

State of the Environment Wiltshire and Swindon 2013





Wiltshire & Swindon Local Nature Partnership

The report was produced by Wiltshire Wildlife Trust on behalf of Link2Nature and forms the environmental section of the Wiltshire Joint Strategic Assessments. Link2Nature acts as the Thematic Delivery Partnership for environmental issues in the Wiltshire Family of Partnerships.

Link2Nature is the Local Nature Partnership (LNP) for Wiltshire and Swindon, officially recognised by government as one of 48 LNPs across England. Link2Nature works strategically to bring together partners from a wide range of sectors to protect and restore our local environment. This is a new approach, based on recognising the value of the natural world in social, economic and environmental terms. More than 40 organisations, businesses and charities are working together through Link2Nature, including the following:

- Action for River Kennet
- Aspire Defence
- Bumblebee Conservation Trust
- Butterfly Conservation
- Campaign for Better Transport
- Center Parcs
- Community First
- Cotswolds AONB
- Cotswolds Water Park Trust
- Countryside Access Forum
- CPRE
- Cranborne Chase and West Wiltshire Downs AONB
- English Heritage
- Environment Agency
- The Environment Bank
- Forestry Commission
- GreenSquare Group
- Johns Associates
- Landmarc Support Services Ltd
- National Farmers Union – Wiltshire
- Natural England
- National Trust
- North Wessex Downs AONB
- RSPB
- RWE npower
- Salisbury GreenSpace Partnership
- Sustrans
- Swindon Borough Council
- Swindon & Wiltshire Local Enterprise Partnership
- Thames Water
- Wessex Chalk Forum
- Wessex Water
- Wiltshire Assembly of Youth
- Wiltshire Council
- Wiltshire Public Health
- Wiltshire Wildlife Trust
- Wiltshire & Swindon Biological Records Centre
- Woodland Trust

For more information please visit www.link2nature.org.uk
email info@link2nature.org.uk or telephone (01380) 736095

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The report has been based on evidence from a range of existing sources, most of which are publicly available. It has not aimed to be comprehensive and many gaps in the evidence are highlighted. In some cases, data does exist but not in a format that could be accessed and interpreted within the time available. Further information is available in the Environment section of the Wiltshire Intelligence Network: www.intelligencenetwork.org.uk

The report was prepared by Jenny Hawley, Environmental Intelligence Officer at Wiltshire Wildlife Trust, with thanks to all those who contributed funding, data, analysis and comments; with special thanks to Dame Fiona Reynolds. The report and associated work was funded by Natural England, Wiltshire Council and Public Health Wiltshire.

Wiltshire Wildlife Trust works to create living landscapes across Wiltshire and Swindon and to lead and support the transition of society towards more sustainable living. We are committed to ensuring that our work is based on sound knowledge and evidence, and that we use this to inform and influence decisions by others. We own or manage 37 nature reserves (967 hectares of land) that provide havens for wild plants and animals, and places for people to experience nature. We have 18,000 members and supporters, and more than 1,000 volunteers.



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For the purposes of this report, **Wiltshire and Swindon** are used to refer to those areas within the boundaries of Wiltshire Council and Swindon Borough Council, unless stated otherwise.

Setting the scene

FOREWORD



DAVID LEVINSON

For seven years, Swindon was at the heart of my working life. In 2005, I was among hundreds of staff moving into the National Trust's new office in Swindon's Brunel Railway Yards. For many of us it was a culture shock, but it was great to see how quickly everyone adapted to our new urban habitat and we soon discovered many ways to connect with nature. A view of trees out of the window, local parks and paths for a lunchtime walk and bigger spaces such as Lydiard Park for a team-building day.

We all need to have easy access to nature, whoever and wherever we are. However busy and difficult things get for me, I know I only have to go out for a walk to become re-energised and find the resilience to tackle the challenges that lie ahead.

Walking really matters to me and I cover many miles a week. On three occasions I've completed the the 26 mile Sarsen Trail, organised each year by Wiltshire Wildlife Trust. This spectacular route from Avebury to Stonehenge perfectly illustrates the beauty and international importance of what's on our doorstep, both natural and historic. It's too easy to take it all for granted.

That's why this new State of the Environment report is so important. Valuing our environment isn't just about enjoying landscapes and wildlife. It's about recognising and valuing the whole range of services that our environment provides – including the essentials of food, drinking water and fresh air.

In order to fully appreciate our environment, we need to have facts and figures about the condition of our rivers, woods and farmland, whether they're getting worse or better and where best to focus our efforts to improve them. We need to have up-to-date evidence at our fingertips and this report gives us just that. It is an invaluable resource, highlighting issues we cannot ignore.

The drivers of change in particular grabbed my attention. The rate of population growth in Wiltshire and Swindon is significant: the implications – for housing, water, energy, food, transport and waste – potentially staggering. The data on 'ecosystem services' shows how much pressure we're already putting on our natural environment. How much more can it take?

It's too easy to put these issues in a box labelled 'the environment' and simply hope they go away. But that isn't going to happen. If we diminish our natural resources we diminish our capability and richness in every sense, including that of our society and our economy. That's why it's so useful to think in terms of ecosystems and the services they provide to us all.

This new approach is also exciting as it provides us with solutions. It helps us to work across sectors – with business, charities, government, local communities – to find ways forward that are genuinely sustainable economically, socially and environmentally. It's good to know that Link2Nature is working to do just that. And these solutions are already happening: as this report shows, we're reducing the amount of CO₂ and waste produced per person, increasing recycling and composting at a phenomenal rate, farmers are making a difference through agri-environment schemes, the Water Framework Directive is bringing new investment to restore our rivers, and rare habitats are protected by Wiltshire Wildlife Trust and others. This is good news, yet there is so much more to do.

This report gives us the information and a compelling platform for action. Let's go.

Fiona Reynolds

Dame Fiona Reynolds

Master of Emmanuel College, Cambridge University; former Director-General of the National Trust (2001–2012); Non-Executive Board member of Wessex Water and chair of Wessex Water Sustainability Panel; Senior Non-Executive Director of the BBC's Executive Board; and Board member of the Green Alliance

JACOB SHEEP; ROB LARGE WWT

INTRODUCTION

This second report for Wiltshire and Swindon takes us another important step forward in understanding our local natural environment. The 2012 report gave a fascinating overview across a range of issues. This new report connects those issues together, presenting new data and new analysis. It shows how our environment works as a system, or 'ecosystem', with each element dependent on the others. It shows how many aspects of our lives are dependent on the services that our environment provides. From the basics such as food, water and clean air, to the wonders of our landscapes and wildlife, we are all fundamentally connected to nature.

Yet our local environment is not something that we can examine in a detached way; we are all partly responsible for its current state, good and bad. The drivers of change identified here are almost all human-induced, whether in the spread of invasive plants from our gardens into our rivers, or the unsustainable consumption of food, energy, water and consumer goods that has become the norm in our modern lives. Taking note of the evidence is not enough; we must also use it to switch to more sustainable ways of living, working and travelling.

Finally, this report brings to light the limits of our knowledge and the worrying gaps that exist in the data. Important decisions are being made about the future of our environment on the basis of incomplete knowledge, which could lead to mistakes being made with irreversible consequences. More research is needed into certain issues and a full ecosystems assessment of our local area would help ensure that decisions are based on the best possible understanding of their impact. We must also take advantage of progress elsewhere to put a quantifiable value on our environment and its services. This will help ensure that the environment is considered on equal terms with social and economic issues that are more easily given a financial value.

Dr Gary Mantle MBE

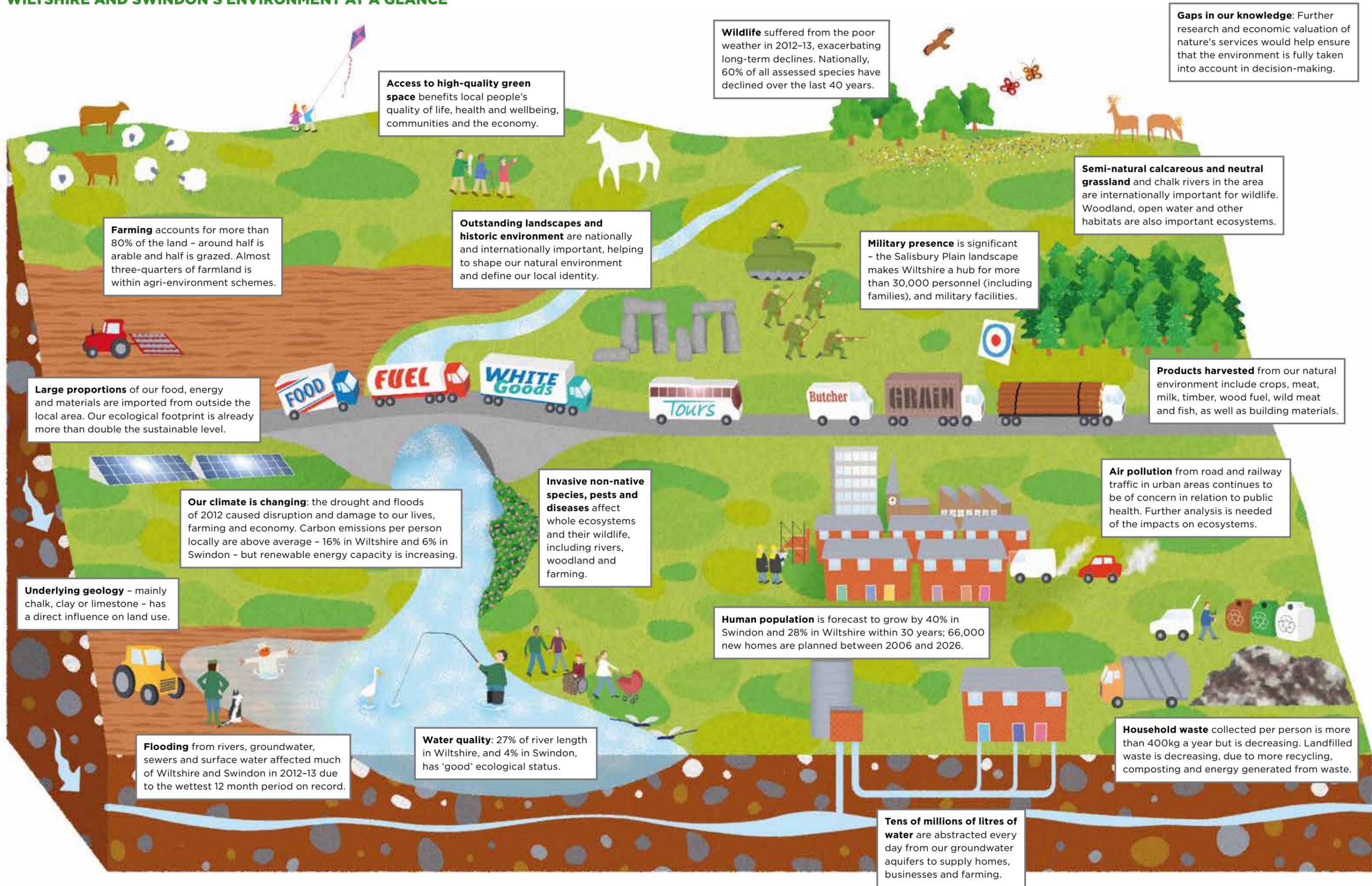
Chair of Link2Nature and Director of Wiltshire Wildlife Trust



CAROLINE ROBSON WWT



WILTSHIRE AND SWINDON'S ENVIRONMENT AT A GLANCE



ECOSYSTEMS AND NATURE'S SERVICES

Our uses of land and other human activities in Wiltshire and Swindon depend upon a healthy natural environment. This report looks at ecosystems and the services that they provide to assess the state of our environment in Wiltshire and Swindon, taking inspiration from the UK National Ecosystem Assessment 2011.

This framework helps to make connections between the state of our natural environment, its goods and services, human wellbeing and drivers of change. It connects a wide range of environmental, social and economic issues and helps us to take account of the full value of our natural environment.

The influences on the state of our environment

- Population growth, consumption and environmental awareness
- Planning and development
- Climate change
- Politics, science and technology
- Invasive species, pests and disease

Drivers of change



Habitats and wildlife



Wildlife

Underpinning all ecosystems and playing a role in many services, eg. earthworms recycling soil, bees pollinating crops, or people watching wildlife. Higher levels of biodiversity help ecosystems to be more stable, resilient and healthy, as well as improving the quality of our daily lives.

