/government/publications/25-year-environment-plan>

12 Defra (2019) *Nature Recovery Network: Discussion Document*. Available from https://www.confor.org.uk/media/247417/nature-recovery-network_discussion-document_defra-group_april2019.pdf

13 Defra (2018) *Press Release Gove sets out proposals for greener developments*. Available from <https://www.gov.uk/government/news/gove-sets-out-proposals-for-greener-developments>

14 Defra (2019) *Blog Government to mandate 'biodiversity net gain'*. Available from <https://deframedia.blog.gov.uk/2019/03/13/government-to-mandate-biodiversity-net-gain/>

15 Defra (2019) *Policy Paper Environment Bill summer policy statement: July 2019*. Available from <https://www.gov.uk/government/publications/draft-environment-principles-and-governance-bill-2018/environment-bill-summer-policy-statement-july-2019>

16 UK Parliament (2019) *Agriculture Bill 2019-21*. Available from <https://services.parliament.uk/bills/2019-21/agriculture.html>

17 NAAONB (2019) *The Colchester Declaration 2019*. Available from https://landscapesforlife.org.uk/application/files/7815/6326/2583/The_Colchester_Declaration.pdf

18 Glover (2019) *Landscapes Review Final Report*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833726/landscapes-review-final-report.pdf

19 Natural England (2019) *Blog National Parks and AONBs can be the backbone of Nature's recovery*. Available from <https://naturalengland.blog.gov.uk/2019/09/24/national-parks-and-aonbs-can-be-the-backbone-of-natures-recovery/>

20 Nidderdale AONB (2019) *Nidderdale AONB Management Plan 2019-2024*. Available from <https://nidderdaleaonb.org.uk/about-us/management-plan-annual-review/>

21 Northern Upland Chain Local Nature Partnership – see <http://www.nuclnp.org.uk/>

22 Nidderdale AONB The Wild Watch project – see <https://nidderdaleaonb.org.uk/about-us/nidderdale-aonb-projects/the-wild-watch/>

Overview of Nidderdale Area of Outstanding Natural Beauty

1 Natural England (2018) *AONB boundary data*. Available from <https://naturalengland-defra.opendata.arcgis.com/search?q=aonb> – latest data is 2018

2 Census (2011) *Council boundary data*. Available from <https://census.ukdataservice.ac.uk/use-data/guides/boundary-data>; Natural England (2018) *AONB boundary data* (as above); and Nidderdale AONB (2019) *Upper Nidderdale Landscape partnership scheme (UNLPS) boundary*.

3 Natural England (2014) *National Character Area profiles*. Available from <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles>

4 Ordnance Survey *Terrain data*. Available under Public Sector Mapping Agreement, see <https://www.ordnancesurvey.co.uk/business-government/licensing-agreements/public-sector-support>

5 British Geological Society (BGS) (2007) *Superficial geology data*. Available from <https://www.bgs.ac.uk/data/home.html>

6 BGS (2007) *Bedrock geology data*. Available from <https://www.bgs.ac.uk/data/home.html>

Why is nature changing?

1 Hayhow, DB *et al* (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>

2 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

3 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

4 Natural England, 2019 *Environmental Stewardship Scheme Agreement and Countryside Stewardship Scheme Agreement data*. Available from <https://naturalengland-defra.opendata.arcgis.com/>

5 Natural England, 2019 *ESS and CSS Agreement data*, as above

6 Nidderdale AONB Annual Review 2016/2017. Available from https://nidderdaleaonb.org.uk/wp-content/uploads/2018/09/Nidd-AONB_Annual-Review-16_17-web.pdf

7 Nidderdale AONB Annual Review 2015/2016. Available from https://nidderdaleaonb.org.uk/wp-content/uploads/2018/09/Annual-Review-2015-16_web.pdf

8 Nidderdale AONB Annual Review 2014/2015. Available from https://nidderdaleaonb.org.uk/wp-content/uploads/2018/09/Annual-Review-2014-15_web.pdf

9 Nidderdale AONB Annual Review 2013/14. Available from https://nidderdaleaonb.org.uk/wp-content/uploads/2018/10/Annual-Review-2013-14_web.pdf

10 <http://www.nuclnp.org.uk/hnv-farming/>

11 Pearce-Higgins JW *et al* (2017) *A national-scale assessment of climate change impacts on species: assessing the balance of risks and opportunities for multiple taxa*. *Biological Conservation*, 213: 124-134. Available from <https://www.brc.ac.uk/sites/www.brc.ac.uk/files/biblio/Pearce-Higgins%20et%20al%202017%20-%20A%20national-scale%20assessment%20of%20climate%20change%20impacts%20on%20species%20-%20Assessing%20the%20balance%20of%20risks%20and%20opportunities%20for%20multiple%20taxa.pdf>

12 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

13 Natural England and RSPB, 2014. *Climate Change Adaptation Manual*. Available from <http://publications.naturalengland.org.uk/publication/5629923804839936> second edition due to be published shortly.

14 *A Natural Capital Investment Plan for peatland in the Northern Upland Chain*. Available from <http://www.nuclnp.org.uk/wp-content/uploads/2016/01/NUCLNP-Natural-Capital-Investment-Plan-for-Peatland.pdf>

15 Yorkshire Peat Partnership website - <https://www.ypppartnership.org.uk/resources>

16 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

17 Eloise Brown (2013) *Multiscale habitat suitability models for foraging bats*, University of Leeds

18 CIEEM, CIRIA & IEMA (2016) *Biodiversity Net Gain: Good practice principles for development*. Available from <https://cieem.net/i-am/current-projects/biodiversity-net-gain/>

19 Natural England (2019) *The Biodiversity Metric 2.0 auditing and accounting for biodiversity User Guide Beta Version*. Available from <http://publications.naturalengland.org.uk/publication/5850908674228224>

20 IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) (2019) *Global Assessment Report on Biodiversity and Ecosystem Services*. Available from <https://ipbes.net/global-assessment>

21 Williams, F *et al* (2016). *The economic costs of invasive non-native species on Great Britain*. CABI Proj No VM10066:1-99 in Hayhow, DB *et al* (2019) *State of Nature 2019*.

22 Yorkshire Dales Biosecurity and INNS Steering Group webpage at <http://www.nuclnp.org.uk/yorkshire-dales-biosecurity-and-inns-steering-group-2/>

23 Nidderdale AONB website at <https://nidderdaleaonb.org.uk/special-qualities/wildlife-and-habitats/biosecurity/>; GBNNNS (GB Non-Native Species Secretariat) 'Check Clean Dry' campaign at <http://www.nonnativespecies.org/checkcleandry/>; and Forestry Commission 'Keep it clean' campaign at <https://www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases>

Local action and people

1 Natural England (2019) *Monitor of Engagement with the Natural Environment – The national survey on people and the natural environment* *Headline report 2019*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828552/Monitor_Engagement_Natural_Environment_2018_2019_v2.pdf

2 RSPB (2013) *Connecting with nature: Finding out how connected to nature the UK's children are*. Sandy, UK. Available from http://www2.rspb.org.uk/Images/connecting-with-nature_tcm9-354603.pdf

3 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

4 iDentiPlant online course see <https://identiplant.co.uk/identwp19/>

5 Hayhow, DB *et al* (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

6 JNCC (2019) *UK Biodiversity Indicators 2019*. Available from <https://jncc.gov.uk/our-work/ukbi-e2-biodiversity-expenditure/>

7 The Greenhow Fund – see <https://nidderdaleaonb.org.uk/greenhow-enhancement-fund/> and <https://nidderdaleaonb.org.uk/wp-content/uploads/2019/11/The-Greenhow-Fund-Case-Studies-Oct-2019.pdf>

8 The Greenhow Fund, as above

Habitat coverage

1 *Natural England Priority Habitat data 2019*. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>

2 *Natural England Priority Habitat data 2019* as above

3 *Natural England Priority Habitat data 2019* as above

4 *SSSI condition definitions* - <https://designatedsites.naturalengland.org.uk/SSSIGlossary.aspx>

5 *Natural England Priority Habitat data 2019* as above

6 UK Habitat Classification approach available from <https://ecountability.co.uk/ukhabworkinggroup-ukhab/>

Designated sites

1 Natural England (2019) *Sites of Special Scientific Interest (England) data*. Available from <https://naturalengland-defra.opendata.arcgis.com/datasets/sites-of-special-scientific-interest-england> and NYCC, 2018

2 Defra (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf

3 UK Biodiversity Indicators. Available from <https://jncc.gov.uk/our-work/uk-biodiversity-indicators>

4 Natural England (2019) *Sites of Special Scientific Interest (England)* <https://naturalengland-defra.opendata.arcgis.com/datasets/sites-of-special-scientific-interest-england>. Accessed 19/02/2020

5 Natural England (2019) *Sites of Special Scientific Interest (England)*, as above

6 Natural England (2019) *Sites of Special Scientific Interest (England)*, as above

7 Natural England Annual Report and Accounts 1 April 2018 to 31 March 2019 available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/816611/natural-england-annual-report-accounts-2018-19.pdf

8 Natural England (2019) *Sites of Special Scientific Interest (England)*, as above

9 Natural England (2019) *Sites of Special Scientific Interest (England)*, as above

10 Natural England (2019) *Monitoring Environmental Outcomes in Protected Landscapes data*.

11 Natural England (2019) *Monitoring Environmental Outcomes in Protected Landscapes data*.

Moorland

1 Hayhow, DB *et al* (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>

2 Natural England (2019) *Priority Habitat Inventory data*. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>

3 Natural England (2019) *Priority Habitat Inventory data*, as above

4 Natural England (2019) *Priority Habitat Inventory data*, as above

5 Natural England (2019) *Monitoring Environmental Outcomes in Protected Landscapes data*.

6 Natural England (2019) *Open Access land data*, and NYCC (2019) *Public Rights of Way data*.

7 Natural England (2006) *Breeding bird data for SSSIs in Nidderdale*.

8 Wilson, M & Calladine, J (unpublished) *Identifying important areas for breeding Curlew in the Northern Upland Chain Local Partnership area: Towards targeting conservation management, guiding forest expansion and other land-use changes*. Report to the Yorkshire Dales National Park Authority, BTO.

9 Nidderdale AONB (2012) *Nidderdale AONB Wading Bird Survey data 2007-2012*.

10 Natural England (2006) *Breeding bird data for SSSIs in Nidderdale*.

11 Upper Nidderdale Landscape Partnership Scheme (2017) *Wader Survey data 2015-2017*

12 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*

13 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*

14 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*

15 YWT and UNLP (undated) *Watch where you tread – how you can help ground nesting birds in the Yorkshire Dales*. Available from http://uppernidderdale.org.uk/wp-content/uploads/2018/11/GroundNestingBirds_web.pdf and UNLP (2019) *A lasting legacy – celebrating the achievements of the UNLP*. Available from <http://uppernidderdale.org.uk/wp-content/uploads/2019/03/Legacy-leaflet-A5-version.pdf>

16 GWCT (Game & Wildlife Conservation Trust) website - <https://www.gwct.org.uk/game/research/species/black-grouse/increasing-black-grouse-range-by-translocation/>

17 Nidderdale AONB (September 2019) *Birds of Prey in Nidderdale AONB Evidence Report*. Available from <https://nidderdaleaonb.org.uk/wp-content/uploads/2019/09/BoP-in-NiddAONB-Evidence-Report-FINAL-Sept-2019.pdf>

18 Nidderdale AONB (September 2019) *Birds of Prey in Nidderdale AONB Evidence Report*, as above

19 Natural England (2019) *Record-breaking year for hen harrier breeding*. Press release available from <https://www.gov.uk/government/news/record-breaking-year-for-hen-harrier-breeding>

20 Operation owl website - <https://www.operationowl.com/>

21 Operation owl Raptor Persecution Priority Delivery Group webpage - <https://www.operationowl.com/rpdgg>

22 Moorland Access Advisory Group (undated) *Moorland Visitor's Code*. Available from <https://www.northpennines.org.uk/visit-explore/codes-of-conduct/moorland-visitors-code/>

Grassland and Farmland

1 Hayhow, DB *et al* (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>

2 UK Biodiversity Indicators 2019 www.jncc.gov.uk/ukbi

3 Hayhow, DB *et al* (2016) *State of Nature 2016*. The State of Nature partnership, as above

4 *Natural England Priority Habitat data 2019*. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>

5 <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1004196.pdf>

6 *Natural England Priority Habitat data 2019*, as above

7 *Natural England Priority Habitat data 2019*, as above

8 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*

9 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*

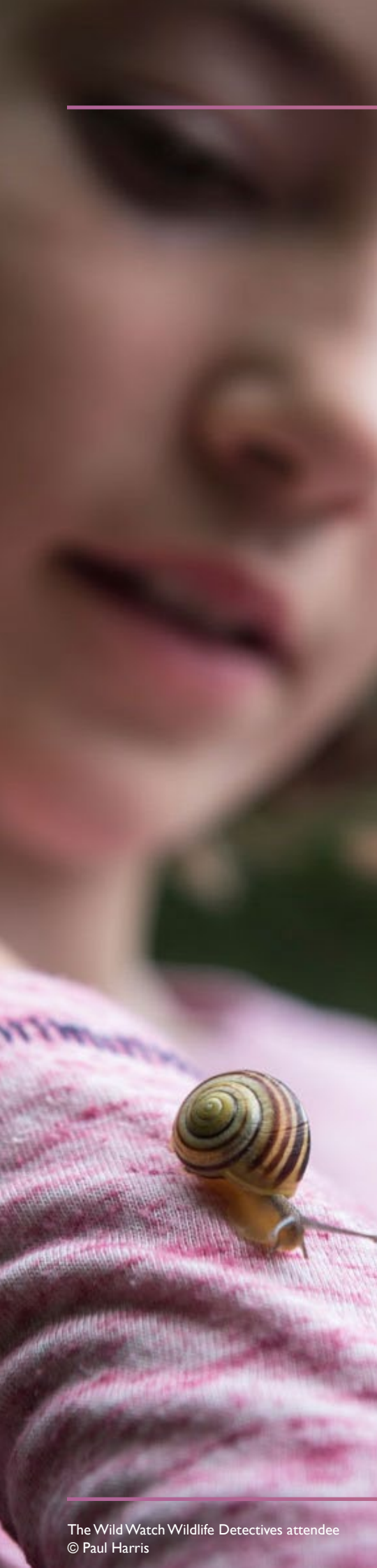
10 YWT and UNLP (undated) *Species-rich hay meadows*. Available from http://uppernidderdale.org.uk/wp-content/uploads/2018/11/Haymeadow_web.pdf and UNLP (2019) *A lasting legacy – celebrating the achievements of the UNLP*. Available from <http://uppernidderdale.org.uk/wp-content/uploads/2019/03/Legacy-leaflet-A5-version.pdf>

11 UNLP *Hay meadow and grassland conservation webpage* - <http://uppernidderdale.org.uk/wildlife-farming/hay-meadow-grassland-conservation/>

12 Nidderdale AONB *Hay meadow restoration webpage* - <https://nidderdaleaonb.org.uk/about-us/nidderdale-aonb-projects/wildlife-projects/hay-meadow-restoration/>

13 Nidderdale AONB *Roadside verges survey project webpage* - <https://nidderdaleaonb.org.uk/about-us/nidderdale-aonb-projects/wildlife-projects/roadside-verges-survey-project/>





- 14 Yorkshire Water (2018) *Beyond Nature Vision and Themes*.
- 15 Yorkshire Water (2019) *Beyond Nature Progress Report*, November 2019
- 16 Yorkshire Water (2016) Press Release - Local man given once in a lifetime opportunity to manage Nidderdale farm for the future. Available from <https://www.yorkshirewater.com/news-media/2016/humberstone-bank-farm-new-tenant/>
- 17 Yorkshire Water (2017) Press Release - Upper Nidderdale farm joins future of farming vision. Available from <https://www.yorkshirewater.com/news-media/2017/high-woodale-farm-nidderdale-beyond-nature-2017/> and Yorkshire Water (2018) Press Release - 10,000 trees planted at High Woodale Farm in upper Nidderdale to improve wildlife habitat. Available from <https://www.yorkshirewater.com/news-media/2018/ten-thousand-trees-high-woodale-beyond-nature-2018/>

Woodland and trees

- 1 Hayhow, DB et al (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>
- 2 National Forest Inventory Woodland GB 2018 data. Available from <https://data.gov.uk/dataset/f316113c-acdf-445b-8576-2bd87e81bf17/national-forest-inventory-woodland-gb-2018>
- 3 Defra (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*. Available from <https://www.gov.uk/government/publications/25-year-environment-plan>
- 4 <https://www.kirklees.gov.uk/beta/white-rose-forest/index.aspx>
- 5 <https://thenorthernforest.org.uk/>
- 6 NFI 2018 as above
- 7 Hayhow, DB et al (2016) *State of Nature 2016*, as above
- 8 UK Biodiversity Indicators 2019 www.jncc.gov.uk/ukbi
- 9 UK Biodiversity Indicators 2019 www.jncc.gov.uk/ukbi
- 10 Defra (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*, as above
- 11 Defra (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*, as above
- 12 NFI 2018 as above
- 13 Natural England Priority Habitat data 2019. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>
- 14 NFI 2018 as above
- 15 Natural England Priority Habitat data 2019, as above
- 16 Natural England Priority Habitat data 2019, as above
- 17 Natural England Priority Habitat data 2019, as above
- 18 Harrogate Borough Council, 2019
- 19 Environment Agency Working with Natural Processes (WWNP) Floodplain Woodland Potential Data, 2017. Available from <https://data.gov.uk/dataset/717bffc4-b165-4deb-b761-a12a7d58af58/wwnp-floodplain-woodland-potential>
- 20 Government guidance on tree diseases. Available from <https://www.gov.uk/government/collections/tree-pests-and-diseases>

- 21 Yorkshire Dales National Park Ash dieback webpage. Available from <https://www.yorkshiredales.org.uk/about/living-and-working/trees-and-woodlands/tree-health-and-diseases/chalara-ash-dieback-chalara-fraxinea/>
- 22 Yorkshire Dales National Park Ash dieback webpage as above
- 23 Forestry Commission (2007) *Ash dieback data*. Available from <https://www.forestryresearch.gov.uk/tools-and-resources/pest-and-disease-resources/ash-dieback-hymenoscyphus-fraxineus/>
- 24 CEH (UK Centre for Ecology & Hydrology) (2007) *Ash density data*. Available from <https://www.ceh.ac.uk/data>
- 25 Defra CSS Woodland bird assemblage priority areas – see <https://magic.defra.gov.uk/Help/cs-magic-interactive-map-guidance.pdf> and www.magic.defra.gov.uk
- 26 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*
- 27 Hackfall website at <http://www.hackfall.org.uk/>
- 28 Wordsworth, W. 1835. *A Guide through the District of the Lakes in the North of England*. Fifth edition. Kendal: Hudson and Nicholson. 1–2
- 29 Woodland Trust webpage on Hackfall at <https://www.woodlandtrust.org.uk/visiting-woods/woods/hackfall/>
- 30 Make It Wild website at <https://www.makeitwild.co.uk/>
- 31 Ancient Tree Forum website at <http://www.ancienttreeforum.co.uk/ancient-trees/what-are-ancient-veteran-trees/>
- 32 Government guidance supporting woodland creation. Available from <https://www.gov.uk/guidance/create-woodland-overview>

Water and wetlands

- 1 Hayhow, DB et al (2016) *State of Nature 2016*. The State of Nature partnership. Available from <https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/state-of-nature/state-of-nature-uk-report-2016.pdf>
- 2 European Commission (2019) *Introduction to the EU Water Framework Directive*. Available from https://ec.europa.eu/environment/water/water-framework/info/intro_en.htm
- 3 UK Biodiversity Indicators 2019. Indicator B7 – Surface water status. Available from <https://hub.jncc.gov.uk/assets/b6dbbc22-235a-4664-8192-3a178d32ffde>
- 4 Environment Agency (2018) *The state of the environment: water quality*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/709493/State_of_the_environment_water_quality_report.pdf
- 5 UK Biodiversity Indicators 2019. Available from www.jncc.gov.uk/ukbi
- 6 Hayhow, DB et al (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>
- 7 Environment Agency (2018) *Catchment Data Explorer: Humber River Basin District data*. Available from <https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/4>
- 8 Environment Agency (2018) *Catchment Data Explorer: Humber River Basin District data* as above
- 9 Natural England Priority Habitat data 2019. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>

- 10 Natural England (2017) *Monitoring Environmental Outcomes in Protected Landscapes data*. Natural England, 2017
- 11 Natural England Priority Habitat data 2019. Available from <https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-fbdfbfaeb159/national-habitat-networks-england>
- 12 Berthinussen, A, Bellamy, C & Altringham, J (2019) *Habitat Suitability Modelling Preliminary Report 2018-2019*
- 13 Berthinussen, A, Bellamy, C & Altringham, J (2019) as above
- 14 McGuire, C. and Whitfield, D. (2017) *National Water Vole Database and Mapping Project, PART 1: Project Report 2005-2015*. Hampshire and Isle of Wight Wildlife Trust. Curdridge
- 15 Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Dejean, T., Griffiths, R.A., Foster, J., Wilkinson, J.W., Arnell, A., Brotherton, P., Williams, P. & Dunn, F. (2015) Using eDNA to develop a national citizen science-based monitoring programme for the great crested newt (*Triturus cristatus*). *Biological Conservation*, **183**: 19–28
- 16 Dan McAndrew, Principal Ecologist, Harrogate Borough Council, Pers Comm.
- 17 *The Naturalist* 141 (2016), pages 61–64
- 18 Nidderdale AONB Annual Review 2014/15. Available from https://nidderdaleaonb.org.uk/wp-content/uploads/2018/09/Annual-Review-2014-15_web.pdf

Species

- 1 Brown E. 2013. *Multiscale habitat suitability models for bats in the Yorkshire Dales*. Are site-specific models more accurate than those transferred from other geographic regions? MSc. Thesis, University of Leeds.
- 2 Bellamy CC, Scott CD & Altringham JD. 2013. Multiscale, presence-only habitat suitability models: fine resolution models for seven species of bat. *Journal of Applied Ecology* 50, 892–901.
- 3 Glover AM & Altringham JD. 2008. Cave selection and use by swarming bat species. *Biological Conservation* 141, 1493–1504.
- 4 Browning E. 2013. *The use of disused mine shafts and caves by swarming bats in the Nidderdale AONB*. BSc Thesis. University of Leeds.
- 5 Gardner E, Julian A, Monk C and Baker J (2019). Make the Adder Count: population trends from a citizen science survey of UK adders. *Herpetological Journal* 29, 57–70.
- 6 Cooke, A.S. & Arnold, H.R. (1982). National changes in the status of the commoner British amphibians and reptiles before 1974. *British Journal of Herpetology* 6, 206–207.
- 7 Gardner E, Julian A, Monk C and Baker J (2019). Make the Adder Count: population trends from a citizen science survey of UK adders, as above
- 8 Berthinussen (2018) *Habitat Suitability Modelling Preliminary Report 2018–2019*.
- 9 Taylor, I. R. (1994) *Barn Owls. Predator-prey Relationships and Conservation*. Cambridge University Press, Cambridge, UK.
- 10 Bond G., Burnside N. G., Metcalfe D. J., Scott D. M. & Blamire J. (2005) the effects of land-use and landscape structure on barn owl (*Tyto alba*) breeding success in southern England, U.K. *Landscape Ecology*, **20**, 555–566.
- 11 Mikkola, H. (1983) *Owls of Europe*. T & A. D Poyser: Calton.
- 12 Rumbutis S., Vaitkuvienė D., Grašytė G., Dagys M., Dementavičius D. & Treinys R. (2017) Adaptive habitat preferences in the Tawny Owl *Strix aluco*. *Bird Study*, **64**, 421–430.