Water/air/soil

These elements interact with wildlife and geology through physical, chemical and biological processes (such as the carbon cycle).

Geology

Providing the foundation of our ecosystems. It includes rocks, minerals, fossils, landforms and sediments. The diversity of geology in our landscapes determines the ecosystems that are present, such as chalk streams and clay vales.

What are ecosystems?

They are ecological systems with living and non-living elements and particular characteristics. The main habitats in Wiltshire and Swindon overlap with the main ecosystem types – farmland, semi-natural grassland, woodland, rivers (freshwater) and urban areas.

All of nature's services contribute to people's wellbeing and this can be valued in economic, health and social terms. Further assessment is needed to quantify the value of nature's services in Wiltshire and Swindon.

More general information on the local economy, social issues and people's health and wellbeing are available on the Wiltshire Intelligence Network.

Human wellbeing



PHILIP COOPER WWT

Nature's services



Core services

Responsible for all other ecosystem services. These include the formation of soil and cycles of water, carbon and nutrients (eg. soils breaking down waste).

Regulating our environment

The ways in which nature provides us with a liveable environment, such as climate regulation; pollination, flood management and breaking down waste and pollution.

Providing goods

The direct physical goods, including food, drinking water, wood for timber and fuel, and building materials.

Benefiting culture and society

Space and resources for our activities, including access to green space, land for military activity, landscapes and historic environment.





Drivers of Change

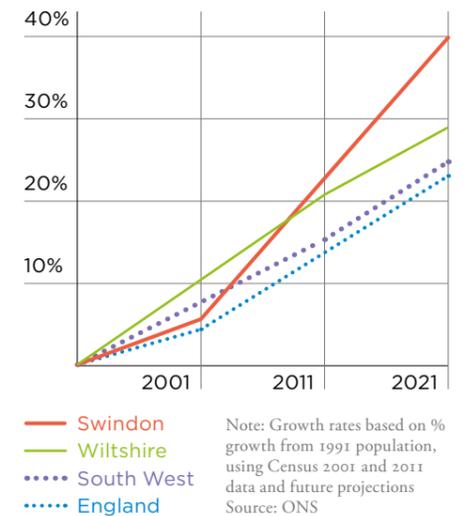
- Human population is forecast to grow by 40% in Swindon and 28% in Wiltshire within 30 years and 66,000 new homes are to be built within 20 years
- Our individual consumption of natural resources and emissions of greenhouse gases are above the national average and way above sustainable levels
- Our climate is already changing and unusual weather events, such as the drought and floods of 2012, are becoming more frequent. Mitigating and adapting to climate change can reduce the impacts on our daily lives, farming, the economy, wildlife and ecosystems
- Wildlife species that are not native to our environment are causing declines in our native wildlife and affecting whole habitats, with widespread knock-on effects

POPULATION GROWTH AND CONSUMPTION

Census 2011 puts the population of Swindon Borough at 209,200 and Wiltshire at 471,000. Rates of population growth in both areas are higher than previously estimated and above regional and national averages. Among local authorities in the South West, Swindon has the highest growth rate at 16.2% since 2001; Wiltshire's 8.8% growth since 2001 is the fourth highest and the highest of rural authorities in the region.¹ Swindon had the sixth highest growth rate outside London in England and Wales.² A wealth of local Census 2011 data is available online.³ Longer term population growth rates are shown in the graph.

The growing population, along with a focus on economic development, raises demand for water, food, consumer goods, buildings, transport and other infrastructure, and produces more waste. This puts ever greater pressure on our natural resources, including land, water and wildlife. The environmental impacts of this are felt within and outside the local area, as large proportions of our food, energy and materials are imported. It is difficult to measure overall levels of consumption but our ecological footprint is thought to be more than double the sustainable level.⁴ There has not been an assessment of the economic and social value of the natural environment and ecosystem services to people in Wiltshire and Swindon.

Actual and projected population growth 1991-2021



1 First data released from 2011 Census: Summary for Wiltshire, Wiltshire Council, 2012
 2 2011 Census – Population and Household Estimates for England and Wales, March 2011, Office of National Statistics (ONS), 16 July 2012
 3 See Wiltshire Intelligence Network: www.intelligencenetwork.org.uk/population-and-census
 4 Stockholm Environment Institute; see State of the Environment 2012 report for details

RYAN TABOR WWIT

RYAN TABOR WWF



Young people are becoming increasingly disconnected from nature

ENVIRONMENTAL AWARENESS

Public awareness of environmental issues influences the behaviour of individuals, communities, local authorities and businesses, as well as government policy and legislation. There is strong national evidence that more people are becoming disconnected from nature in their daily lives.¹ Each generation has different experiences and expectations of the natural environment and younger people may not realise the magnitude of the changes it has gone through in recent decades.

This means the baseline is shifting; young people are less likely to appreciate nature because there is less nature to appreciate. They are less likely to expect or desire the abundance of wildlife that existed 50 years ago because they have not experienced it.²

¹ *Natural Childhood*, Stephen Moss, National Trust, 2012
² 'Biodiversity conservation and the extinction of experience', James R Miller, *Trends in Ecology and Evolution*, 2005

PLANNING AND DEVELOPMENT

In Wiltshire 37,000 new homes are planned to be built between 2006 and 2026. Swindon has increased the number of new homes planned from 25,000 to 29,000.¹ Between 2006 and 2012, 12,054 new homes were completed in Wiltshire and 7,741 in Swindon Borough.²

Figures for the total area of land allocated to new housing are not available. Strategic sites for housing cover 1,959 hectares in Swindon Borough (for about 60% of planned new homes) and 312 hectares in Wiltshire (for around 33% of planned new homes). A further 521 hectares have been permitted in Wiltshire for sites with 10 or more homes. Since 1996, 51.5% of Wiltshire's new housing has been on previously developed (brownfield) sites and 48.5% on greenfield sites; in Swindon Borough this split is 40% brownfield and 60% greenfield.³ From 2013 to 2026, Wiltshire Council estimates that 28% of new homes will be on brownfield sites and 72% on greenfield sites.

In 2012, there were almost 1,600 empty homes in Wiltshire and more than 500 in Swindon. Bringing empty properties back into use can reduce the need for new development and lessen its environmental impact; 681 properties were returned to use in Wiltshire between April and October 2012.⁴

Between 2006 and 2026, the area of land planned for industrial and commercial sites is 323 hectares in Wiltshire and 120 hectares in Swindon Borough.⁵

Transport infrastructure is another major consumer of land, energy and materials (eg. for road building and vehicle production) and transport is a primary source of air pollution and carbon emissions. Motor vehicle traffic has increased steadily in recent decades, but declined slightly in the last five years. In Swindon Borough, vehicle miles peaked in 2008 at 731 million miles, having increased by 31% since 1993. In Wiltshire vehicle miles peaked in 2007 at 2,342 million miles, an increase of 25% since 1993.⁶

In Wiltshire roads take up 36% more land than buildings, while in Swindon Borough there is no difference between them, although the percentage of total land area taken up by roads is 3.9% – much higher than the England average of 2.2%. The proportion of households with access to two or more vehicles rose from 40% in 2001 to 44% in 2011 in Wiltshire, and from 31.8% to 34.2% in Swindon Borough.

The presence of the Ministry of Defence (MoD) in Wiltshire and Swindon is a major driver of change. For example, the MoD's ownership and management of land on Salisbury Plain has preserved large expanses of wildlife-rich grassland which might otherwise have been ploughed for agriculture or developed.



66,000 new homes are planned for Wiltshire and Swindon

CAROLINE ROBSON WWF

¹ *Swindon Borough Local Plan 2026*, Pre-Submission Document, Swindon Borough Council, December 2012
² *Housing Land Availability*, Wiltshire Council and Swindon Borough Council, April 2012 (figures show net gain in homes – number of new homes less the number demolished or otherwise lost)
³ *Housing Land Availability*, Wiltshire Council and Swindon Borough Council, April 2012,
⁴ Empty Homes Agency and Wiltshire Council, 2012
⁵ Wiltshire Council, February 2013
⁶ Department for Transport, 2012 (figures exclude trunk roads: M4, A36, A303, A417, A419)

INVASIVE SPECIES, PESTS AND DISEASES

Our natural environment and ecosystems have been influenced over time by the introduction and spread of non-native species. Some of these are considered invasive, causing damage to the environment, the economy, our health and the way we live. They are one of the greatest threats to biodiversity and can affect whole habitats and landscapes. It is estimated that invasive non-native species cost the English economy at least £1.3bn per annum.¹ Many species such as rabbits have already become part of the altered ecosystem, while others have spread more recently.

Invasive plants in rivers and on their banks are causing serious declines in native wildlife and are affecting river flows across Britain, often choking rivers and causing flooding.² All of Wiltshire and Swindon's river catchments are threatened by invasive plants, although they have not yet spread as widely in Wiltshire and Swindon as in other counties. Preventive action is being taken to minimise their impact.

Species already well-established include Himalayan balsam, orange balsam, Japanese knotweed, giant hogweed, water fern and monkey flower. Species that are present but not very well established yet include Himalayan knotweed, giant knotweed, American skunk cabbage, Australian swamp stoncrop and parrot's feather.³ Many of these were introduced as ornamental garden plants and have spread or been dumped in the wild, often illegally. In April 2014, five additional plant species will be banned from sale: floating water primrose, floating pennywort, parrot's feather, Australian swamp stoncrop and water fern.

Non-native animal species such as the signal crayfish and American mink are invasive and cause damage to native species. The killer shrimp and Asian hornet are not yet known to be established in Wiltshire but could be a significant threat in the near future.

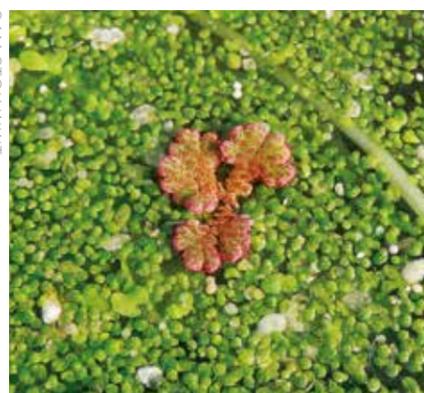
Sika and muntjac deer have been introduced

in the last 150 years, adding to red, roe and fallow deer populations. Their numbers and range are increasing due to a lack of natural predators, despite the killing of hundreds of thousands of animals in England each year through culling and road accidents. Deer are valued highly by some and considered as pests by others. Where they are at high densities their grazing can prevent plant growth and damage trees.

Whole habitats and ecosystems are affected by pests and diseases, often introduced from outside the area in imported plants or spread by animals or in the wind. Since 2012, the spread of the *Chalara fraxinea* infection in ash trees, known as 'ash dieback', has caused widespread concern across the UK. Infected trees are likely to die, causing immense damage to whole ecosystems such as hedgerows and woodland, in addition to the loss of the trees themselves. As of July 2013, there were two confirmed cases of infection in Wiltshire at recently planted sites near Calne and Melksham. Sixty per cent of cases in the UK have been at recently planted sites, with infection in the wider environment largely restricted to eastern parts of England and Scotland and one case confirmed in Devon in July 2013.⁴

Bovine tuberculosis (bTB) affects cattle and wild mammals, and is transmitted as a respiratory disease between animals. It has spread since the late 1980s to cover large areas of west and south west England and Wales, and other parts of Great Britain. Its impact varies greatly from county to county; from 2008 to 2012, more than 6,500 cattle were slaughtered in Wiltshire, compared to almost 32,000 in Devon and 4,450 in Dorset. In 2012, between 170 and 200 herds in Wiltshire were under restrictions each month due to a bTB incident. Two pilot badger culls are being carried out in 2013 in West Gloucestershire and West Somerset with the aim of reducing the spread of bTB.

SAM STOK WWF



A tiny water fern (azolla) can...

SAM STOK WWF



...spread to this!

DARIN SMITH



Muntjac deer: friend or foe?



The parrot's feather can...

SAM STOK WWF



...choke waterways

SSNNS

¹ *The Economic Cost of Invasive Non-Native Species on Great Britain*, Williams et al, CABI, 2010
² *Managing invasive non-native plants*, Environment Agency, 2010
³ 'Source to Sea' project, Wiltshire Wildlife Trust, 2013
⁴ Forestry Commission, July 2013

CLIMATE CHANGE

Climate change is one of the greatest threats to our environment, society and economy. Increasing greenhouse gases in the atmosphere are changing our climate and further change is now unavoidable.¹ This topic presents data on greenhouse gas emissions, actions to reduce emissions (mitigation) and progress in adapting to a changing climate.

RYAN TABOR WWT



Climate change leads to flooding

Greenhouse gas emissions²

From 2009 to 2010, estimated carbon dioxide (CO₂) emissions per person increased by 0.2 tonnes in Wiltshire and Swindon and fell significantly in 2011 (see table, above right). This reflected similar trends in the South West and England. These figures are all based on direct use of energy through gas, petrol and other fuels; they exclude emissions from motorways, railways and other major sources beyond the influence of local authorities. They also exclude emissions that come from producing food and other goods elsewhere, which are then consumed locally.

Emissions per person (see table, above right) in Wiltshire in 2010 and 2011 remained significantly above the England average (16%). This appears to be due to higher than average use of energy in homes, with more homes using 'other fuels' (such as oil and coal, which have greater CO₂ emissions), and fewer using gas, as well as higher emissions from road transport, particularly A roads. This is likely to be because Wiltshire's population is highly dispersed,

with about half living in rural areas. Many areas are not connected to the mains gas supply and private vehicles are the primary form of transport. In Swindon Borough, emissions per person from home energy use and road transport are lower than the national average, while industrial and commercial emissions are higher. Domestic electricity sales per consumer are consistently higher in Wiltshire than the national average – 18% in 2010 – while domestic gas sales per consumer are slightly below average in both Swindon and Wiltshire.

Since 2005, in both Wiltshire and Swindon, emissions from transport on A roads have gradually decreased, while emissions from transport on minor roads have increased by 1% and 2% respectively. Emissions from 'other fuels' in homes has increased by 9% since 2005 in both areas, although this accounts for a much smaller proportion of total emissions in Swindon (1.5%) than in Wiltshire (8.9%).

Climate change mitigation

Reducing energy use and generating renewable energy helps to lower greenhouse gas emissions, mitigating our contribution to climate change. Energy efficiency also has benefits for our health and wellbeing, helping us to stay warm and dry and to save money. The proportion of households in fuel poverty in 2010 was 11.7% in Swindon and 12.8% in Wiltshire, below the national average (16.4%). Energy efficiency measures benefit the local economy, including by providing employment for installation companies and reducing energy costs for businesses. Installations of domestic loft and cavity wall insulation are significantly lower than the national average in Swindon, while in Wiltshire they are close to or above the average.³ Insulation rates dropped significantly in early 2013 due to changes in the government's insulation programme.

In Wiltshire and Swindon, renewable energy is largely generated as electricity from small-scale solar photovoltaic (PV) systems and landfill gas, and as heat from biomass (including energy recovered from waste), heat pumps and solar thermal. The proportion of

homes in Wiltshire using PV was almost double the national average and slightly below average in Swindon (June 2012). The growth in overall renewable energy capacity from 2010 to 2012 is shown in the table (right). After several years of relatively slow growth, there was a dramatic increase in 2011/2012; the number of solar PV projects in Wiltshire and Swindon shot up from 347 in 2011 to 5,317 in 2012. Continued high growth is predicted in the next few years as several large-scale projects, including land-based solar PV farms, are completed. In 2012, Wiltshire and Swindon had the lowest renewable heat capacity compared with other local authorities in the South West region.⁴

Renewable energy installations, from domestic solar PV to wind farms, can have environmental impacts in terms of landscape and the historic and natural environment; these are considered through the planning process. The proposed Wiltshire Core Strategy and Swindon Borough Local Plan contain policies on planning for future renewable energy installations.

CO₂ emissions per person (tonnes)

	Swindon	Wiltshire	South West	England
2011	5.8	6.5	5.8	5.6
2010	6.6	7.2	6.4	6.2
2009	6.4	7.0	6.2	6.0
2008	7.4	7.7	6.8	6.7
2007	7.5	7.9	7.0	6.8
2006	7.8	8.2	7.3	7.1
2005	7.8	8.2	7.3	7.1

Note: Figures are for emissions within the scope of influence of local authorities; figures for 2011 are provisional
Source: DECC

CO₂ emissions per person (tonnes) by sector 2010



Source: DECC

Renewable energy capacity (MW)

Swindon	2010	2011	2012
Renewable electricity capacity	4.90	7.12	15.09
Renewable heat capacity	0.45	1.41	1.45
Total	5.35	8.55	16.54
Wiltshire	2010	2011	2012
Renewable electricity capacity	10.39	11.11	44.68
Renewable heat capacity	2.25	4.07	5.19
Total	12.64	15.18	49.87

Source: Regen South West annual surveys

1 The UK Climate Change Risk Assessment, Government Report, HM Government, January 2012
2 All data under this heading is from the Department of Energy and Climate Change (DECC)
3 DECC
4 Regen South West annual surveys

WWT



Flooding disrupts our daily lives

TINA TOWNEND



Species like the little egret are moving north as temperatures rise

Climate change adaptation

Our climate is already changing as a result of increased greenhouse gases in the atmosphere. Unusual and extreme weather events are becoming more frequent – as experienced during the drought and floods of 2012 and the cold spring of 2013. The average annual temperature in England has already risen by about 1°C since the 1970s.¹ In the long term, it is predicted that there will be hotter, drier summers and milder, wetter winters, with more frequent extremes of dry spells and heavy downpours.

The disruption and damage caused by climate change are already having a significant impact on our daily lives, farming and the economy. The flooding of 2012 affected properties, farm crops and transport systems and the cost to the UK insurance industry was estimated at more than £1bn.² Climate change will also have serious consequences for our health, particularly among the poorest and most vulnerable in society, who are unable to cope with events such as heatwaves. Efforts to adapt to climate change can also help to reduce greenhouse gas emissions and enhance ecosystem functioning. For example, high quality green spaces in urban areas will encourage people to walk or cycle rather than drive, increase tree cover to provide shade, reduce the risk of flooding and give space for wildlife.

Our ecosystems are also adapting to a changing climate. Wild plants and animals will be lost and gained in Wiltshire as they

travel to find more suitable conditions. Birds, butterflies and moths are already moving north as temperatures rise; the recent increase in little egret numbers in Wiltshire is one example. This movement may introduce new invasive species, pests and diseases to our local environment.

Extreme weather events and changes in the timing of seasonal events are disrupting the current behaviour patterns of plants and animals, including breeding, feeding and migration. River species such as salmon are at risk from higher water temperatures and changes in quality, such as saltness in the sea. Water availability will be affected by drought, which could lead to wholesale changes in our river systems and their wildlife, as well as public water supply.³

In the long term, our ecosystems are unlikely to be able to keep pace with the unprecedented rate of climate change. This will lead to irreversible and significant changes in our natural environment, and have major impacts on our lives. Our understanding of all this is limited and requires increased monitoring and research. Already on the basis of current evidence, there is a clear need for immediate action to conserve wildlife, habitats and ecosystems, to make them more resilient and able to adapt to climate change.⁴ For example, tree planting on river banks provides shade to keep water temperatures cool, helping trout, salmon and other species to survive.

1 Wiltshire Council, 2012
2 Price Waterhouse Cooper, 23 November 2012
3 A Summary of Climate Change Risks for South West England, Climate UK, 2012
4 England Biodiversity Strategy Climate Change Adaptation Principles, Defra, 2008

POLITICS, SCIENCE AND TECHNOLOGY

Legal and policy frameworks introduced by national, European and international bodies are key drivers of change in Wiltshire and Swindon's environment in relation to greenhouse gas emissions, renewable energy, water quality and air quality. Policy and legislation for farming practices have had particularly widespread and wide-ranging impacts. Government grants in the mid-20th century encouraged increased food production which led to grassland being ploughed up and hedgerows removed. By the late 20th century, agri-environment schemes had been introduced to improve environmental management and the current reform of the European Common Agricultural Policy (CAP) will bring further changes.

There is also continuing pressure on farmers to increase production to contribute to global food security while reducing greenhouse gas emissions. The globalisation of our food system and (at the opposite end of the spectrum) the recent resurgence in local food sales, have also affected market prices, farming practices and consumer demand.

Developments in science and technology, including in transport, industry, waste management and energy production, are continual drivers of change. Mechanisation and use of chemicals in farming have been particularly influential and in future, biotechnology and more precise application of water and chemicals may drive further changes in the natural environment.

Local food sales are influenced by global markets



CAROLINE ROBSON WWT

Habitats and wildlife

■ This is a county of farming and as such is heavily influenced by national and European policy; in turn farming affects our ecosystems, soils, water, wildlife, landscapes and people

■ We have wildlife-rich grasslands and rivers that are internationally important. However, while wildlife sites are on the whole well managed, they are not well connected so wildlife struggles to move between them

■ Many wildlife species are suffering from long-term declines, made worse by the dry winters and wet summers of recent years

■ Underlying geology – mainly chalk, clay or limestone – has an impact on land use, landscape character and wildlife. There are 11 distinct Landscape Biodiversity Areas within Wiltshire and Swindon

LAND USES AND HABITAT TYPES

Farmland

Farming accounts for about 80% of the total area due to the suitability of soils and landscapes. Around half is arable and half is grassland for grazing animals. The management of farmland has widespread and direct impacts on soils, water, wildlife, other habitats, landscapes and people, and this has been strongly influenced by national and international drivers of change (page 11).

Since the late 1980s, agri-environment schemes have funded environmental management by farmers and other land managers. Almost 73% of farmland in Wiltshire and Swindon is covered by 1,171 agri-environment agreements, above the England average of 68%. Their value in payments to farmers is almost £13m per year in Wiltshire and Swindon.¹

The most popular agri-environment management options include: organic management; permanent grassland with low/very low inputs; six-metre buffer strips on cultivated land; field corner management; and restoration of species-rich, semi-natural grassland. There is national evidence that these schemes have been effective in many respects, but have not yet reached their potential in delivering the full range of ecosystem services and adapting to climate change.² Higher Level Stewardship (HLS) schemes aim to deliver greater environmental benefits in priority areas and themes. In Wiltshire and Swindon the target areas are The Cotswolds, North Wessex Downs, Salisbury Plain and West Wiltshire Downs.³

The large area of 'permanent pasture' shown

in the table (page 18) includes grassland that has been 'improved' (with chemical fertilisers and pesticides) as well as semi-natural grassland which may be 'unimproved'. The improvement of grassland gives higher yields for farming in the short-term but affects pollination, soil quality and wildlife. In the 20th century, 97% of semi-natural grassland in England and Wales is estimated to have been lost to ploughing or improvement.⁴ Today, Wiltshire and Swindon contain about 55% of Britain's remaining unimproved calcareous (chalk) grassland (more than 19,000 hectares) and an estimated 19–26% of Britain's unimproved neutral grassland – traditional wildflower meadows which are one of the most threatened lowland habitats in the UK (around 1,900 hectares).⁵

Woodland

The area of woodland (8.8%) in Wiltshire and Swindon has hardly changed for centuries, much of it having previously been cleared for farming. This is slightly below the average of 10% woodland cover across England.⁶ Important ancient and semi-natural woods remain, which host a huge variety of wildlife and provide a wide range of ecosystem services. In the 20th century, large areas were replaced with conifer plantations, which support less wildlife. These are now starting to be managed to attract more wildlife. Many woods are isolated, making them less resilient to change and preventing wildlife from moving between sites. Since 1993 the Great Western Community Forest initiative has seen about 1,000 hectares

BEECH TREE IN SAVERNAKE FOREST: STEPHEN DAVIS WWF

¹ *Wiltshire Agri-Environment Schemes: Key information, scheme uptake and expenditure data*, Natural England, November 2012

² *Agri-environment schemes in England 2009: A review of results and effectiveness*, Natural England 2009

³ Natural England, 2013

⁴ *UK National Ecosystem Assessment (NEA)*, UNEP-WCMC, 2011

⁵ WSBRC; UK BARS; Natural England; comprehensive mapping has not been carried out

⁶ Forestry Commission, 2012

of new woodland planted across Swindon Borough and parts of North Wiltshire and Oxfordshire.