Natural capital, ecosystem services and economic benefits

- 1 HM Government (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
- 2 Holt, A. (2018) *A baseline ecosystem services assessment of the Sheffield Lakeland landscape*. Available from http://www.naturalcapitalsolutions.co.uk/wp-content/uploads/2018/05/Sheffield-Lakeland-Final_2_compressed.pdf
- 3 UK National Ecosystem Assessment <http://uknea.unep-wcmc.org/>; Common International Classification of Ecosystem Services <https://cices.eu/content/uploads/sites/8/2018/01/Guidance-V51-01012018.pdf>

- 4 Upper Nidderdale Landscape Partnership (2019) *A lasting legacy Celebrating the achievements of the Upper Nidderdale Landscape Partnership*. Available from <http://uppernidderdale.org.uk/wp-content/uploads/2019/03/Legacy-leaflet-A5-version.pdf>
- 5 Global Tourism Solutions (UK) Ltd (2018) *Steam Final Trend Report for 2018: Nidderdale AONB*.
- 6 York, North Yorkshire & East Riding Local Enterprise Partnership (undated) *Connecting Landscape and Economy in Yorkshire: The Case For Doing Business With Yorkshire's Landscapes*. Available from <https://www.businessinspiredgrowth.com/news/connecting-landscape-and-economy-in-yorkshire-the-case-for-doing-business-with-yorkshires-landscapes/>
- 7 The Guardian (2019) *Two-hour 'dose' of nature significantly boosts health – study*. Available from <https://www.theguardian.com/environment/2019/jun/13/two-hour-dose-nature-weekly-boosts-health-study-finds>
- 8 White, M.P et al (2019) *Spending at least 120 minutes a week in nature is associated with good health and wellbeing*. Scientific Reports volume 9, Article number: 7730 (2019). Available from <https://www.nature.com/articles/s41598-019-44097-3>
- 9 Defra (2019) *Natural England research on the natural environment*. Press Release available from <https://deframedia.blog.gov.uk/2019/09/04/natural-england-research-on-the-natural-environment/>
- 10 Natural England (2019) *Monitor of Engagement with the Natural Environment: Headline report and technical reports 2018 to 2019*. Available from <https://www.gov.uk/government/statistics/monitor-of-engagement-with-the-natural-environment-headline-report-and-technical-reports-2018-to-2019>
- 11 York, North Yorkshire & East Riding Local Enterprise Partnership (undated) *Invest in nature to grow our economy?* Available from <https://www.businessinspiredgrowth.com/news/invest-nature-grow-economy/>
- 12 AECOM and NEYEDC (2019) *Natural Capital Data Assessment for York, North Yorkshire, East Riding and Hull*

Methods and data sources

- 1 Bradter, U., Thom, T.J., Altringham, J.D., Kunin, W.E. and Benton, T.G. (2011) Prediction of National Vegetation Classification communities in the British uplands using environmental data at multiple spatial scales, aerial images and the classifier random forest. *Journal of Applied Ecology*, **48**(4), pp.1057–1065.

Further data and monitoring

- 1 Hayhow, DB et al (2019) *State of Nature 2019*. The State of Nature partnership. Available from <https://nbn.org.uk/stateofnature2019/reports/>

Glossary and acronyms

Habitat descriptions

There are several different classifications, sources and mapping methods for habitats, including Natural England’s Priority Habitat Inventory (PHI), the National Forest Inventory (NFI), the Ancient Woodland Inventory (AWI), National Vegetation Classification (NVC), Phase I and the new UK Habitat Classification approach (UKHab). This report principally uses the first three methods and the categories referred to in this report are defined below. Habitats classified through PHI are noted by *, those classified through NFI by +, and those through AWI●. More detailed descriptions of the PHI habitats are available from: data.jncc.gov.uk/data/2728792c-c8c6-4b8c-9ccd-a908cb0f1432/UKBAP-PriorityHabitatDescriptions-Rev-2011.pdf, NFI definitions from forestresearch.gov.uk/documents/2773/NFI-Description-of-attributes.pdf and AWI definitions from publications.naturalengland.org.uk/file/6219402453712896.

For a list of the key NVC habitats found in Nidderdale AONB, see Annex 6 on page 160.

Moorland

Blanket bog*	A broad habitat definition that covers wetlands that support peat-forming vegetation and which receive mineral nutrients principally from rainfall rather than ground water. Peat depth is very variable, with an average of 0.5–3m being fairly typical.
Upland flushes, fens and swamps*	Peat or mineral-based terrestrial wetlands in upland areas, which receive water and nutrients from surface and/or groundwater sources as well as rainfall and remains waterlogged year-round. This habitat is restricted to upland areas and is typically dominated by sedges and <i>Sphagnum</i> species.
Lowland heathland*	A broadly open landscape on impoverished, acidic mineral and shallow peat soil (<0.5m deep), which is characterised by the presence of plants such as heathers and dwarf gorses. It is dependent on management (grazing, cutting and burning) to prevent invasion by trees and conversion to woodland. It is generally found below 300m.
Upland heathland*	As above, but in upland areas (typically above 300m). It is characterised by the presence of dwarf shrubs at a cover of at least 25%.

Grassland and farmland

Calaminarian grassland*	A range of semi-natural and anthropogenic sparsely vegetated habitats on substrates characterised by high levels of heavy metals such as lead, chromium and copper, or other unusual minerals. These are associated with outcrops of serpentine and river gravels rich in heavy metals, as well as with artificial mine workings and spoil heaps. Succession is slowed or arrested by the toxicity of the substrate.
Lowland calcareous grassland*	Grasslands characterised by lime-loving plants and found mainly on shallow, calcareous soils overlying limestone. These grasslands are naturally largely found on escarpments or dry valley slopes below 300m.
Upland calcareous grassland*	As above but found over 300m.
Lowland dry acid grassland*	Nutrient-poor, free-draining soils often overlying gravel. Large areas occur in upland fringes and also form well-drained parched habitats in dryer lowland areas. It is normally managed as pasture.
Lowland meadows*	Lowland neutral meadows and pastures consisting of a rich mixture of native grasses and broad-leaved herbs, often on shallow slopes or level ground with deep neutral soils. They are mostly managed by hay cropping, followed by grazing, or may be managed as permanent pasture.
Purple moor grass and rush pasture*	Marshy grasslands dominated by purple moor-grass and/or rushes. They are traditionally used as rough grazing for cattle or ponies and occasionally for hay.
Upland hay meadow*	Upland meadows with dense growth of grasses and herbs up to 0.6–0.88m high. No single grass species is consistently dominant and the most striking feature is the variety and abundance of herbs. They are mostly managed by hay cropping, followed by grazing.
Improved grassland	Improved grasslands consist of areas with vegetation dominated by fast growing grasses and managed as pasture for agricultural purposes excluding amenity grassland managed with the purpose of recreation and amenity purposes.
Arable	Land modified and used for annual and perennial crops and horticulture, often defined by regular ploughing.
Improved grassland	Grasslands managed as pastures for agriculture including short-term grasslands and pastures that are made up of high productivity grasses often used for silage or to support livestock.

Woodland

Deciduous woodland*	This habitat type covers most semi-natural woodlands across the UK. Many are ancient woodlands
Traditional orchards*	Characterised by the presence of trees from the Rosaceae family which includes fruit trees. The habitat is usually composed of managed grassland with a dense arrangement of managed trees.
Broadleaved+	Natural and semi-natural broadleaved plantations more than 80% cover of broadleaved species.
Conifer+	Plantations with more than 80% cover of coniferous species.
Coppice+	Areas with very even, smooth appearance on aerial photographs. Recently cut areas may have a very clear floor with little felling debris.
Felled+	Areas of woodland where the trees have been harvested or felled.
Ground prepared for new planting+	Area recently converted from some other land use to woodland. Will show plough furrows or mounding but new planting (if present) cannot yet be discerned.
Mixed – mainly broadleaved+	The proportion of broadleaves will be >50% and <80% of the area.
Mixed – mainly conifer+	The proportion of conifer will be >50% and <80% of the area.
Shrub+	Shrub lands are characterised by rough ground growth with at least 20% cover of small, immature trees that cannot yet be distinguished as conifer or broadleaved species.
Young trees+	Areas with visible plantation where there is no clear difference between conifer and broadleaved species because of their immaturity.
Ancient woodland ●	Woodland that has existed continuously since 1600 or before in England. They support complex communities of trees, plants, fungi, microorganisms and insects. Includes both ASNW and PAWS.
Ancient semi-natural woodland (ASNW) ●	Woodlands where stands are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. Stands may have been managed by coppicing or pollarding in the past, or the tree and shrub layer may have grown up by natural progression.
Plantations on ancient woodland sites (PAWS) ●	Areas of ancient woodland where former native tree cover has been felled and replaced by planted trees, predominately species not native to the site. Sites often retain some ancient woodland features such as soils, ground flora, fungi and woodland archaeology and can respond well to restoration management.
Hedgerow	Any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide.

Water and wetlands

Coastal and floodplain grazing marsh*	Pasture or grazed/cut meadows which are periodically flooded or have high water levels sustained by ponds or ditches.
Lowland fens*	Peatlands which receive water and nutrients from the soil, rock and ground water as well as from rainfall. This habitat can support a high level of biodiversity including numerous higher plants and insects. It is an important habitat for aquatic beetles.
Standing water	Comprising all areas of natural and artificial standing water including reservoirs, lakes, ponds and canals.
Running water	All running freshwater features and systems, mostly rivers, brooks and streams.



Glossary

Abundance (of species and/or habitats)	A measurement of the number of individuals of a species or the amount of habitat found.
Richness (of species)	A measure of the number of individual species represented in the habitat (in contrast to abundance).
Occurrence (of species and/or habitats)	The presence, or absence, of a species or habitat within a site or location.
Distribution (of species and/or habitats)	The geographical spread of a species or habitat.
Agricultural runoff	Water running off agricultural land into bodies of water, containing chemicals which affect its balance and health, e.g. excess nitrogen from fertiliser or fungicides, and herbicides and pesticides from crop treatment.
Ancient trees	Very old trees that provide a range of unique services and features within a wider habitat.
Biodiversity	The total variety of life, including all genus, species and habitats.
Biodiversity Indicator	Assessments of biodiversity that are used to summarise and communicate broad trends.
Citizen science	Scientific data collection carried out by the general public either to simple instructions or under the guidance of a trained professional.
Ecosystem Services	The benefits provided by ecosystems that contribute to making human life both possible and worth living.
European Protected Species	Animals and plants that are listed in Annex IV of the European Habitats Directive and are covered under regulation (section) 41 of The Conservation of Habitats and Species Regulations (2010), offering species protection from deliberate harm.
Favourable Condition	The designated feature(s) within a unit are being adequately conserved and the results from monitoring demonstrate that the feature(s) in the unit are meeting all the mandatory site specific monitoring targets set out in the Favourable Condition Table (FCT). The FCT sets the minimum standard for favourable condition for the designated features and there may be scope for the further (voluntary) enhancement of the features/unit. A unit can only be considered favourable when all the component designated features are favourable.
Flash	A shallow body of still freshwater, sometimes only present in wet weather.

Invasive Non-Native Species (INNS)	A plant, fungus, or animal species that was introduced to a specific location and that has a tendency to spread to a degree believed to cause damage to the environment usually by outcompeting native species.
Lowland	Land at the level of the alluvial plain and terraces. Sometimes considered to be land below 200m above sea level.
National Protected Species	A species that is protected within the UK under the Wildlife & Countryside Act (1981). This also contains all European Protected species.
Natural capital	The sum of our ecosystems, species, freshwater, land, soils, minerals, our air and seas. These are all elements of nature that directly or indirectly bring value to people and the country at large.
Priority habitat	Habitats of conservation concern as outlined by Natural England in the Priority Habitat Inventory (PHI).
Protected (species or habitat)	Many individual species and habitats receive statutory protection under a range of legislative provisions. The protection afforded is different depending on the legislation but can for example range from a duty to further the conservation of the living organisms and types of habitat to preventing intentional injury, removal or death of certain species or damage to habitats. National Protected Species are protected within the UK under the Wildlife & Countryside Act (1981). These include Section 41: Species of Principal Importance and (NERC Act Section 41) Habitat of Principal Importance in England.
Red list species	Threatened species, defined by The International Union for Conservation of Nature (IUCN) that fit precise criteria relating to their risk of extinction.
SSSI Condition	The condition of the SSSI land in England is assessed by Natural England, using categories across England, Scotland, Wales, and Northern Ireland through the Joint Nature Conservation Committee. There are six reportable condition categories: favourable; unfavourable recovering; unfavourable no change; unfavourable declining; part destroyed and destroyed.
SSSI Unit	SSSI units are divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment. The size of units varies greatly depending on the types of management and the conservation interest. There are around 22,000 SSSI units.

Acronyms

SSSI Unit Condition	The area of each SSSI unit in hectares calculated from digitised unit boundaries.
Species and Habitats of Principal Importance (NERC Act Section 41)	Species and habitats that are conservation priorities and require conservation action, usually through the production of a Biodiversity Action Plan.
Unfavourable Recovering Condition	Often known simply as 'recovering'. Units/features are not yet fully conserved but all the necessary management mechanisms are in place. At least one of the designated feature(s) mandatory attributes are not meeting their targets (as set out in the site specific FCT). Provided that the recovery work is sustained, the unit/feature will reach favourable condition in time.
Unfavourable No Change Condition	The unit/feature is not being conserved and will not reach favourable condition unless there are changes to the site management or external pressures and this is reflected in the results of monitoring over time, with at least one of the mandatory attributes not meeting its target (as set out in the site specific FCT) with the results not moving towards the desired state. The longer the SSSI unit remains in this poor condition, the more difficult it will be, in general, to achieve recovery. At least one of the designated feature(s) mandatory attributes and targets (as set out in the site specific FCT) are not being met.
UK Biodiversity Indicators	The suite of indicators adopted by the UK Government to monitor progress towards meeting biodiversity goals: jncc.gov.uk/our-work/uk-biodiversity-indicators-2019
Upland	Land above the level of the alluvial plain.
Veteran tree	A tree usually in its second or mature stage of its life that often provides micro-habitats to nesting species.

AES	Agri-Environment Scheme
ASNW	Ancient Semi-Natural Woodland
BSBI	Botanical Society of Britain and Ireland
CABI	Centre for Agriculture and Bioscience International
CROW Act	Countryside and Rights of Way Act 2000
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
ESS	Environmental Stewardship Scheme
INNS	Invasive Non-Native Species
NERC Act	Natural Environment and Rural Communities Act 2006
NEYEDC	North & East Yorkshire Ecological Data Centre
NGO	Non-Governmental Organisation
PAWS	Plantations on Ancient Woodland Sites
PHI	Priority Habitat Inventory
SAC	Special Area of Conservation
SINC	Site of Interest for Nature Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UNLP	Upper Nidderdale Landscape Partnership



Acknowledgements

The production of the Nidderdale AONB State of Nature 2020 Report was linked to The Wild Watch project. This ground-breaking, three year wildlife survey project was generously funded by the National Lottery Heritage Fund and supported by the Friends of Nidderdale AONB, Geenhow Fund, Kew Gardens (Grow Wild), Meopta, Prince of Wales Trust, Sir George Martin Trust, Wharfedale Naturalists.

We are extremely grateful for the support and help of the National Lottery Heritage Fund and the many individuals and organisations who have submitted data and case studies. We are especially grateful to The Wild Watch Steering Group for providing guidance.

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Harrogate District Naturalists
Wharfedale Naturalists
Nidderdale Birders
The gamekeepers who worked with us
The c.350 landowners that let us on their land to carry out surveys.
The photographers whose images have helped bring this report to life.

The Wild Watch volunteers

The 112 wonderful volunteers who gave their time to do surveys, talks and other activities to support the project.

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Citation

Nidderdale AONB (2020) Nidderdale AONB State of Nature 2020. Nidderdale AONB, Pateley Bridge.

Summary version of this report is available from nidderdaleaonb.org.uk/stateofnature



Annex I

The Wild Watch survey species list

River transects	
Aquatic mammals	Skylark (<i>Alauda arvensis</i>)
Water vole (<i>Arvicola amphibious</i>)	Song thrush (<i>Turdus philomelos</i>)
Otter (<i>Lutra lutra</i>)	Linnet (<i>Carduelis cannabina</i>)
River birds	Lesser redpoll (<i>Carduelis cabaret</i>)
Kingfisher (<i>Alcedo atthis</i>)	Wading birds (breeding) – upland farmland and moorland transects
Dipper (<i>Cinclus cinclus</i>)	Lapwing (<i>Vanellus vanellus</i>)
Grey wagtail (<i>Motacilla cinerea</i>)	Curlew (<i>Numenius arquata</i>)
Invasive plants	Snipe (<i>Gallinago gallinago</i>)
Himalayan balsam (<i>Impatiens glandulifera</i>)	Redshank (<i>Tringa totanus</i>)
Japanese knotweed (<i>Fallopia japonica</i>)	Golden plover (<i>Pluvialis apricaria</i>)
Giant hogweed (<i>Herculeum mantagazzianum</i>)	Dunlin (<i>Calidris alpina</i>)
Dragonfly	Woodland birds – woodland transects
Golden-ringed dragonfly (<i>Cordulegaster boltonii</i>)	Tree pipit (<i>Anthus trivialis</i>)
Azure damselfly (<i>Coenagrion puella</i>)	Wood warbler (<i>Phylloscopus sibilatrix</i>)
Black darter (<i>Sympetrum danae</i>)	Spotted flycatcher (<i>Muscicapa striata</i>)
	Pied flycatcher (<i>Ficedula hypoleuca</i>)
	Lesser spotted woodpecker (<i>Dendrocopos minor</i>)
Reptiles – basking/refugia surveys	Nocturnal moth trapping
Adder (<i>Vipera berus</i>)	Pale eggar (<i>Trichiura crataegi</i>)
Grass snake (<i>Natrix natrix</i>)	Square spotted clay (<i>Xestia stigmatica</i>)
Slow worm (<i>Anguis fragilis</i>)	V-moth (<i>Macaria wauaria</i>)
Common lizard (<i>Lacerta zootoca vivipara</i>)	Ghost (<i>Hepialus humuli</i>)
	Grey mountain carpet (<i>Entephria caesiata</i>)
Bird transects	
Farmland birds – farmland transects	
Cuckoo (<i>Cuculus canorus</i>)	

Invertebrate transects	Flowering Plant surveys
Bumblebee	Crosswort (<i>Cruciata laevipes</i>)
Garden bumblebee (<i>Bombus hortorum</i>)	Common spotted orchid (<i>Dactylorhiza fuchsia</i>)
Mountain bumblebee (<i>Bombus monticola</i>)	Common sundew (<i>Drosera rotundifolia</i>)
Butterflies and day-flying moths	Crowberry (<i>Empetrum nigrum</i>)
Wall (<i>Lasiommata megera</i>)	Cross-leaved heath (<i>Erica tetralix</i>)
Green hairstreak (<i>Callophrys rubi</i>)	Hare's-tail cottongrass (<i>Eriophorum vaginatum</i>)
Small heath (<i>Coenonympha pamphilus</i>)	Ragged robin (<i>Lychnis flos-cuculi</i>)
Emperor moth (<i>Saturnia pavonia</i>)	Bogbean (<i>Menyanthes trifoliata</i>)
Speckled yellow (<i>Pseudopanthera macularia</i>)	Spring sandwort (<i>Minuartia verna</i>)
Clouded buff (<i>Diacrisia sannio</i>)	Bog asphodel (<i>Narthecium ossifragum</i>)
Mother shipton (<i>Euclidia mi</i>)	Mouse ear hawkweed (<i>Pilosella officinarum</i>)
Beetles	Marsh cinquefoil (<i>Potentilla palustris</i>)
Green tiger beetle (<i>Cicindela campestris</i>)	Cloudberry (<i>Rubus chamaemorus</i>)
Carabus nitens	Meadow saxifrage (<i>Saxifraga granulata</i>)
Nocturnal birds – anecdotal sightings	Betony (<i>Stachys officinalis</i>)
Barn owl (<i>Tyto alba</i>)	Devil's bit scabious (<i>Succisa pratensis</i>)
Little owl (<i>Athene noctua</i>)	Wild thyme (<i>Thymus polytrichus/pulegioides</i>)
Long-eared owl (<i>Asio otus</i>)	Cranberry (<i>Vaccinium oxycoccos</i>)
Tawny owl (<i>Strix aluco</i>)	Mountain pansy (<i>Viola lutea</i>)
Short-eared owl (<i>Asio flammeus</i>)	Pale forget-me-not (<i>Myosotis stolonifera</i>)
	Bog rosemary (<i>Andromeda polifolia</i>)

Pond surveys
Amphibians
Great crested newt (<i>Triturus cristatus</i>)
Common toad (<i>Bufo Bufo</i>)
Invasive plant species
Australian swamp stonecrop (<i>Crassula helmsii</i>)

Annex 2

Full list of species considered for The Wild Watch Survey

The full list of 132 species considered for inclusion in the project with a brief rationale for inclusion/rejection (green shading = species selected for the project (n = 50), light grey shading = less suitable species (n = 64), dark grey shading = unsuitable species (n = 18)). The conservation status for birds has been highlighted as red, amber or green according to the Birds of Conservation Concern 4 list (Eaton *et al.* 2015).