Rivers and other water bodies

The three main river systems – the Salisbury Avon, the Bristol Avon and the Thames – are important examples of chalk streams and winterbournes, lowland clay rivers and limestone rivers. The Salisbury Avon is designated as a European Special Area of Conservation (SAC) for its biodiversity. Rivers have shaped Wiltshire and Swindon’s landscapes and are vital for wildlife, farming, public water supply and recreation, along with canals, ponds and lakes such as the Cotswold Water Park and Coate Water near Swindon. Yet many of these water bodies face threats, outlined in more detail on pages 22, 23, 27 and 30.

Other habitats

A variety of other wildlife habitats are present in small patches. Many are remnants of larger areas and are now isolated in the farmed landscape. These sites are often priorities for nature conservation (see page 19), but their isolation makes it harder for wildlife to move between them and thrive.

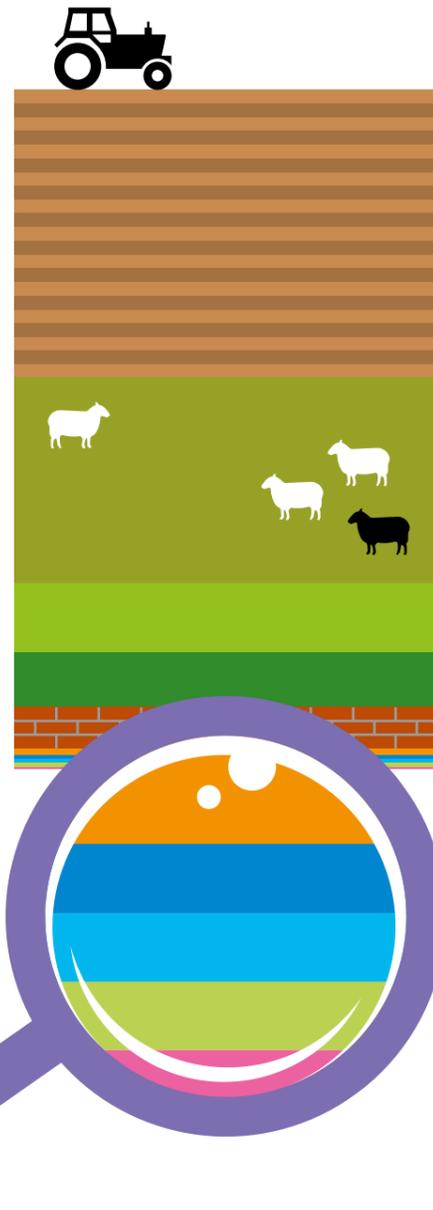
Overall

Land uses and habitat types are presented in the graphic (right), giving an indication of current coverage according to the best available data. No comprehensive and current map showing this information exists.

The condition of every habitat type has not been assessed. For available data see page 23.

How habitats link together is not well understood, even though this is important if wildlife is to move between sites and adapt to changing conditions.

Broad land use and habitat types in Wiltshire and Swindon



Total land area
348,500 hectares (100 hectares = 1km²)

Crops
147,304 hectares • 42.36%

Permanent pasture
108,332 hectares • 31.15%

Temporary grass
35,468 hectares • 10.20%

Broadleaved/mixed/yew woodland
26,733 hectares • 7.69%

Built-up areas and gardens
22,736 hectares • 6.54%

Conifer woodland
3,816 hectares • 1.10%

Standing open water
1,024 hectares • 0.29%

Rivers and streams
980 hectares • 0.28%

Other priority habitats*
947 hectares • 0.27%

Permanent fruit and vegetables
419 hectares • 0.12%

*includes inland rock, fen, marsh, swamp, acid grassland, bracken and heathland. Data sources: ONS Land Use Statistics 2010 (built-up areas and gardens); Rural Payments Agency data 2012 (crops, permanent pasture, temporary grass, permanent fruit and veg); Wiltshire and Swindon Biological Records Centre 2012 (all other).

GRAHAM COULES



Dot moth larvae: this species has declined by 88% in the last 30 years in Britain

WILDLIFE SPECIES

In 2012–13, the wettest 12 months on record followed the driest two-year period on record, making it a very poor year for wildlife. Opportunities for feeding, sheltering and breeding were reduced for many species including bats, butterflies, dragonflies and birds. The cold spring of 2013 is likely to have had further impacts on wildlife this year.

New analysis of bird monitoring data in Wiltshire gives an indication of trends from 1995 to 2010. This confirms that generalist species are faring better than specialist species. Of the 97 more common bird species, 30 species are at least 10% more widespread, 27 declined by 10% or more and the remaining 40 are substantially unchanged. Three species have established breeding populations in the past 10 years: raven, red kite and little egret. Herring gull and common tern have also increased significantly.¹ The greatest declines are shown in the table, reflecting national trends. Statistics on bird populations in

England as a whole for 1970 to 2011 show severe declines in many specialist farmland and woodland birds, with little change in recent years.²

More information is available on longer term trends at regional and national levels. For example, in southern Britain, the abundance of the larger moth species decreased by 40% between 1968 and 2007. This is thought to be an indication of the rapid loss of insect diversity in Britain. Butterflies have also suffered long term declines; in 2012 butterfly abundance reached a record low in the UK due to the poor weather conditions.³

Across the UK, quantitative trends are available for only 6.7% of the 47,000 or so terrestrial and freshwater species in the UK, and for very few of the 8,500 marine species. The assessments of those 3,147 species show that 60% have declined over the last 40 years and 30% have declined strongly.⁴

Declining trends in bird species

	Wiltshire 1995–2012	UK 1995–2010
Turtle dove	-70%	-80%
Grey partridge	-69%	-55%
Lesser spotted woodpecker	-60%	n/a*
Willow tit	-57%	-79%
Cuckoo	-52%	-49%
Common nightingale	-50%	-52%
Little owl	-48%	-40%
Curlew	-41%	-44%

*Longer term UK trend since 1970 is 71% decline
Sources: Wiltshire Ornithological Society; State of the UK’s Birds 2012



Grey partridge populations fell by 69%

- 1 Wiltshire Ornithological Society, 2013
- 2 Defra, 2013
- 3 Butterfly Conservation, 2013
- 4 *State of Nature 2013*, published by a partnership of 25 UK conservation and research organisations

Wildlife and ecosystem services

Biodiversity is the name given to the *variety* of wildlife that ranges across all living organisms, from bacteria to birds. It underpins all ecosystems and the services they provide to humans. The more species and abundance of biodiversity we have, the better the health of our natural environment and the quality of ecosystem services. Wildlife is a good indicator of our ecosystems’ health.

Our understanding of the state of our biodiversity and its role in ecosystem services is very limited, with data only available on recognised wildlife sites and a small proportion of species. In Wiltshire, a four-year research project – Wessex Biodiversity and Ecosystem

Services for Sustainability (BESS) – is underway funded by the UK Natural Environment Research Council. It aims to understand how biodiversity underpins ecosystem functions and services with a focus on the Wessex Chalk region in south-eastern Wiltshire, including Salisbury Plain. It is looking at four key services: climate regulation, water-related services, crop production and cultural services. The results will significantly boost our understanding of biodiversity and ecosystem services in Wiltshire and Swindon, and so help to inform local decision-making and land management.

Speckled bush cricket nymph: insects play a key role in making ecosystems work



PENNY FRITH



DAVID KJAER WW1

Monitoring

Monitoring, recording and analysing data to show accurate trends in wildlife is notoriously difficult and time-consuming. Hundreds of individuals, mainly dedicated volunteers, devote considerable time and energy to this task, yet it is often not possible to compare data between years due to differences in the times, places and methods of data collection. In some cases, data is available but there is no capacity to analyse it due to lack of resources. The state of wildlife from year to year is also highly variable depending on weather conditions and a range of other factors. In some years, it is difficult to attribute changes in the state of wildlife to any specific factors.

Recording in Cloatley Meadows nature reserve near Malmesbury

MARGARET HOLLAND

LANDSCAPE BIODIVERSITY AREAS

Eleven Landscape Biodiversity Areas across Wiltshire and Swindon were defined in 2012, giving an overview of the main habitats and land uses. The map shows the strong influence of the underlying geology on the distinct ecosystems, wildlife, landscape character and local communities in each area.

1

Wiltshire Upper Thames Clay Vale

Low-lying rural area on the River Thames floodplain, with wet pasture, arable farming and rare traditional hay meadows, including North Meadow and Clattinger Farm, which have internationally-important snakeshead fritillaries; wildlife-rich lakes in the former gravel pits of the Cotswold Water Park.

2

Swindon Ridge and Clay Lowlands

Swindon town lies on top of Purbeck and Portland Stone; arable and pastoral farmland, and mixed deciduous woodland to the north; a limestone ridge runs northeast-southwest, with hills, dry woodland, sandy pastures and arable fields; undulating clay vales to the south with arable and pasture land; Rivers Ray and Cole feed into the Thames.

3

Braydon Forest

Low-lying floodplain of Oxford Clay, interspersed by Kellaways Sand and limestone; part of the historic Royal Hunting Forest of Braydon, with a mosaic of ancient woodland and unimproved neutral grassland, particularly traditional hay meadows; tributaries of the Thames and the Bristol Avon.

4

Cotswolds Limestone Lowland

Rolling limestone region, largely farmed; Bristol Avon and By Brook river systems have carved steep valleys and limestone scarps with calcareous grassland and mixed deciduous woodland; to the east and north are meadows and wet woodlands; Box Mine and Winsley Mines in the south are of European importance for bats.

5

Marlborough Downs and Savernake Forest

Marlborough and Pewsey Downs are distinct areas of high chalk downland dissected by dry valleys and coombes; intensively farmed, with unimproved calcareous grassland primarily on the steep scarps; important for rare butterflies, orchids and endemic early gentian; River Kennet, tributary of the River Thames, supports lowland meadows and wet woodland; important woodland in the southeast includes Savernake Forest and West Woods.

6

Bristol Avon Vale

Open clay vales and rolling clay lowland, shaped by the Bristol Avon and its tributaries; intensively-managed pastures, with arable farming on the floodplain; ancient and wet woodland and some neutral grassland; a diagonal limestone ridge from the north east gives way to clay vales to the west; greensand hills to the south contain historic parklands and wooded estates.

7

Vale of Pewsey

Undulating, low-lying greensand valley, with rounded chalk scarps to the north and south; intensively farmed, meadows and pasture predominantly along the waterways with arable farming dominating the chalk foothills; strong examples of the former mosaic of meadows, fens and wet woodland types; the Kennet and Avon canal crosses the area and streams feed into the River Avon; pockets of mixed deciduous woodland and beech and yew woodland.

8

Salisbury Plain

Open, rolling chalk plateau with the largest area of lowland calcareous grassland in northwest Europe, dissected by chalk river valleys with alluvia and terrace gravels; UK's largest military training area, it has avoided intensive agricultural practices and is internationally important for butterflies, farmland birds and other wildlife; elsewhere arable and livestock farming; chalk rivers support water meadows, wet and dry woodland; in the northeast, Collingborne Wood.

9

West Wiltshire Downs and Cranborne Chase

Open chalk downland with significant ancient woodland sites; downlands used extensively for arable farming; areas of unimproved chalk grassland on the steep chalk scarps and ridges; Cranborne Chase is a remnant of an ancient hunting forest with semi-natural woodland and strong agricultural and woodland heritage; chalk river systems including the River Wyle, with important water meadows.