Common name	Latin name	Taxon group	Survey group	Conservation status	Reason to reject / include
Water vole	<i>Arvicola amphibius</i>	Mammals	Aquatic mammals	UK BAP; S41	Survey water vole and otter together - transects along riverbanks. Good citizen science and HSM candidate
Otter	<i>Lutra Lutra</i>	Mammals	Aquatic mammals	UK BAP; S41	Survey water vole and otter together - transects along riverbanks. Good citizen science and HSM candidate
Hedgehog	<i>Erinaceus europaeus</i>	Mammals	Hedgehog	UK BAP; S41	Higher equipment costs involved (footprint tunnels) and would require separate survey
Harvest mouse	<i>Micromys minutus</i>	Mammals	Harvest mouse	UK BAP; S41	Would require separate survey, unsuitable for grouping
Red squirrel	<i>Sciurus vulgaris</i>	Mammals	Red squirrel	UK BAP; S41	Too rare for structured survey and unlikely to occur throughout much of NAO NB
Cuckoo	<i>Cuculus canorus</i>	Birds	Farmland birds	UK BAP; S41	Easy to ID for average birders
Skylark	<i>Alauda arvensis</i>	Birds	Farmland birds	UK BAP; S41	Easy to ID for average birders
Song thrush	<i>Turdus philomelos</i>	Birds	Farmland birds	UK BAP; S41	Easy to ID for average birders
Linnet	<i>Carduelis cannabina</i>	Birds	Farmland birds	UK BAP; S41	Easy to ID for average birders
Lesser redpoll	<i>Carduelis cabaret</i>	Birds	Farmland birds	UK BAP; NCA CSS Priority; S41	Easy to ID for average birders
Turtle dove	<i>Streptopelia turtur</i>	Birds	Farmland birds	UK BAP; S41	Easy to ID for average birders
Starling	<i>Sturnus vulgaris</i>	Birds	Farmland birds	UK BAP; S41	Generalist species found in a broad range of habitats
Grey partridge	<i>Perdix perdix</i>	Birds	Farmland birds	UK BAP; S41	Lots of existing documentation / management advice. Already targeted for conservation
Yellowhammer	<i>Emberiza citrinella</i>	Birds	Farmland birds	UK BAP; S41	Lowland species - limited range in NAO NB
House sparrow	<i>Passer domesticus</i>	Birds	Farmland birds	UK BAP; S41	Could be confused with the tree sparrow
Tree sparrow	<i>Passer montanus</i>	Birds	Farmland birds	UK BAP; S41	Difficult to ID - looks like the house sparrow, would require separate expert survey
Bullfinch	<i>Pyrrhula pyrrhula</i>	Birds	Farmland birds	UK BAP; S41	Lower conservation priority than other species within group (amber status)
Swift	<i>Apus apus</i>	Birds	Farmland birds		Lower conservation priority than other species within group (amber status)
Barn swallow	<i>Hirundo rustica</i>	Birds	Farmland birds		Lower conservation priority than other species within group (green status)
Siskin	<i>Carduelis spinus</i>	Birds	Farmland birds		Not a conservation priority relative to other species in this group (green status)
Twite	<i>Carduelis flavirostris</i>	Birds	Farmland birds	UK BAP; NCA CSS Priority; S41	Very few records, likely to be rare and extinct as breeder in NAO NB
Yellow wagtail	<i>Motacilla flava</i>	Birds	Farmland birds	UK BAP; S41	Rare / extinct as breeder in NAO NB. Very difficult for beginners
Corn bunting	<i>Emberiza calandra</i>	Birds	Farmland birds	UK BAP; NCA CSS Priority; S41	Not found / very rare in NAO NB
Corncrake	<i>Crex crex</i>	Birds	Farmland birds	UK BAP; S41	Not found in NAO NB
Barn owl	<i>Tyto alba</i>	Birds	Nocturnal birds		Iconic species, only recently moved from amber list (2015), low survey effort – public to report sightings
Short-eared owl	<i>Asio flammeus</i>	Birds	Nocturnal birds		Important habitats in NAO NB (upland, moorland and heathland) – public to report sightings
Nightjar	<i>Caprimulgus europaeus</i>	Birds	Nocturnal birds	UK BAP; S41	Requires specialist survey to record calls, rare in NAO NB
Kingfisher	<i>Alcedo atthis</i>	Birds	River birds		Easy to ID, survey with other river birds along river walks
Dipper	<i>Cinclus cinclus</i>	Birds	River birds		Easy to ID, survey with other river birds along river walks
Sand martin	<i>Riparia riparia</i>	Birds	River birds		Lower conservation priority than other species within group (green status)
Hen harrier	<i>Circus cyaneus</i>	Birds	Upland birds	S41	Rare, experience needed
Merlin	<i>Falco columbarius</i>	Birds	Upland birds		Rare, experience needed
Ring ouzel	<i>Turdus torquatus</i>	Birds	Upland birds	UK BAP; S41	Rare, experience needed
Black grouse	<i>Lyrurus tetrix</i>	Birds	Upland birds	UK BAP; NCA CSS; S41	Reintroductions / rare - already a focus of other conservation projects
Lapwing	<i>Vanellus vanellus</i>	Birds	Wading birds	UK BAP; NCA CSS; S41	Easy to ID, distinctive well-known species, high conservation status
Curlew	<i>Numenius arquata</i>	Birds	Wading birds	UK BAP; NCA CSS; S41	Distinctive, well-known species, high conservation status
Snipe	<i>Gallinago gallinago</i>	Birds	Wading birds	NCA CSS	Easy to ID, survey with other wading birds
Redshank	<i>Tringa tatanus</i>	Birds	Wading birds	NCA CSS	Easy to ID, survey with other wading birds
Golden plover	<i>Pluvialis apricaria</i>	Birds	Wading birds		Easy to ID, survey with other wading birds
Dunlin	<i>Calidris alpina</i>	Birds	Wading birds		Nest in uplands alongside golden plover, therefore can be surveyed together
Tree pipit	<i>Anthus trivialis</i>	Birds	Woodland birds	UK BAP; NCA CSS; S41	Rare but very specialist species. For experienced birders
Wood warbler	<i>Phylloscopus sibilatrix</i>	Birds	Woodland birds	UK BAP; NCA CSS; S41	Rare but very specialist species
Spotted flycatcher	<i>Muscicapa striata</i>	Birds	Woodland birds	UK BAP; NCA CSS; S41	Experienced birders
Pied flycatcher	<i>Ficedula hypoleuca</i>	Birds	Woodland birds	NCA CSS	Experienced birders
Lesser spotted woodpecker	<i>Dendrocopos minor</i>	Birds	Woodland birds	UK BAP; S41	Experienced birders (difficult to spot)
Hawfinch	<i>Coccothraustes coccothraustes</i>	Birds	Woodland birds	UK BAP; S41	Elusive species - difficult to survey
Redstart	<i>Phoenicurus phoenicurus</i>	Birds	Woodland birds		Lower conservation priority than other species within group (amber status)
Marsh tit	<i>Poecile palustris</i>	Birds	Woodland birds	UK BAP; NCA CS; S41	ID too difficult even for experts
Willow tit	<i>Poecile montanus</i>	Birds	Woodland birds	UK BAP; NCA CS; S41	Unlikely to occur, and ID too difficult as above
Adder	<i>Vipera berus</i>	Reptiles	Reptiles	UK BAP; S41	Survey alongside other reptiles - visual and refugia searches in spring, good candidate for citizen science
Grass snake	<i>Natrix natrix</i>	Reptiles	Reptiles	UK BAP; S41	Survey alongside other reptiles - visual and refugia searches in spring, good candidate for citizen science
Slow worm	<i>Anguis fragilis</i>	Reptiles	Reptiles	UK BAP; S41	Survey alongside other reptiles - refugia searches, good candidate for citizen science
Common lizard	<i>Lacerta Zootoca vivipara</i>	Reptiles	Reptiles	UK BAP; S41	Survey alongside other reptiles - visual and refugia searches in spring, good candidate for citizen science



Common name	Latin name	Taxon group	Survey group	Conservation status	Reason to reject / include
Great crested newt	<i>Triturus cristatus</i>	Amphibians	Amphibians	UK BAP; S41	Good citizen science candidate, easy to ID or use eDNA analysis
Common toad	<i>Bufo Bufo</i>	Amphibians	Amphibians	UK BAP; S41;	Good citizen science candidate, easy to ID
Common frog	<i>Rana temporaria</i>	Amphibians	Amphibians		Not a conservation priority
River lamprey	<i>Lampetra fluviatilis</i>	Fish	Freshwater animals	UK BAP; S41	Would require expensive specialist survey – costs would be prohibitive
Atlantic salmon	<i>Salmo salar</i>	Fish	Freshwater animals	UK BAP; S41	Would require expensive specialist survey – costs would be prohibitive
European eel	<i>Anguilla anguilla</i>	Fish	Freshwater animals	UK BAP; S41	Would require expensive specialist survey – costs would be prohibitive
Brook lamprey	<i>Lampetra planeri</i>	Fish	Freshwater animals		Would require expensive specialist survey – costs would be prohibitive
Brown/sea trout	<i>Salmo trutta</i>	Fish	Freshwater animals	UK BAP; S41	Not a local priority species
Bullhead	<i>Cottus gobio</i>	Fish	Freshwater animals		Would require expensive specialist survey – costs would be prohibitive
Ruffe	<i>Gymnocephalus cernuus</i>	Fish	Freshwater animals		Would require expensive specialist survey – costs would be prohibitive
White-clawed crayfish	<i>Austropotamobius pallipes</i>	Aquatic invertebrates	Freshwater animals	UK BAP; S41	Would require expensive specialist survey – costs would be prohibitive
Pond mud snail	<i>Omphiscola globra</i>	Aquatic invertebrates	Freshwater animals	UK BAP; S41	Rare, very small and difficult to ID
Cylindrical whorl snail	<i>Truncatellina cylindrica</i>	Aquatic invertebrates	Freshwater animals	UK BAP; S41	Rare, very small and difficult to ID
Garden bumblebee	<i>Bombus hortorum</i>	Insects	Bumblebee	Common	Easy to spot and ID, good candidate for citizen science, common but useful bioindicator species
Golden-ringed dragonfly	<i>Cordulegaster boltonii</i>	Insects	Dragonfly	Locally scarce	Easy to spot and ID, good candidate for citizen science, locally scarce, should be suitable habitat in NAO NB (upland streams)
Wall	<i>Lasiommata megera</i>	Insects	Butterflies	UK BAP; S41; Butterfly Conservation: High	Declining, identification possible with some instruction
Green hairstreak	<i>Callophrys rubi</i>	Insects	Butterflies	Butterfly Conservation: medium	Distinctive and easy to ID (moorland edge late April to early June), NAO NB contains important habitat (upland heathland)
Marbled white	<i>Melanargia galathea</i>	Insects	Butterflies	Butterfly Conservation: Low	Distinctive (grassland mid June - August), outlying populations in NAO NB at the edge of the species range. Retain to include a more common distinctive species within survey group
Dingy skipper	<i>Erynnis tages</i>	Insects	Butterflies	UK BAP; S41	Very rare in NAO NB and can easily be misidentified
Small pearl-bordered fritillary	<i>Boloria selene</i>	Insects	Butterflies	UK BAP; S41	More difficult to ID, and similar to the pearl-bordered fritillary (grassland and moorland May - June)
Brown argus	<i>Aricia agestis</i>	Insects	Butterflies		More difficult to ID - can be confused with female common blue and northern brown argus
Dark Green Fritillary	<i>Argynnis aglaja</i>	Insects	Butterflies		Can be confused with the wall brown butterfly and would require instruction / experience
Small heath	<i>Coenonympha pamphilus</i>	Insects	Butterflies	UK BAP; S41	Very widespread in NAO NB (on grassy moorland) therefore less of a conservation priority
White-letter hairstreak	<i>Satyrjum w-album</i>	Insects	Butterflies	UK BAP; S41	Difficult to survey and ID, flies around the tops of elm trees
Purple hairstreak	<i>Neozephyrus quercus</i>	Insects	Butterflies		Difficult to survey as flies around the tops of oak trees
Pale eggar	<i>Trichiura crataegi</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, common/declining, specialist
Square-spotted clay	<i>Xestia stigmatica</i>	Insects	Moths - nocturnal	Nationally scarce B	Important populations in NAO NB
V-moth	<i>Macaria wauaria</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, important to monitor, specialist (upland only)
Ghost	<i>Hepialus humuli</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, specialist (old grasslands)
Grey mountain carpet	<i>Entephria caesiata</i>	Insects	Moths - nocturnal	UK BAP; S41	Declining in area - needs to be monitored, more difficult to ID - training / experience required
Figure of eight	<i>Diloba caeruleocephala</i>	Insects	Moths - nocturnal	UK BAP; S41	Declining specialist species. Flight period not compatible with other species in survey group
Oak hook-tip	<i>Watsonalla binaria</i>	Insects	Moths - nocturnal	UK BAP; S41	Uncommon, at the northern edge of range
Garden tiger	<i>Arctia caja</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, generalist
Feathered gothic	<i>Tholera decimalis</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, generalist
Mouse	<i>Amphipyra traopoginis</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, generalist
Clouded Magpie	<i>Abraxas sylvata</i>	Insects	Moths - nocturnal		Easy to ID, local
Brindled Ochre	<i>Dasyptolia templi</i>	Insects	Moths - nocturnal	UK BAP; S41	More difficult to ID, local
Blomer's Rivulet	<i>Venusia blomeri</i>	Insects	Moths - nocturnal		More difficult to ID, very specialist (wych elm)
Dark-barred twin spot carpet	<i>Xanthorhoe ferrugata</i>	Insects	Moths - nocturnal	UK BAP; S41	More difficult to ID
Knot grass	<i>Acronicta rumicis</i>	Insects	Moths - nocturnal	UK BAP; S41	More difficult to ID
Light Knot Grass	<i>Acronicta menyanthidis</i>	Insects	Moths - nocturnal		More difficult to ID, local/declining, two old records in NAO NB
Northern Rustic	<i>Standfussiana lucerneae</i>	Insects	Moths - nocturnal		More difficult to ID, local, very few records in NAO NB
Lunar Thorne	<i>Selenia lunularia</i>	Insects	Moths - nocturnal		More difficult to ID
Latticed heath	<i>Chiasmia clathrata</i>	Insects	Moths - nocturnal	UK BAP; S41	Could be confused with common heath, generalist
Grey dagger	<i>Acronicta psi</i>	Insects	Moths - nocturnal	UK BAP; S41	Difficult to ID, generalist
Sallow	<i>Cirrhia icteritia</i>	Insects	Moths - nocturnal	UK BAP; S41	Could be confused with other sawfly species. Common and widespread
Shaded broad-bar	<i>Scotopteryx chenopodiata</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, very common and widespread (everywhere)
Blood-vein	<i>Timandra comae</i>	Insects	Moths - nocturnal	UK BAP; S41	Easy to ID, very common and widespread (everywhere)
Emperor Moth	<i>Saturnia pavonia</i>	Insects	Moths - day flying		Easy to ID, widespread - retain to include a more common distinctive species (and important habitats)
Speckled Yellow	<i>Pseudopanthera macularia</i>	Insects	Moths - day flying		Distinctive, uncommon in NAO NB
Clouded Buff	<i>Diadrisia sannio</i>	Insects	Moths - day flying		Distinctive, uncommon in NAO NB
Argent and Sable	<i>Rheumaptera hastata</i>	Insects	Moths - day flying	UK BAP; S41	Nationally scarce B and uncommon in NAO NB, more difficult to ID but possible with some training
Fox Moth	<i>Macrothylacia rubi</i>	Insects	Moths - day flying		Easy to ID, common species - less of a conservation priority
Wood Tiger	<i>Parasemia plantaginis</i>	Insects	Moths - day flying		Easy to ID, common species - less of a conservation priority
Small Argent and Sable	<i>Epirrhoe tristata</i>	Insects	Moths - day flying		Uncommon in NAO NB, more difficult to ID
Heath Rivulet	<i>Perizoma minorata</i>	Insects	Moths - day flying		Nationally scarce B and uncommon in NAO NB, more difficult to ID