Wiltshire's geology

- Bagshot beds
- Chalk
- Clay with flint and plateau flint gravels
- Corallian beds
- Gault clay
- Great oolite
- Inferior oolite or lias
- Kellaways sand
- Kimmeridge clay
- Landslip
- London clay and Reading beds
- Lower greensand
- Oxford clay
- Purbeck and Portland
- River alluvia and river terrace gravels
- Upper greensand
- Rivers
- Kennet & Avon Canal

10

Vale of Wardour

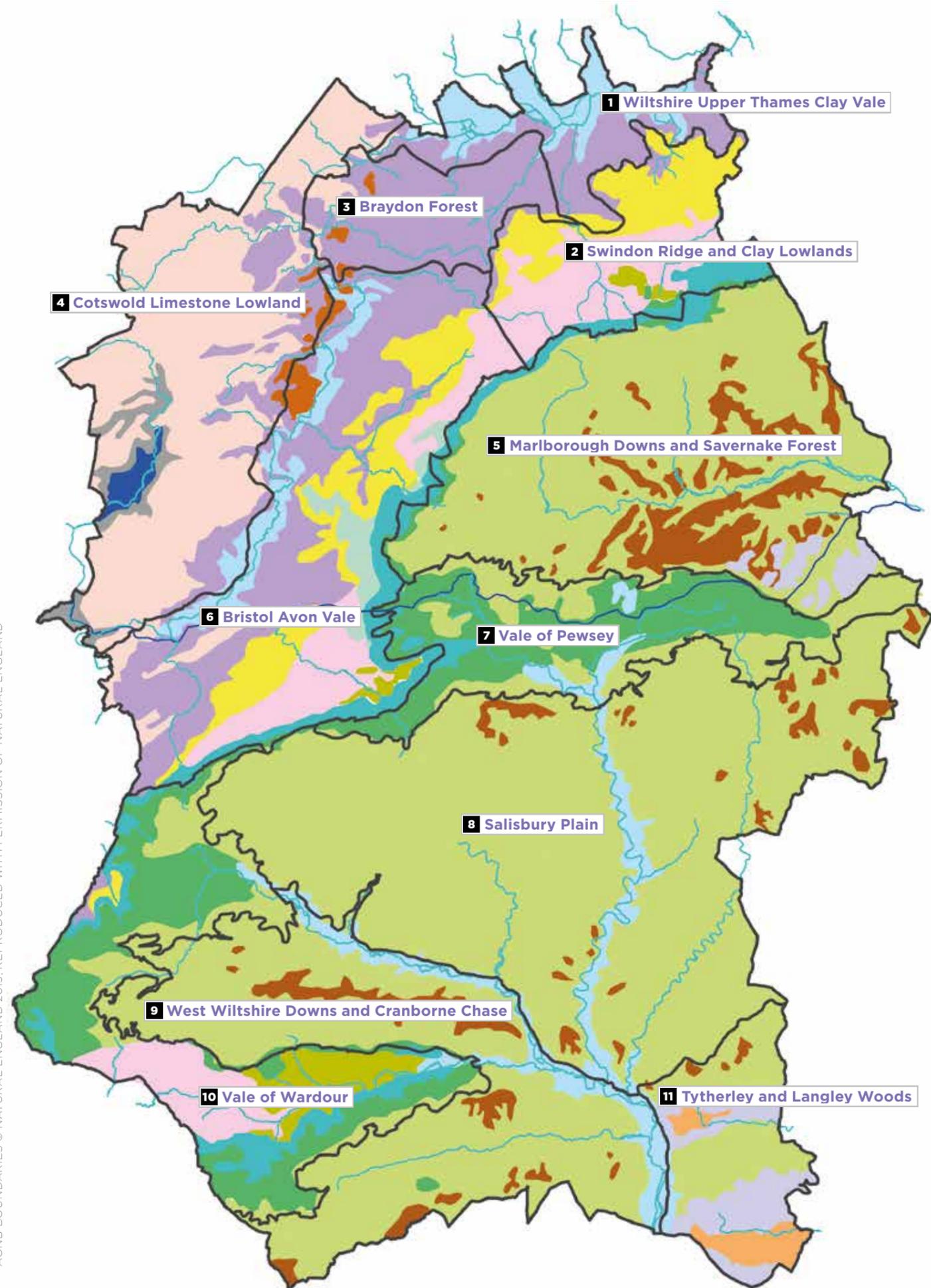
Clay vale and wooded hills, geologically and ecologically diverse, with Rivers Nadder, Wyle and Biss supporting meadows, purple moor-grass and rush pasture, grazing marsh and lowland fens; a range of soil types supports wet woodland, conifer woodland, and neutral and calcareous grasslands; extensive ancient woodland; Purbeck and Portland stone north of the River Nadder, with many quarries important for bats and other wildlife.

11

Tytherley and Langley Woods

Highly wooded landscape on distinct bands of sand and clay in the north and south, separated by a long scarp of calcareous grassland; Tytherley Forest in the north is an ancient semi-natural broadleaved woodland renowned for its butterflies; Langley Woods and the tip of the New Forest in the south are mainly acid woodland with heathland and bog, purple moor-grass and rush pasture; remnants of traditional common land; Blackwater River and River Dunn flow east to the River Test.

Further information on Landscape Biodiversity Areas is available at www.Link2Nature.org.uk



DATA PRODUCED BY THE WSBRG BASED ON ORDNANCE SURVEY 1:25,000 SCALE COLOUR RASTER © CROWN COPYRIGHT 2013. ALL RIGHTS RESERVED. LICENCE NUMBER 100005798 AONB BOUNDARIES © NATURAL ENGLAND 2013. REPRODUCED WITH PERMISSION OF NATURAL ENGLAND

WILDLIFE SITES

Sites of Special Scientific Interest (SSSIs) and Local Wildlife Sites (LWSs) (see table, below left) are among the most important sites for wildlife. Lowland chalk grassland (29,813 ha) and lowland broad-leaved, mixed and yew woodland (13,629 ha) are by far the main habitat types covered by SSSIs and LWSs, followed by lowland neutral grassland (2,542 ha). While there are 1,655 sites, with the exception of Salisbury Plain, they are not well connected.

The proportion of Local Wildlife Sites known to be receiving positive conservation management in the previous five years has

Coverage of recognised wildlife sites in 2012

SSSIs	Swindon Borough	Wiltshire	England
Number	8	127	4,121
Area (km ²)	1.36	280.94	10,643
% of total land area	0.6%	8.6%	8%
LWSs			
Number	87	1,433	41,000 +
Area (km ²)	7.92	211.79	7,112 +
% of total land area	3.4%	6.5%	5%
Wildlife sites as a % of total area	4%	15.1%	13%



Shaggy ink cap is commonly found on road verges: over 3,000 fungi species have been recorded in Wiltshire

continued to increase (see table, below) and has reached 59% in Swindon and 70% in Wiltshire – significantly above the national average of 45%. Each site is assessed every five to 10 years. Part of the reported increase is due to improving data quality and improved uptake of agri-environment schemes. These statistics also include Protected Road Verges (PRVs), which are vital refuges and corridors for wildlife. They are designated by local authorities and are managed to prevent damage from inappropriate cutting and planting, pollution, fly-tipping, road vehicles and road widening.

Local Wildlife Sites receiving positive conservation management

	Swindon Borough	Wiltshire	England
2008-09	37%	43%	32%
2009-10	46%	54%	39%
2010-11	53%	65%	43%
2011-12	59%	70%	45%

Source (above): Defra 2012
 Note: Statistics for local wildlife sites include local geological sites and Protected Road Verges (PRVs)

Source (left): Natural England November 2012 (SSSIs) Defra, The Wildlife Trusts (Local Wildlife Sites 2011/12), ONS 2012 (land areas)

Note: A small proportion of SSSIs and LWSs included in this data are recognised for their geological interest

Areas of concern

Among the 10 European-designated Special Areas of Conservation (SAC) within Wiltshire, two sites are of particular concern as more than half of their area is assessed as 'unfavourable no change' condition:

■ Chilmark Quarries near Tisbury, designated for its late Jurassic rocks and fossils and its large wintering roost of bats – Natural England is planning the necessary works to improve its condition.

■ River Avon (Salisbury) – issues with the condition of this rich and diverse chalk river system are well documented, including low river flows, high phosphate levels and other pollution, non-native invasive species and damage to river banks. The need to protect this SAC from the impacts of development has been recognised in the Wiltshire Core Strategy and several projects are underway to improve its condition and to meet objectives for 'good ecological status' set under the EU Water Framework Directive.

River Avon at Salisbury



DAVID KJAER WW1

SSSIs

The condition of SSSIs in Wiltshire and Swindon is summarised in the table (below) – this has not changed significantly since 2010 (the condition of SSSIs by habitat type is shown, right). SSSI condition is assessed on a six-year cycle, so only a small proportion of sites are assessed each year.

By 2020, the government's target is for 50% of SSSIs to be in 'favourable' condition and 45% to be in 'unfavourable recovering' condition. In Swindon, more than 50% of SSSI area is already in 'favourable' condition. However, another 35% of the SSSI area is represented by Burderop Wood near Chiseldon, which is Swindon Borough's largest SSSI and is currently in 'unfavourable no change' condition due to pressure from deer grazing. The overall target can only be met if this improves.

In Wiltshire, the target can only be met through a change in the assessment of Salisbury

Plain from 'unfavourable recovering' to 'favourable condition', as this accounts for 70% of Wiltshire's SSSI area. Natural England and the Ministry of Defence (MoD) are working to bring large areas of chalk grassland into 'favourable' condition through scrub removal and juniper regeneration, including by working with tenant farmers through agri-environment schemes. The next SSSI condition assessment of Salisbury Plain is scheduled for 2014.

Longer term data from 2005 (see chart, below) shows that SSSI condition has improved significantly in Swindon Borough while in Wiltshire, it appears that some SSSIs have improved while others have deteriorated.

This may be due to changes in the criteria for 'favourable' condition, which includes requiring more detailed wildlife monitoring. This is likely to have meant that many SSSIs were reclassified.

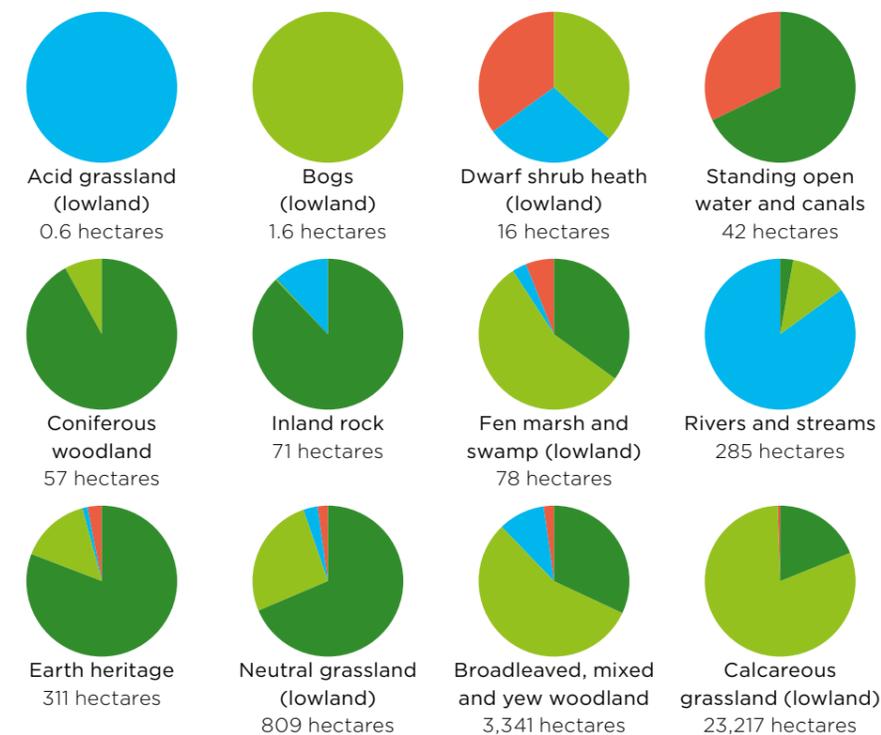
Condition assessment of SSSIs by region

	Swindon Borough	Wiltshire	Wiltshire & Swindon	South West	England
% Favourable	50.13	22.63	22.73	40.84	37.55
% Unfavourable (recovering)	14.04	74.92	74.66	54.35	58.56
% Unfavourable (no change)	35.38	2.01	2.17	2.98	2.21
% Unfavourable (declining)	0.44	0.44	0.45	1.80	1.66

Source: Natural England, April 2013

Condition of SSSIs in Wiltshire and Swindon by habitat

■ % Favourable ■ % Unfavourable (recovering) ■ % Unfavourable (no change) ■ % Unfavourable (declining)



Source: Natural England, April 2013

Change in condition of SSSIs

■ % Favourable ■ % Unfavourable (recovering) ■ % Unfavourable (no change) ■ % Unfavourable (declining)



Swindon 2005 2013
 Wiltshire 2005 2013



Meadow flowers at Clattinger Farm nature reserve SSSI and SAC, near Minety

BARNEY WILCZAK

Nature's services

- Air quality is generally good, except in certain urban centres
- Natural functioning of our rivers and aquifers is being disrupted by pollution, development, farming practices and extreme weather
- Little information is available about some essential services, including soil quality, carbon storage, food networks and pollination
- Landfilled waste is decreasing, due to more recycling, composting and energy generated from waste
- Water is increasingly being transferred into the area from other counties to meet future demand
- Our distinctive historic environment, green spaces and landscapes bring a range of benefits to local people and visitors

REGULATING OUR ENVIRONMENT

One of the key features of our natural environment is its ability to regulate itself through cycles of carbon, nitrogen, phosphorus, water and energy. This self-regulation provides us with the things that are essential to our survival: a liveable climate, clean air, water and soils, pollination of crops and management of hazards, floods, disease, pollution and waste. Biodiversity plays a vital role in providing these services, from micro-organisms to plants and bees. When regulating services are functioning well, with high levels of biodiversity, our environment is more resilient and able to deal with change.