Common name	Latin name	Taxon group	Survey group	Conservation status	Reason to reject / include
Moonwort	<i>Botrychium lunaria</i>	Plants	Ferns	Least Concern (VPRDL)	Less of a conservation priority, would require high survey effort (separate survey and difficult to spot)
Marsh stitchwort	<i>Stellaria palustris</i>	Plants	Flowering plants	UK BAP; S41	Survey by specialist
Fine leaved sandwort	<i>Minuartia hybrida</i>	Plants	Flowering plants	UK BAP; S41	Survey by specialist
Burnt orchid	<i>Neotinea ustulata</i>	Plants	Flowering plants	UK BAP; S41	Survey by specialist
Fly orchid	<i>Ophrys insectifera</i>	Plants	Flowering plants	UK BAP; S41	Easy to spot and ID, good candidate for citizen science
Thistle broomrape	<i>Orobanche reticulata</i>	Plants	Flowering plants	Near Threatened (VPRDL)	Less of a conservation priority than other species within this group (not UK BAP or S41)
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	Plants	Flowering plants		Less of a conservation priority than other species within this group (not UK BAP or S41)
Yellow star of Bethlehem	<i>Gagea lutea</i>	Plants	Flowering plants	Least Concern (VPRDL)	Less of a conservation priority than other species within this group (not UK BAP or S41)
Tower mustard	<i>Arabis glabra</i>	Plants	Flowering plants	UK BAP; S41	Too rare
Red hemp nettle	<i>Galeopsis angustifolia</i>	Plants	Flowering plants	UK BAP; S41	Too rare
Pennyroyal	<i>Mentha pulegium</i>	Plants	Flowering plants	UK BAP; S41	Too rare
Rare spring-sedge	<i>Carex ericetorum</i>	Plants	Flowering plants	UK BAP; S41	Too rare
Corn buttercup	<i>Ranunculus arvensis</i>	Plants	Flowering plants	UK BAP; S41	Rare, associated with agricultural areas / field margins - may require separate survey to other plant species
Wild tulip	<i>Tulipa sylvestris</i>	Plants	Flowering plants		Too rare and non-native species
Spring sandwort	<i>Minuartia verna</i>	Plants	Flowering plants: mountain grassland	Vulnerable (VPRDL)	Easy to ID with some training and suitable habitats in NAONB
Mountain pansy	<i>Viola lutea</i>	Plants	Flowering plants: mountain grassland	Near Threatened (VPRDL)	Distinctive and suitable habitats in NAONB
Frog orchid	<i>Dactylorhiza viridis</i>	Plants	Flowering plants: mountain grassland	UK BAP; S41	Survey by specialist
Alpine pennycress	<i>Thlaspi caerulescens</i>	Plants	Flowering plants: mountain grassland	Least Concern (VPRDL)	Less of a conservation priority than other species within this group
Slender thread moss	<i>Orthodontium gracile</i>	Lower plants & fungi	Bryophyte	UK BAP; S41	Rare and difficult to ID - specialist only
Nowell's limestone moss	<i>Zygodon gracilis</i>	Lower plants & fungi	Bryophyte	UK BAP; S41	Very rare, no records found in NAONB, difficult to ID – specialist only
Oak polypore	<i>Buglossoporus pulvinus</i>	Lower plants & fungi	Fungi	UK BAP; S41	No records in NAONB and very rare
<i>Anaptychia ciliaris</i> subsp. <i>Ciliaris</i>	<i>Anaptychia ciliaris</i> subsp. <i>Ciliaris</i>	Lower plants & fungi	Lichen	UK BAP; S41	Rare, difficult to ID - specialist only
Sap groove lichen	<i>Bacidia incompta</i>	Lower plants & fungi	Lichen	UK BAP; S41	Small, difficult to see and identify, requires expert / specialist, very scarce in northern England

NAONB = Nidderdale Area of Outstanding Natural Beauty
UK BAP = UK Biodiversity Action Plan (BRIG 2007)
S41 = Section 41 Species of Principal Importance in England (National Environment and Rural Communities (NERC) Act 2006)
NCA CSS = Natural Character Area Countryside Stewardship priority species (Natural England *et al.* 2015)
VPRDL = The Vascular Plant Red Data List for Great Britain (Cheffings & Farrell 2005)
Butterfly Conservation priority = taken from <http://butterfly-conservation.org> and based on Fox *et al.* (2015)



Annex 3

Full list of SINCs in Nidderdale AONB

- Angram
 - Azerley Marshy Grassland
 - Backstone Gill Wood
 - Bark Cabin Wood
 - Beaver Dyke Reservoir
 - Birch Wood
 - Braisty Woods
 - Brim Bray Pond
 - Bryan's Wood
 - Catstone Wood
 - Coal Bank Wood
 - Cock Hill and Sunny Side Lead Mines and Gill Beck
 - Coldstones Grassland
 - Copy Wood, Gouthwaite Farm
 - Cow Close Wood
 - Deepgill Wood
 - Denton Park
 - Dob Park Wood
 - Duck Street
 - Duck Street Quarry
 - East Wood
 - Eavestone Lake
 - Ellington Banks
 - Farnley Hall
 - Farnley Lake
 - Fewston/Swinsty Reservoirs
 - Fishpond Wood
 - Fountainhead
 - Fountains Abbey and Studley Royal Complex
 - Great Wood
 - Greenhow Burial Ground
 - Hammer Farm
 - High far side cottage fields
 - High Thrope Wood
 - High Wood Farm Wood
 - Holden Gill Wood
 - Horse Wood
 - Hungate Gill
 - Kex Beck Wood
 - Laver Banks Wood Complex
 - Lawnwith Two Acre
 - Leighton and Roundhill Reservoir
 - Lindley Wood Reservoir Complex
 - Lofthouse Spoil Heaps
- Low Hall Wood
 - Low Skelding Field
 - Lumley Moor Reservoir
 - Magdalen Wood
 - March Ghyll Grassland
 - Mickley Barras
 - Middle Tongue Bank
 - Middleton Hospital
 - Middlewood
 - Mowbray Castle
 - Nidd Marsh
 - North Close Wood
 - Park House Farm Woodland
 - Picking Gill Nature Reserve
 - Prim Gap
 - Redlish House Farm
 - Redlish Road Verges
 - River Ure (Masham to Mickley), Hambleton
 - Skrikes Wood and Nought Bank
 - South Park Wood & Adjacent Grassland
 - Spa Gill Wood
 - Spring Hall Wood
 - Spring House Wood
 - Spring Wood (Riva Hill)
 - Stony Bank
 - Strawberry Hill
 - Stripe Wood
 - Tang Beck Complex
 - Tewit Farm, Greenhow
 - Throstle Nest Bridge Wood
 - Thruscross Reservoir
 - Timble Ings
 - Toft Gate Lime Kilns
 - Tranmire Bog
 - West End Marsh
 - West Park Wood/Stubbs Wood
 - Weston Park
 - Wet Woodland, Park House Farm
 - Winksley Banks
 - Winsleyhurst Wood
 - Woodhouse Farm Fishing Ponds
 - Woodman Wray Flush

Annex 4

Summary of biodiversity engagement initiatives and citizen science projects

Example	Description	Strengths	Weaknesses	URL
iSpot	iSpot is an on-line community for the sharing of taxonomic skills, developed by the open university and based on a community of users and experts that consider digital photographs submitted on-line.	Very large, strong and active user community with fast response times	Cannot really be used as a means of gathering biological records.	http://www.ispotnature.org/communities/uk-and-ireland
Bioblitzes	Bioblitzes were developed in the USA as a public engagement activity in which taxonomic experts, ecological data experts and the general public came together in a time limited event targeted at identifying as many of the organisms present at that place as possible. The concept was intended to promote public engagement with both nature and data about nature. They were seen as gateway events to biological recording and ecological monitoring. Bioblitzes had a brief period of popularity within Yorkshire and NEYEDC collaborated with a number of partners including the Stockholm Environment Institute to publish a guide to bioblitzes and the lessons learned http://www.opalexplornature.org/sites/default/files/7/file/Bioblitz-lessons-learned-York.pdf and http://www.ynu.org.uk/node/320 . Unfortunately, the term has been more generally annexed to events in which the ecological data element was lost and over time bioblitzes have become indistinguishable from the more generic events described in the section above. Properly done, the bioblitz is a powerful event, but it may be too late to regain the focus it originally had.	Time limited, with direct exposure to both taxonomic and biodiversity data specialists. Fun with a sense of shared mission. Opportunity to signpost further engagement opportunities.	Can lack structure and focus due to activity across a wide physical area. Little incentive for participants to re-visit results, even when they are readily available on-line, due to ephemeral "feeling" of the events and the fact that results are usually available in real-time on the day. AN OPPORTUNITY WASTED?	https://yorkshirebioblitz.wordpress.com/about/ https://en.wikipedia.org/wiki/BioBlitz
rECOrd / Rodis	Record, based in Cheshire, is an example of a very public engagement / volunteer focused Local Environmental Record Centre (LERC) that operate RODIS, an on-line recording scheme aimed at amateur naturalists. Their mission is very different from the one established for NEYEDC, however, both are rare examples of independent LERCs and we work together very closely on a wide range of technical issues related to biodiversity data.	Has a very strong local base and focus, though is very active in the national LRC community. Have taken a leading role in the development of local on-line recording.	Financially vulnerable as reliant on short term funding arrangements.	http://www.recordlrc.co.uk/
Butterfly Conservation Yorkshire	An example of a very active and effective local recording community, with an effective on-line presence.	Strong local focus, committed members and recorders and a strong track record of survey, research and publication.	Can be insular and the communication between the local level and national level of the organisation on issues of data exchange and sharing with outside organisations and projects can be confused and inconsistent.	http://www.yorkshirebutterflies.org.uk/