Climate regulation

Local land management and human activities contribute to the regulation of our climate, by absorbing, storing or emitting greenhouse gases. Trees, grasses and soils absorb carbon dioxide from the atmosphere, reducing emissions that cause climate change. Woodland is estimated to be the greatest store of carbon per hectare and, in Wiltshire and Swindon, the extensive areas of permanent grassland and other undisturbed soils are also important carbon stores. The ploughing of large areas of grassland for arable farming in the 20th century will have released large quantities of carbon. There are no specific estimates of land-based carbon for the local area and general estimates vary depending on how the land is managed.¹ Sustainable harvesting and use of timber also helps to store carbon and acts as a substitute for fossil fuels.

Arable and livestock farming are also sources

of greenhouse gas emissions, mainly from the disturbance of soils through ploughing, the application of nitrogen fertilisers and the methane produced by ruminant animals. Development of land for buildings and other hard surfacing (such as roads or car parks) removes the capacity of that land to help regulate the climate. The specific impacts of different land uses and farming practices in terms of climate regulation are not yet fully known, but more intensive uses are thought to have higher impacts.²

Details of our progress in mitigating and adapting to climate change are covered in 'Drivers of change' (page 11).

Air quality

Air quality across Wiltshire and Swindon is generally good. Air pollution from road and railway traffic in urban areas is of concern for its impact on public health. High levels of road traffic and congestion also have implications in relation to road safety, noise, carbon emissions, physical activity, quality of life, fuel costs and time spent travelling. In urban areas, trees and green space help to absorb pollutants and improve air quality.

In Wiltshire, there are now eight Air Quality Management Areas (AQMAs), including a new AQMA declared in Calne in 2013; the Devizes AQMA was extended in 2012. Their main source of air pollution is nitrogen dioxide from road traffic, with levels of fine particulate matter also of concern in Bradford on Avon. Detailed and continued assessments in Swindon have not

¹ 'Mapping ecosystem service and biodiversity changes over 70 years in a rural English county', James M Bullock and Danny AP Hooftman, NERC Centre for Ecology and Hydrology, *Journal of Applied Ecology*, 2013 (doi: 10.1111/1365-2664.12093)

² *NEA*, 2011

identified a need to declare any AQMAs. Levels of air pollution in many of Wiltshire's towns and the city of Salisbury are made worse by their historic design and topography, whereas in Swindon's more open setting, vehicle emissions are easily dispersed or absorbed by trees and green space. In both areas, significant housing and commercial/industrial developments are planned that would impact on areas of concern and the local authorities are producing air quality policies and Supplementary Planning Guidance that will integrate the issue into development and transport strategies.

The use of road vehicles is predicted to continue increasing – by 28% in Wiltshire by 2025, for example.³ However, air pollution from road transport overall is expected to decline due to new vehicles that are cleaner and less harmful to the environment. The predicted increase in heat waves and unusual weather events as a result of climate change will also have impacts on air quality as many air pollutants become more concentrated in higher temperatures.

Air quality regulation is also an essential function of a healthy natural environment

and this is affected by high concentrations of pollutants. Road traffic, farming, power stations and industry emit pollutants into the atmosphere and these are deposited on plants and on the land, leading to acidification and eutrophication of the environment (its response to artificial or natural substances). This affects natural systems and has negative impacts on wildlife habitats and species, as well as the growth of crops.⁴

In Wiltshire and Swindon, the main pollutants are likely to be ammonia and nitrates from intensive animal housing, manure and slurry management, fertilisers and pesticides on farmland and nitrogen oxides from road traffic. However, there is no easily accessible overview of this issue in relation to Wiltshire and Swindon and further analysis is needed to identify the levels of pollution and their environmental impacts. There is uncertainty about the impact of air pollution on several European Special Areas of Conservation (SACs) and nitrogen deposition from agriculture may be an issue at North Meadow and Clattinger Farm SAC.⁵



STEVE DAY WWIT

Field maple: trees absorb carbon dioxide from the atmosphere, improve air quality and protect soils

3 Wiltshire JSA 2012/13, Wiltshire Council, 2012
 4 NEA, 2011
 5 Wiltshire Core Strategy Submission Draft – Assessment under the Habitats Regulations, Wiltshire Council, February 2012

Soil quality and land contamination

The quality of our soil determines the quality of services that it provides; it sustains a healthy natural environment and is the basis of food production and wildlife habitats. There is very little information about the current status of soils, even at a national level, although there is general evidence of deterioration in soil quality on farmland, semi-natural grasslands and other habitats.¹

Farming and construction are likely to be the broadest influences on soil quality in Wiltshire and Swindon. Arable and livestock farming, particularly in the last 60 years, has fundamentally altered soil composition and quality through the use of nitrogen fertilisers, phosphates, pesticides and other inputs, as well as other farming practices. The loss of organic matter and excessive nutrient enrichment in agricultural soils has significant knock-on effects for biodiversity, water quality and other aspects of the natural environment.²

Construction can have an impact on soils by covering the land with impermeable materials and through contamination, over-compacting and topsoil wastage. The management of soils in construction is linked to broader sustainability, such as water management,

where the use of permeable materials allows water to seep into the soil, helping to prevent flooding.³

Historically, there is a legacy of contamination from past industrial and commercial use of land, particularly in the major urban areas. Local authorities have a duty to identify sites that are likely to be contaminated and to draw up a strategy detailing how they will deal with these. Wiltshire Council has taken action on four sites so far and further sites are being considered. Many previously developed sites are being used for new development (see 'Drivers of change' on planning and development, page 12), which helps to relieve pressure on undeveloped greenfield sites. Twenty sites in Wiltshire were remediated (had pollution and contaminants removed) for this purpose in 2012.

The historic military presence has also left a legacy, for example in terms of decommissioning sites that were used during the two World Wars. Wiltshire Council is also increasingly involved in land remediation following the failure of domestic oil tanks and there have been two significant non-domestic leaks of substances that have resulted in land remediation works.



STEVE DAY WWIT

The quality of the soil on farmland will affect wildlife and water quality

1 NEA, 2011
 2 NEA, 2011
 3 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Defra 2009

Water quality

The quality of water in Wiltshire and Swindon's rivers affects wildlife, river flows and the supply of water for human consumption and farming. Our water quality is primarily affected by pollution from farming, sewage works, households and businesses.

The ecological status of rivers and other water bodies is assessed every year and objectives have been set (under the European Water Framework Directive) for many rivers to reach Good ecological status by 2015 and all by 2027. Ecological status is determined by levels of pollution, wildlife, abstraction for public water supply and agriculture, and physical modification of the river course (for example through erosion or development).

From 2009 to 2012, the ecological status of Wiltshire's rivers improved slightly overall, with more river length having Good or Moderate status and less with Poor or Bad status. In Swindon Borough, 12% of river length overall declined from Good to

Moderate status and the river length with Poor status was unchanged.

Nitrates, pesticides and phosphates are major pollutants of freshwater in Wiltshire and Swindon, with the main sources being farming and household detergents (phosphates only).¹ They cause accelerated growth of algae and alternative plant communities, and increase oxygen levels, making it unsuitable for fish and other species. Pollutants in water for public supply must also be removed by treatment, increasing the cost and the use of energy and chemicals. Much of Wiltshire and Swindon's land is within a Nitrate Vulnerable Zone, where farmers must take action to reduce water pollution from fertilisers and animal manure. An EU ban on phosphates in household detergents takes effect from June 2013 and in dishwasher detergents by June 2017. Other initiatives are underway to reduce diffuse water pollution from farming across whole river catchments.

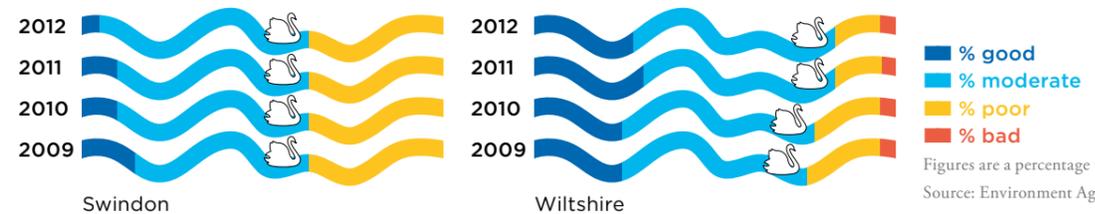


MARTIJN ANTHEUNISSE WWIT

Salisbury Avon at Fifield: fresh water is at risk from pollutants

1 Environment Agency, 2013

Ecological status of Swindon's and Wiltshire's rivers 2009-2012



Figures are a percentage total of river length
 Source: Environment Agency, 2013

Flood risk and surface water management

Wiltshire and Swindon's ecosystems have a natural capacity to absorb water from rainfall and snow, feeding aquifers, rivers and streams and preventing flooding. Chalky and sandy soils drain water rapidly, while clay and other soils retain water on the surface for longer. The way that we use and manage the land affects its capacity to absorb water. For example, water quickly runs off fields that are ploughed down slopes compared to fields that are ploughed across slopes; trees, hedgerows and other vegetation also help to retain water for longer. Land that is built on or covered in impermeable surfaces such as tarmac prevents water from

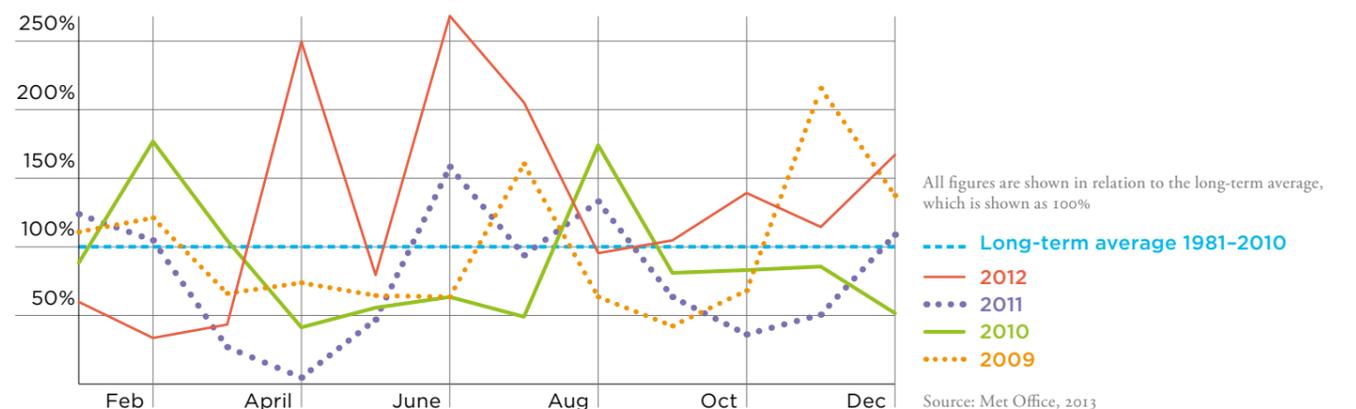
being absorbed and increases the risk of flooding. Natural floodplains are vital for retaining water in periods of heavy rainfall as they prevent flooding further downstream and store water against drought. Retaining water on the land gives it time to seep down to the aquifers. This means it can be used for public water supply and farming rather than being lost to the sea.

Drought was declared in spring 2012 after 18 months of below-average rainfall. Heavy rains began in early April and continued, making 2012 the wettest on record for England, with annual rainfall 35% above the long term average in southern England.¹

Much of the rain ran quickly downstream, causing flooding across Wiltshire and Swindon from rivers, groundwater, sewers and surface water; some land remained flooded into spring 2013. This affected properties, farming, roads and railway networks, at significant cost to people's lives, businesses and the environment. It is predicted that we will get more extreme and unusual weather as our climate continues to change.