Example	Description	Strengths	Weaknesses	URL
Harlequin Ladybird Survey	An example of a well-produced, designed and focused on-line data collection / citizen science project.	Self-contained, focused and with a strong current narrative, credible links to science and to real world implications of invasive species.	Doing it this well costs money. This single survey is rumoured to have had a budget similar to the one proposed for Nidderdale.	http://www.harlequin-survey.org/
Big Garden Bird Watch	There are a number of on-line time-limited events, which are similar in concept to a bioblitz, most notably the Big Garden Birdwatch; however, though undoubtedly hugely popular, with BGBW gathering more than 8,000,000 records, it very much has a national trend emphasis, rather than a reconnection with local wildlife emphasis in terms of data analysis.	Slick design including on-line data entry. Well publicised and marketed, with good feedback to participants.	Lacks effective local links and perspectives. Lacks direct links with experts and opportunities for progression under mentoring. Would be interested to know the progression rate from BGBW to other BTO / RSPB surveys.	https://www2.rspb.org.uk/discoverandjoynature/discoverandlearn/birdwatch
BTO / RSPB breeding bird survey and Bird Track	Without question the most successful on-line survey and data recording initiative.	Attracts a huge number of records and scores very highly in terms of satisfaction with bird-watchers. Is a safe and secure on-line repository for a user's data, with a number of very useful data management functions as well as an on-line data collation mechanism.	Focus is very much on distributions and national trends. Has a poor record of sharing data with other organisation and for local purposes like local decision making. Many subscribers do not realise that this is the case and assume that data is widely used.	http://www.bto.org/volunteer-surveys/bbs
OPAL	The OPAL or Open Air Laboratory project was a major multi-partner Heritage Lottery funded project, aimed at developing and critically evaluating citizen science tools and activities. OPEL developed a number of time limited surveys, which had both local workshop and online elements. NEYEDC was a member of the OPAL steering group and worked closely with Dr Sarah West (sarah.west@york.ac.uk) of the Stockholm Environment Institute on OPAL tools and activities from a very early stage in the project. Whilst it was unfortunate that the University led OPAL project was not legacy funded by the Universities which took part, many of the tools and activities are excellent and all are still available for use.	A combination of supported and unsupported activities, underpinned with high quality published materials (produced by FSC) and an effective website. Prompt and effective feedback both of results and their scientific implications. Effective monitoring of outcomes and engagement by academics who also developed an engagement monitoring and efficacy toolbox.	Expensive and unsustainable.	http://www.opalexplornature.org/

Example	Description	Strengths	Weaknesses	URL
Zooniverse	The international “daddy” of on-line citizen science initiatives. A platform for a huge number of projects which spans the spectrum from the most ephemeral engagement with big data analysis to the capacity to award higher degrees in partnership with Universities. Some of the most impressive applications are related to astronomy. Similar crowd sourcing approaches have been taken to repetitive tasks in biological recording like transcribing the notebooks of famous naturalists and digitising herbaria labels.	Well established, flexible & well supported	Is remote and lacks any human contact or local focus.	https://www.zooniverse.org/projects?discipline=nature&page=1
Natural History Museum Outreach	The Natural History Museum develops excellent Citizen Science programmes that emphasise the importance of combining workshops or other forms of direct access to NHM staff or local Natural History Groups with an on-line element. The Natural History Museum very much acknowledges the importance of a human element in providing a gateway between an interest in nature and technical participation in Natural History and have developed ID Trainers for the Future, a work based training scheme aimed redressing the decline in experts with the necessary skills to train would-be natural historians. NEYEDC have a good working relationship with the NHM Citizen Science team having worked with them over a period of years and could broker their involvement in the project.	High quality initiatives, developed within an international centre of excellence. Emphasise the role of mentors and trainers within the engagement process	Very London centric. The scale of the ID trainer initiative does not meet the scale of the need.	http://www.nhm.ac.uk/take-part.html
Field Studies Council	The Field Studies Council runs an excellent and well established national programme of workshops which equip participants with identification and methodological skills. Their workshops, however, are quite expensive and are unlikely to constitute a first point of engagement for someone with a passing interest in nature or wildlife. There is a cross-over from FSC training and workshops into academia and continued professional development.	Detailed, immersive, supported by excellent tutors, materials and publications	Expensive, few national locations, expensive	http://www.field-studies-council.org/
NBN Gateway	Designed to be the over-arching UK biodiversity data hub / access point.	Has amassed a huge number of records from a diverse range of data providers. Many of these, however, are not available at useable resolutions. Has the support of all uk statutory bodies.	Has had many administrative and technical problems and currently does not constitute a fully functional biodiversity data infrastructure. Many policy makers that support the NBN do not realise that this is the case.	https://data.nbn.org.uk/

- Whilst it is quite easy to identify examples of good practice, it is less easy to confidently identify its components. There is a consensus that certain elements are commonly found in a successful biodiversity data project:
 - Currency and real world context. Data collection initiatives that link to invasive and indicator species for example have often been found to be successful.
 - Evidence that project data will lead to interventions or influence decision making seems to attract and retain participants.
 - Perceived integration with rigorous science is often cited as a positive aspect of a biodiversity data project.
 - Clear focus and purpose. Projects with multiple biodiversity data objectives often struggle.
- Involvement with charismatic species.
 - Rapid and eloquent feedback of both of raw data and interpreted information.
 - Strong and compelling project narratives are popular and encourage re-engagement.
 - Easy submission of data. Difficult survey forms and clumsy on-line interfaces have been shown to lead to the demise of otherwise strong projects.
 - Projects that have opportunities for real-world or virtual interactions with and mentoring from subject specialists.
 - Strong and active on-line communities supporting survey activities, sharing experiences and answering questions.



Annex 5

The Wild Watch survey methodologies

River bank survey methodology

1. You will have been allocated a specific transect, along the bank of a waterway. Follow the allocated transect as closely as possible, they will usually follow rights of way, recording signs and sightings of the species listed above.
2. Record sightings on the survey recording form using the appropriate codes (see below). Use a separate recording sheet for each visit.
3. If you find there are many species to look for at once, try looking for river birds and dragonflies on the outward transect and then focus on aquatic mammals and invasive plant species on your return. This will help reduce the numbers of species you are looking for at any one time.
4. Each transect should take around 1 hour to walk in one direction, but if it takes longer than this as you need to stop to identify species that is absolutely fine.
5. It should be walked twice, between April and September, at least 4–5 weeks apart, but ideally not during or within two days of heavy rainfall.
6. To help with species identification please refer to the 'River transect spotter sheet' and materials supplied during the training.

Aquatic mammals

7. Please look for signs/sightings (e.g. droppings/spraints, latrines, food remains and burrows) of water vole and otter and record these on your survey recording form.
8. If you see signs/sightings of American mink (*Mustela vison*), record these too, as this invasive species has been responsible for declines in water vole populations.

River birds

9. Record sightings of the three river bird species on your survey recording form.

10. The best time to spot these species is early in the morning, before 9am, early April to late June, but they can be seen at any time.

11. If you are walking a transect outside of these times please do still record any of the bird species you do see.

Invasive species

12. Walk the 1km transect route, searching for each flowering plant species within an area 3–4m each side of the path. Recording sightings as above, noting if it is a small patch/single plant, line or large area of the plant.

Invertebrates

13. Record sightings of the dragonfly species on your recording form.

Reptile survey methodology

1. The target reptile species are **adder**, **common lizard**, **grass snake** and **slow worm**. We would also like records for **common toad** if you spot this during your reptile surveys.
2. Survey transects should be at least 1km long, and surveys involve walking slowly along the same route on 4 surveys visits:
3. The first visit should take place in March and will involve laying 10 sections of roofing felt at locations along the survey route. These artificial refuges heat up quickly and will attract reptiles nearby. Place one piece of roofing felt roughly **every 100m**, in sunny locations and in a range of habitats.
4. Mark the location of the roofing felt on the map so you can find them again!
5. The second survey must be undertaken at least 4 weeks after you have laid out your roofing felt, to give the reptiles time to find and use the refugia

6. Two further survey visits are needed and these should be spread throughout the survey season, undertaken at least two weeks apart and before September 2018. Remember, also, that reptile surveys require reasonably good weather!
7. When walking the survey route look ahead at the ground, not at your feet, staying alert for any signs of reptiles. Wear strong gloves and lift the roofing felt you have laid out at the ten spot locations.
8. Record the location of any reptiles you see on the map. The sex of the reptile is not required.
9. Avoid rainy and windy days and aim for a temperature of 9–18 °C
10. The best times for survey are 8:30–11:00 and 16:00–18:30. This is when temperatures are cooler and reptiles are less mobile. In the early part of the year, mid-day may be more appropriate.
11. If possible, try to walk with the sun and wind facing you – reptiles can pick up your scent from quite a distance and may be disturbed by your shadow.
12. Look out for shed reptile skins (called 'sloughs').
13. The roofing felt will need to be collected back in the late autumn/winter when reptiles are in hibernation. This will require another visit between late October and February.

Pond survey methodology

Please pick up your eDNA survey kit from the AONB offices in Pateley Bridge. Kits will be available at the AONB office from 1pm on Monday 13th May. Please contact Alice to do this. There are full instructions on how to carry out the eDNA test with each kit. You can also refresh your memory here: <https://www.youtube.com/watch?v=igF2N3sJbvU>

Each kit will contain

- eDNA kit (x1 per pond)
- eDNA survey methodology (x1)
- eDNA risk assessment (x1)

- Biosecurity information sheet (x1)
- Biosecurity kit
- Pond survey recording forms (x1 per pond)
- OS maps – location map and aerial photo of area
- White extension pole (to enable you to reach water if the pond edge is difficult to access)

Key reminders:

- As you will be visiting more than one pond, please ensure you clean your boots thoroughly between visits. We have provided you with a biosecurity kit to use between each pond. Please ensure you disinfect your boots between every pond and at the end of the day. Once back home please refer to the 'Better Biosecurity' leaflet with your survey pack to clean footwear.
- Please make sure the white extension pole does not touch the ground or pond water when in use. This is to prevent cross contamination between survey sites.
- Between visits, kits must be kept in a cool bag in a car if the weather is hot.
- **Please ensure each kit is labelled with the surveyor names, pond code and sampling date.**
- **If you are not able to sample the pond due to it being dried up/not accessible. Please let us know and do not use the kit, we will try and organise a replacement pond.**

Returning survey kit

- Please organise with Alice Crosby a time to return the kits to office. If you have time you can return them on the same day as your survey. **If this is not possible please keep the kits cool and dark.**
- Please keep used kits cool and dark e.g. cool bag in car or in fridge. Return to the AONB office by 24th May 2019.

Invertebrate Survey Methodology

- 1. Volunteers will walk each 1km² survey transect noting sightings of the target species listed in the table above. Please use a separate survey recording sheet, for each visit, to note your sightings and use the relevant species codes shown in the invertebrate spotter guide and above.
- 2. Transects should be walked between 11am and 4pm in dry, warm (over 13°C when sunny or 17°C when overcast) and when wind speeds are below 18mph. Avoid surveying on rainy days as you might not see very much!
- 3. Each transect should be walked three times: once in May, once in late June/early July and once in August. This will ensure the main flight periods for the butterflies and day flying moths are covered. You can walk the survey route more times than this but please ensure that you record sightings on a new recording sheet (contact Alice for extra copies of these) so we can account for this when analysing the data.
- 4. Green tiger beetles and *Carabus nitens* are usually found on the ground and they prefer bare areas. We suggest that on the outward transect walk you look for bumblebees, butterflies and dragonflies, and then on the return journey focus on looking for the beetles at ground level. Scan the footpath ahead of you as you walk – *Carabus nitens* tends to prefer the border between dry and wet areas and the Tiger beetle on bare ground with little vegetation.

Survey methods are adapted from the Volunteer BeeWalk (Bumblebee Conservation Trust) and Wider Countryside Butterfly Survey (Butterfly Conservation/CEH/BTO).

Botany Survey Methodology

- 1. You will be allocated a 1km² survey route to walk. During the survey each target flowering plant should be scanned for approximately 2m each side of the survey route.
- 2. Please mark the location of target species

seen whilst walking the route as accurately as possible on the survey recording form. Slight deviations off the route, depending on site conditions, are not a problem as long as the location of any target species found is accurately marked on the map. Use a separate survey recording form for each survey visit. You are unlikely to find all species on one survey route as the list of species covers a range of habitats.

- 3. When marking the location of target species please use the following shapes to identify the spread of each species (example table below for invasive species):
 - a. **Point** – If it is just a few occurrences of the target species, mark as individual plants on the survey recording form.
 - b. **Line** – If the species covers a linear area, draw the extent of the coverage as a line on the recording form.
 - c. **Shape** – If the plants are numerous and cover a large area draw the approximate outline of its area on the recording form.

Invasive Species	Code	>5m	Line	Area
Himalayan balsam	HB			
Giant hogweed	GH			
Japanese knotweed	JK			

- 4. In addition to walking the route, place five 1m² quadrats along the survey route (roughly every 200m, 2–3m from the edge of the path if feasible) and search for the target species within each quadrat. Mark the location of each quadrat on the survey recording form so that this quadrat can be re-visited. Use the quadrat recording form to record what you see.
- 5. Each survey route should be walked twice, once during May/June and once in July/August. The quadrats should be located in the same place each time. Please try and ensure that surveys are 6–8 weeks apart. It should take 1–2 hours to do each survey.

- 6. A second survey should be carried out in 2019, along a different transect route.

This survey methodology has been adapted from Plantlife’s Wildflower Count (Plantlife 2013).

Bird Survey Methodology

The Wild Watch Bird Survey methodology – Non Waders

The main target species for survey are tree pipit (*Anthus trivialis*), wood warbler (*Phylloscopus sibilatrix*), spotted flycatcher (*Muscicapa striata*), pied flycatcher (*Ficedula hypoleuca*) and lesser spotted woodpecker (*Dendrocopos minor*). Sightings of other key red and amber list bird species encountered should also be recorded.

Overall there will be up to 25 transects, located across Nidderdale AONB. Survey methods and recording sheets will be based on the Breeding Bird Survey (BTO 2015), with several adaptations to the standard methodology:

- Only one transect, largely restricted to habitat suitable for woodland birds, will be surveyed in each 1km², rather than two transects as specified in the standard BBS survey;
- Juvenile birds will be recorded;
- Birds should be recorded approximately 250m either side of the transect;
- It will not be necessary to record standard BBS habitat data or mammal sightings.

The transect route will follow public footpaths wherever possible through woodland, along woodland edge and through open habitats between patches of woodland. Sightings of the woodland bird species and any calls heard should be recorded on the map.

- Timetable
- Each transect route will be repeated twice during the breeding season each year for two years (2017–2018).
 - Visits should be undertaken once in early April to mid-May, and again in mid-May to late June, with surveys at least four weeks apart.
 - Each transect should commence ideally between 6am and 7am and no later than 9am.
 - Weather conditions with heavy rain, poor visibility and/or strong winds should be avoided.
 - Each transect will take approximately one hour to complete.

The Wild Watch Bird Surveys – Waders in Upland Landscapes

The target species for this group are Lapwing (*Vanellus vanellus*), Curlew (*Numenius arquata*), Snipe (*Gallinago gallinago*), Redshank (*Tringa totanus*), Golden plover (*Pluvialis apricaria*), Dunlin (*Calidris alpina*). Some of the survey transects cover moorland habitats. Surveys in these areas are to be carried out as the standard method outlined for non-waders with a time amendment 0600–1800. This extended time element follows the generic survey methodology adapted from Brown and Shepherd (1993)¹ as described within Bird Monitoring Methods, a manual of techniques for key UK species (Gilbert *et al.* RSPB 1998). The method was principally aimed at developing a census of all upland breeding waders including Golden Plover, Snipe, Lapwing, Curlew and Redshank. These waders are characteristically active throughout the day and easier to detect in open environments.

¹ A. F. Brown & K. B. Shepherd (1993) A method for censusing upland breeding waders, Bird Study, 40:3, 189-195, DOI: 10.1080/00063659309477182

Annex 6

NVC level 3 categories found in Nidderdale AONB

NVC	Community/sub-community name	Common name equivalent
H9	Calluna vulgaris-Deschampsia flexuosa heath	Ling-wavy-hair grass heath
H10	Calluna vulgaris-Erica cinerea heath	Ling-bell heather heath
H12	Calluna vulgaris-Vaccinium myrtillus heath	Ling-bilberry heath
H18	Vaccinium myrtillus-Deschampsia flexuosa heath	Bilberry-wavy-hair grass heath
M2	Sphagnum cuspidatum /recurvum bog pool community	Feathery/recurved bog-moss pool
M6	Carex echinata-Sphagnum recurvum/auriculatum mire	Star sedge-Sphagnum recurvum mire
M19	Calluna vulgaris-Eriophorum vaginatum blanket mire	Ling-hare's tail cotton grass mire
M20	Eriophorum vaginatum blanket and raised mire	Hare's tail cotton grass mire
M23	Juncus effusus/acutiflorus-Galium palustre rush-pasture	Soft rush-marsh bedstraw rush-pasture
M25	Molinia caerulea-Potentilla erecta mire	Purple moor grass-tormentil mire
MG1	Arrhenatherum elatius grassland	False oat grass grassland
MG5	Cynosurus cristatus-Centaurea nigra grassland	Crested dog'stail-knapweed grassland
MG6	Lolium perenne-Cynosurus cristatus grassland	Ryegrass-crested dog's-tail grassland
MG7	Lolium perenne leys and related grasslands	Ryegrass ley
MG9	Holcus lanatus-Deschampsia cespitosa grassland	Yorkshire fog-tufted hair grass grassland
MG10	Holcus lanatus-Juncus effusus rush-pasture	Yorkshire fog-soft rush rush-pasture
U1	Festuca ovina-Agrostis capillaris-Rumex acetosella grassland	Sheep's fescue-Common bent-sheep's sorrel
U2	Deschampsia flexuosa grassland	Wavy hair grass grassland
U4	Festuca ovina-Agrostis capillaris-Galium saxatile grassland	Sheep's fescue-heath bedstraw grassland
U5	Nardus stricta-Galium saxatile grassland	Mat grass-heath bedstraw grassland
U6	Juncus squarrosus-Festuca ovina grassland	Heath rush-sheep's fescue grassland
U20	Pteridium aquilinum-Galium saxatile community	Bracken-heath bedstraw community
W4	Betula pubescens-Molinia caerulea woodland	Downy birch-Purple moor grass woodland
W7	Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum woodland	Alder-ash-yellow pimpernel woodland
W9	Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis woodland	Ash-rowan-dog's mercury woodland
W10	Quercus robur-Pteridium aquilinum-Rubus fruticosus woodland	English oak-bracken-bramble woodland
W11	Quercus petraea-Betula pubescens-Oxalis acetosa	Sessile oak-downy birch-wood sorrel woodland
W16	Quercus spp.-Betula spp.-Deschampsia flexuosa woodland	Oak-birch-wavy hair grass woodland



Annex 7

Proposed State of Nature indicators

Area/issue	Proposed indicator	Current Indicator value (end March 2020)	Data source
People	1. Number of AONB volunteers, hour given and value per year		AONB / NAAONB KPIs
	Nature Conservation Volunteers (NVC)s	95 volunteers 404 days Value £20,200 (Unskilled volunteers at £50/day)	
	INNS volunteers	1 volunteer 48 days Value £2,400 (Unskilled volunteers at £50/day)	
	TWW volunteers	39 volunteers 333 days Value - £36,057 (Volunteers with professional skills at £150/day Volunteers with semi-professional skills at £100/day Unskilled volunteers at £50/day)	
	2. Number of people attending AONB nature events per year	People attending TWW Events 3262	
Priority habitats	1. Overall area of priority habitat	24,028.58ha	Natural England Priority Habitat Data 2019
	2. Area of priority habitat outside designated sites in favourable or unfavourable condition (broken down by habitat type)	Baseline condition assessment to be undertaken in 2020	AONB
Designated sites	1. Total extent of all protected areas in AONB	35% AONB area (c21,000ha)	Natural England/ Harrogate Borough Council
	2. SSSIs - % in i) Favourable and ii. unfavourable recovering condition	i. 2,048ha (=11.79% of our SSSI); ii 15,297ha (=88.1%)	Natural England
	4. No/% of SINCs with Man Plans	Baseline assessment to be undertaken in 2020	AONB
	5. No/% percentage SINCs surveyed within last 10 years.	20 sites (23%)	NEYEDC/ AONB

Area/ issue	Proposed indicator	Current Indicator value (end March 2020)	Data source
Agricultural management	1. Area of AES coverage (% cover of AONB)	22,170ha (37%)	Natural England [MEOP data 2019]
	2. No of AES schemes	75 schemes	Natural England [MEOP data 2019]
	3. No of Beyond Nature Farms/area of land on BN farms in AONB	6 farms, 3127ha (= 5% AONB area)	Yorkshire Water
Moorland	Area of key habitat – blanket bog/upland heath conserved or enhanced	<i>Data to be included from next year</i>	AONB/YPP/ NAAONB KPIs
Grassland	Area of hay meadow restored or enhanced in year/in total	3.58ha/230.19ha	AONB/ NAAONB KPIs
Woodland	1. % woodland coverage in AONB	8% [NFI data 2018]	Forestry Commission
	2. Area of new tree planting in year	<i>Data to be included from next year</i>	AONB/ NAAONB KPIs
	3. No/area covered by woodland grants	1,762 ha	Forestry Commission
Water	1. No of farms/area engaged in CSF	<i>Data to be included from next year</i>	AONB
	2. INNS reduction measures – area covered	16 ha	AONB
Species	1. No of new surveys	1 - 510 surveys in 2019	AONB
	2. No of citizen science records	270 records (Two campaigns running Owl Watch and Hedgehog Watch)	AONB
Natural capital, Ecosystem Services and economic benefits	1. AONB Natural capital/Ecosystem Services	1. Baseline assessment to be undertaken in 2020	AONB
	2. Amount of external grant funding AONB helped channel into conservation in AONB over year	2. c£680,000	AONB/ NAAONB KPIs



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