1 Met Office, 2013 (long-term average is based on 1961 to 1990 averages)

Monthly rainfall in South East and Central South England 2009-2012



All figures are shown in relation to the long-term average, which is shown as 100%

Source: Met Office, 2013

BUFF-TAILED BUMBLEBEE: DARIN SMITH



Pollination

Bees, wasps, hoverflies and other insects pollinate wildflowers and crops and it has been estimated that 84% of EU crops and 80% of wildflowers rely on insect pollination.¹ The extent and value of pollination in Wiltshire and Swindon has not been quantified. Much of our food is imported, in particular fruit and vegetables, so we also rely on the pollination of crops elsewhere. Honeybees are the most commonly managed pollinator species in the UK, but their numbers have seriously declined in recent years and wild insects are now thought to be the main pollinators.²

In Wiltshire, around 180 bee species have been recorded, including many rare species on

Salisbury Plain and elsewhere, but their status is often unclear. Across the UK, two wild bumblebee species are extinct and others are threatened, probably due to disease and loss of forage and nesting sites. Unimproved grassland, woodland and areas such as river banks, verges and open ground provide vital habitat for bees and other pollinating insects. Further research is needed into the impact of pollinators living close to farm crops.

1 *The Natural Choice*, HM Government, 2011
 2 Breeze TD, Bailey AP, Balcombe KG and Potts SG (2011), 'Pollination Services in the UK: How important are honeybees?', *Agriculture, Ecosystems and Environment*, 142 (3-4), pp. 137-143. ISSN 0167-8809



WILTSHIRE COUNCIL

Management of waste

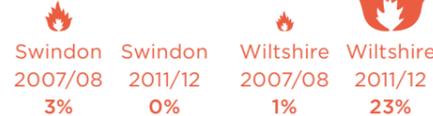
Municipal waste sent to landfill



Household waste recycled or composted



Municipal waste incinerated to recover energy



Source: Defra

Waste

Humans create waste and this has direct impacts on the environment in terms of land used for landfill and management facilities, the greenhouse gases that emanate from landfill, and the pollution of soil and water. Indirectly, energy, water and other resources are also wasted in producing goods that are thrown away. Nature is able to absorb some of the waste through decomposition and other processes. Sewage sludge on farmland acts as a fertiliser, for example, and river pollution is dealt with naturally to a certain extent. However, nature cannot cope with the levels of waste that we currently produce. The average amount of solid household waste collected per person is declining in the long term, but in 2011/12 this was 465kg in Wiltshire, 416kg in Swindon, and 431kg in England as a whole, giving an indication of our levels of consumption (see 'Drivers of change', page 11).

The proportion of municipal waste sent to landfill continued to decrease in 2011/12, due to sustained rates of recycling and composting, and the diversion of waste to generate energy. Wiltshire's performance is similar to the average for England, while in Swindon, recycling and composting rates are above average but landfill rates are also above the England average. This

will be addressed by new facilities to generate energy from waste in 2013/14. The first anaerobic digestion plant in Wiltshire, at Bore Hill Farm in Warminster, began to collect food waste from local businesses in 2012 and use it to generate electricity. New facilities are being built to process an additional 60,000 tonnes of residual waste each year at Northacre Industrial Estate, Westbury, and 48,000 tonnes of waste per year at Cheney Manor Industrial Estate, Swindon. Waste taken to the treatment plants will be shredded and dried to produce fuel.

Much greater quantities of non-municipal waste are produced from commercial, industrial, construction, mining and quarrying sources, but there is little data available at a local level as this waste is managed by private contractors. Biodegradable waste, such as food and plant matter (from gardens and elsewhere), is of particular concern as it emits methane, a powerful greenhouse gas, if sent to landfill. Many landfill sites now capture the gas and use it to generate energy.

Population growth, new housing, economic growth and new industrial and commercial sites are all likely to lead to increased levels of waste, unless steps are taken to minimise waste production and manage resources in more cost-effective and efficient ways.

PROVIDING GOODS

Farm produce

Crops, meat and milk are the main products of Wiltshire and Swindon's farms. Half of the farmland is grassland for grazing animals, while another 43% of farmland is used for growing cereals and other arable crops. Horticultural production covers less than 1% of farmland. Other animals such as poultry are farmed more intensively.¹ Of 152,750 cattle in Wiltshire in 2010, 43% were dairy cattle and 32% were beef cattle, the remainder being young males. Similar proportions apply to Swindon's 5,905 cattle. The total number of cattle has declined slightly since 2005.²

Figures are not available on the amount of food produced in Wiltshire and Swindon, although some indication of this can be gained from data on economic output. Statistics for gross value added (GVA – a measure of the value of goods and services produced) for local

authorities show that in 2010 the agriculture, forestry and fishing industries generated £140m GVA in Wiltshire and £7m GVA in Swindon Borough. This sector accounted for 1.7% of GVA in Wiltshire and 0.12% in Swindon, compared to a UK average of 0.65%. Since 1997, these figures have fluctuated between £103m and £143m in Wiltshire and between £6m and £9m in Swindon, while total GVA has grown by more than 50% in both areas.³

Given the nature of the UK and global food system, it seems likely that only a small proportion of the food produced within Wiltshire and Swindon is consumed locally, although detailed figures are not available. Local food networks such as farmers' markets and farm shops are increasingly popular but limited in scale, particularly given the small amount of fruit and vegetables grown locally.



DAVID HALL WWT

Belted Galloway calf at Clattinger Farm: half of farmland is for grazing animals

1 Defra Agricultural Census, 2010
 2 Defra, 2011 (from DairyCo website, February 2012)
 3 Defra, 2013

Woodland produce

Wood is harvested from both coniferous and deciduous woodland, but the extent of this is not known. There are 3,816 hectares of coniferous woodland in Wiltshire and Swindon. The Forestry Commission manages 3,456 hectares of woodland in Wiltshire and 51 hectares in Swindon Borough, all of which are certified by the Forest Stewardship Council (FSC) and are actively managed to produce sustainable timber and other woodland products. The only exception is Nightingale Wood, a newly planted woodland to the east of Swindon.

The Longleat Estate has 1,588 hectares of FSC-certified woodland; its estimated sustainable annual production is 6,000–8,000 tonnes per year. All National Trust and Woodland Trust woodland (around 450 hectares) are FSC-certified.

Historically food products were harvested from woodland such as Savernake Forest, including meat (see below), berries, honey and fungi. Today, the volume extracted locally is not known, but most products are likely to be harvested on a small scale for personal use, with the exception of venison.



TOM CAIRNS WWT

Cut logs in Savernake Forest



NEIL ALDRIDGE

Wild meat and fish

Shooting of game birds and fishing are widespread and popular across Wiltshire and Swindon. These provide food but are also important culturally, socially and economically. Deer that are culled to control their numbers are also used for their meat. Specific data for the local area has not been found, but these activities have an important impact on the ecosystems of our woodland, farmland, rivers, streams and other habitats. For example, many areas of farmland are managed specifically to provide cover for game birds. It is estimated that 35 million pheasant are released and 15 million shot in Britain each year.¹

1 Game and Wildlife Conservation Trust, April 2013

The shooting of game birds such as pheasant is widespread

RYAN TABOR WWT



Extraction of building materials is determined by the underlying geology

Building materials

The extraction of building materials is determined by the underlying geology. The main minerals currently extracted are sand and gravel for construction aggregates; 683,000 tonnes of sand and gravel were extracted in 2011.¹ Chalk (for cement) and clay (for cement manufacturing and engineering uses) are extracted on a smaller scale. The main sources are:

- Cotswold Water Park/Upper Thames Valley – the main production area, a major concentration of sharp sand and gravel workings. Decades of gravel extraction have led to the creation of more than 100 lakes which have important wildlife and recreational value.
- Calne/Compton Bassett area – dominated by two sites currently producing soft sand.
- A single site in south Wiltshire producing soft sand.

■ A number of quarries in the Vale of Wardour and the Cotswold Limestone Lowlands meet the demand for natural building stone in line with the local architecture.

Supply of these materials has declined significantly in recent years, falling well below targets set at a regional level. With plans for new development, these supplies are likely to be put under increasing pressure. There is a recognised need to balance quarrying activities with the protection and enhancement of the natural environment in these areas of high landscape value.²

¹ Mineral Extraction in Great Britain, ONS, 2012
² Wiltshire and Swindon Minerals Core Strategy 2006–2026, Wiltshire Council, 2009

Water abstraction and use

Tens of millions of litres of water are abstracted every day from Wiltshire and Swindon's groundwaters (and reservoirs to a lesser extent) for public and private water supply, farming and other purposes such as fish farming. In 2013, Wessex Water supplied on average 53 million litres of water every day to its customers in Wiltshire. This demand has reduced in recent years, amounting to an 11% decrease since 2001. Depending on where the water is returned after use, abstraction can reduce the flow of water into our rivers, affecting their ecological status and wildlife. The heavy rains of 2012–13 dramatically improved water availability since the 2012 drought, and by spring 2013 water levels had returned to normal for the time of year.

Increasingly unpredictable patterns of rainfall are likely with climate change and

this will have an impact on water availability. Groundwater is a more secure source than some (such as reservoirs) as rainwater can be stored for longer in the aquifers. However, the Environment Agency already considers that Swindon Borough and Thames Valley areas fall within a 'seriously water stressed' region. Both Wiltshire and Swindon's Core Strategies state that population growth and new development will put increasing pressure on water supply, treatment and sewage, and that action is needed to reduce demand and improve water quality from sewage discharge. Rates of population growth shown in Census 2011 data (see page 11) may bring further pressure.

Two main companies are managing public water supply, Thames Water and Wessex Water. They have also predicted future growth in demand and have planned action to manage

supplies, and reduce demand and leakage. Wessex Water is linking its region through new infrastructure to transfer water from Dorset into southern Wiltshire. Thames Water is planning a pipeline from the Farmoor Reservoir in Oxfordshire to supply Swindon and reduce abstraction from the River Kennet.

More than 500 private water supplies in Wiltshire and Swindon provide drinking water to over 22,000 people. Some supply water to a single home while others supply water to several thousand individuals. The risk of infection from microbiological contamination of private water supplies is significantly greater than in public water supplies. Although private water supplies only serve 0.5% of the population in England and Wales they have been responsible for 36% of outbreaks of gastrointestinal infection caused by drinking water.



These watercress beds near Warminster use water from the River Wylfe

DAVID KJAER WWT

BENEFITING CULTURE AND SOCIETY

Beyond the basic services such as air, water and food, we also depend on the environment for our personal health and wellbeing, for space to carry out our activities, and for our sense of place, culture and history.



WILDLIFE SITES PROJECT

Stonehenge: one million visitors per year make a vital contribution to the local economy

Historic environment

Wiltshire and Swindon's historic and natural environment are closely connected; our ecosystems have been shaped by human activity over time, helping to define landscape character and our sense of place. Historic sites can provide valuable evidence of how ecosystems have evolved and been managed in the past, providing important learning for the future.

The natural and historic environment is valued by local people and visitors for recreation, culture, history, education, tourism, and for religious, aesthetic and spiritual reasons, contributing to our health and wellbeing. Historic buildings and places provide homes, workplaces and green spaces, and help to conserve the natural environment at those sites. They make vital contributions to the local economy, attracting business, visitors and investment, and underpinning sustainable development.

The number and status of Wiltshire and Swindon's historic buildings, sites and monuments have not changed significantly since the previous report. The key concern relates to the number of scheduled monuments classed as being 'at risk' – 28.3% in Swindon and 18.5% in Wiltshire – largely due to arable ploughing and clipping. Extensive animal burrowing, plant growth, vandalism and vehicle damage are also threats. Only one of Wiltshire and Swindon's registered parks

and gardens is 'at risk' – Tottenham House and Savernake Forest – as the main house has planning permission for a luxury hotel development.¹ The AONB partnerships have also published details and maps of historic landscape characterisation in their areas.

The historic environment is also affected by many of the main drivers of change that influence ecosystems, such as planning and development, farming practices and the impacts of climate change such as flooding. Pests and disease affecting ecosystems also pose a threat to designed landscapes, historic landscape character, timbers in historic buildings, and museum collections.

¹ Heritage Counts 2012, English Heritage

Geological sites

There are 25 Geological Sites of Special Scientific Interest and 60 Local Geological Sites in Wiltshire and Swindon. These sites contain exposed areas of sediments, rocks, fossils, and other landscape features, offering valuable opportunities to understand and appreciate the underlying geology of the area. Assessment of their condition appears to have remained unchanged since 2012, with around half in good, favourable or recovering condition and half in declining condition.



STEVE DAY/WMT

Public access to green space

The quality of our green spaces and how easily we can access the natural environment are central to our quality of life, our society and our economy in Wiltshire and Swindon. In a 2011 survey, Wiltshire residents were asked which things are the most important in making somewhere a good place to live; 45% chose 'access to nature', second only to 'health services' (56%). 'Clean streets' and 'parks, green spaces and countryside' both gained 42%. When asked why the natural environment is important to them, respondents chose: 'for the wildlife' (78%); 'for the large open spaces' (73%); 'for passive recreation' (70%); 'for active recreation' (56%); 'for inspiration' (34%); 'for sports' (22%). In a 2008/9 survey of 4,517 Swindon residents, 'parks and open spaces' was ranked as the fourth most important aspect of quality of life, after 'level of crime', 'clean streets' and 'health services'.¹

Regular contact with nature can benefit our physical and mental health and wellbeing, and green space is comparatively cheap and cost effective to provide.² A national Public Health indicator is the percentage of people using outdoor places for exercise or health reasons in the previous seven days. The results from 2009–2012 were 5.6% of people in Swindon (lowest in the South West) and 26.9% in Wiltshire (highest in the South West) – the average for England is 14%.³

Access to green space can encourage us to take exercise outdoors, helping to prevent and

treat health problems including obesity, cardiovascular disease, chronic stress, depression and anxiety. Contact with nature has particular benefits for children's development and for addressing emotional and behavioural difficulties such as Attention Deficit Hyperactivity Disorder (ADHD). Activities in natural green space can help families and communities to spend time together, strengthening social networks.⁴

On the economic side, high quality and wildlife-rich green space can reduce health and social care costs, prevent flooding and drive urban regeneration and economic renewal. This will attract visitors and businesses and investment in land and property. Areas of higher deprivation tend to have less access to natural green space.⁵

Accessible natural green space close to where people live is known as 'green infrastructure'. Swindon Borough Council has identified significant gaps in the quality, quantity and accessibility of its green infrastructure, and has a Green Infrastructure Strategy in place. Wiltshire Council has committed to producing an equivalent strategy as part of its Local Development Framework and an audit of existing green infrastructure is due to be completed in 2014. These strategies should ensure that green infrastructure is delivered as an integral part of new development. There is a well-established network of public rights of way and access land.

¹ 'What matters to you?' survey, Wiltshire Council, 2011

² Technical information note TINO55, Natural England, 2009

³ *Public Health Outcomes Framework for Wiltshire*, Public Health England, May 2013

⁴ *Health and Wellbeing Benefits of Access to Nature*, Wiltshire JSA for Health and Wellbeing, 2012/13

⁵ *Health and Natural Environments – An evidence-based information pack*, Natural England, March 2012

Health and wellbeing

There is a real need for the sorts of benefits that green space provides. Adult obesity in the UK has more than doubled over the last 20 years. It is estimated that 25.2% of adults in Wiltshire and 27.0% in Swindon are obese, higher than both the South West (24.7%) and England (24.2%) for 2011.

By 2020, 30% of men and 28% of women in Wiltshire may well be obese. In 2012, 15.9% of Year 6 children measured in Wiltshire and 19.2% in Swindon were found to be obese, compared to 19.2% for England.

Mental health is another key local issue. It is estimated that 60,000 adults in Wiltshire and 29,000 adults in Swindon have a Common Mental Disorder such as anxiety or depression. In Wiltshire, it is estimated that 4,000 children and young people (aged 5–16) have conduct disorders; 2,500 have emotional disorders (depression and anxiety); 1,000 are hyperactive (ADHD); and 1,000 have less common mental health disorders.

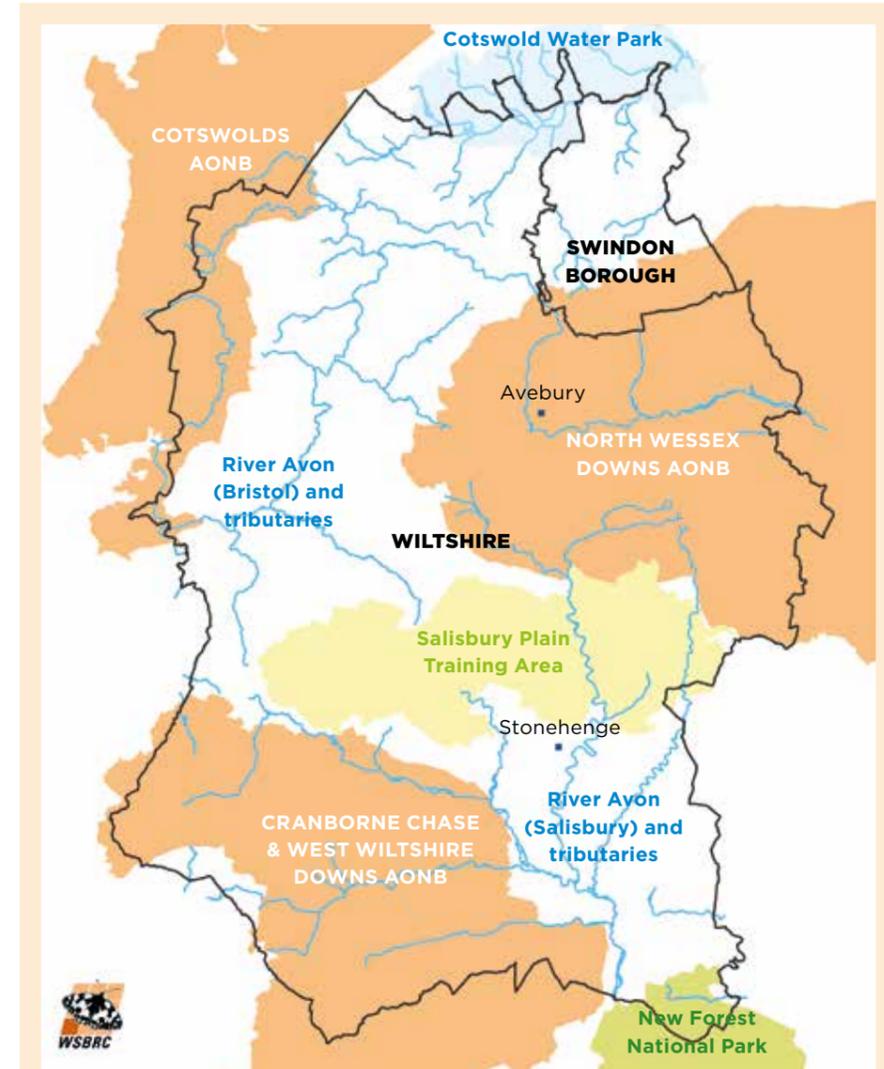
For further information please see the Joint Strategic Assessments for Health and Wellbeing

Military activity

Military activity is one of the most important uses of land in Wiltshire. Salisbury Plain Defence Training Estate is the largest and most important training area in the UK. It covers 380km² (11.7% of Wiltshire) and has been used by the British Army since 1897. The uninterrupted landscape of semi-natural grassland and underlying resilient chalk soils make it the only site in the UK where extensive armoured manoeuvre training can be undertaken.¹ The Plain also provides a wide range of other services and functions, including livestock grazing, arable farming, groundwater storage, publicly accessible green space, heritage and wildlife conservation.

The nature of this landscape has made Wiltshire a hub for the military and their families, with widespread social, economic and environmental impacts. The Ministry of Defence owns or manages other areas of land and facilities such as the Defence Science and Technology Laboratory at Porton Down and Defence Technical Training, which is moving to the former RAF Lyneham site. Thousands of military personnel and their families (30,000 in 2008) are based in Wiltshire, with an additional 4,000 personnel (plus dependents) moving in by 2019 following the closure of bases in Germany.

¹ NEA, 2011



Landscape

The character of Wiltshire and Swindon's landscapes is recognised in the three Areas of Outstanding Natural Beauty (AONBs) that cover 44% of Wiltshire and 28% of Swindon Borough. The New Forest National Park covers 1% of Wiltshire (see map). These large landscape areas are mainly used for farming, but are also invaluable resources for recreation, leisure and tourism. They are often the only places where we can enjoy distant views, tranquillity and dark night skies, and their distinctive character forms part of our sense of place and identity. They are vital to the healthy functioning of our ecosystems, providing space for wildlife to flourish and adapt.

AONBs are designated under national legislation because it is considered in the national interest to safeguard them; they are managed through partnerships to conserve and enhance the natural beauty of the area for all to enjoy, recognising the needs of the local community and economy. In 2012, the *State of the North Wessex Downs AONB* report was published and the other two AONBs within Wiltshire established a suite of indicators to monitor condition, identify trends and inform their management plans. All are being reviewed for the period 2014–19. These include many of the indicators used in this report and the condition of AONBs is determined by many of the same drivers of change.

Gaps in our knowledge

This report presents an overview of available data and analysis on a wide range of issues, giving a broad indication of the state of our environment. Yet there are many gaps in the current evidence which limit our full understanding.

What we're missing

- Detailed mapping of land uses and habitats across Wiltshire and Swindon.
- Mapping connectivity between priority habitats for nature conservation.
- Impact of agri-environment schemes on the condition of farmland ecosystems.
- Abundance, variety and distribution of wildlife and its role in ecosystems.
- Up-to-date assessments of the condition and management of recognised wildlife sites.
- Role of different land uses in carbon capture and storage.
- Impact of atmospheric pollution on ecosystems and farming.
- Status and trends in soil quality.
- Extent and status of pollination.
- Quantities and management of waste from industrial, commercial, construction and other non-municipal sources.
- Levels of local food production, its value, distribution and uses; amount of food imported from outside the county for sale.
- Levels of harvesting of wood and woodland produce, wild meat and fish.
- Extent and quality of existing green space close to where people live ('green infrastructure').
- Levels and impact of local human consumption of energy and material goods.
- Current and future impacts of climate change on wildlife and ecosystems.

Further research

Given the scale and urgency of the drivers of change in our local environment, we need more comprehensive and detailed assessment of many of these issues. This may also highlight other concerns that have been overlooked. It is important to consider these issues as a whole rather than separately as each is one element of a broader ecosystem and depends on the functioning of other elements. There are also possible trade-offs between different ecosystem services which need to be considered and managed, such as the relationship between farming and wildlife.

A detailed ecosystems assessment for Wiltshire and Swindon, based on the UK National Ecosystems Assessment, would provide

a sound evidence base for local decision-makers. It would help to ensure that the drivers of change identified above can be managed to contribute to healthier, more sustainable ecosystems and sustainable communities.

A significant gap exists in valuing ecosystem services in monetary or other terms. Filling this gap would make it easier and more likely that the natural environment and ecosystem services would be fully taken into account in local decision-making, alongside economic and social aspects which have already been valued. Ongoing work at national and local levels provides an important framework and starting point for future work in Wiltshire and Swindon.

EXPLORING AT AVEBURY: CAROLINE ROBSON WW1

¹ *The State of Natural Capital: Towards a framework for measurement and valuation*, Natural Capital Committee, April 2013



The 2012 and 2013 reports are available to download from www.wiltshirewildlife.org and www.intelligencenetwork.org

A large print version of the text of this report is available on request. Please telephone Wiltshire Wildlife Trust on **(01380) 725670**.

Wiltshire Intelligence Network and Link2Nature

More detailed statistics, graphics, documents and links on all the issues covered in this report can be found on the Wiltshire Intelligence Network (www.intelligencenetwork.org.uk).

The Wiltshire Intelligence Network website was developed in response to the ever-growing demand for local information. It presents current evidence and reports on a broad range of social, economic and environmental issues.

The website hosts the Joint Strategic Assessments for Wiltshire and its Community Areas, as well as assessments from the thematic delivery partnerships on the economy, health and wellbeing, community safety and other issues. This State of the Environment report constitutes the environmental assessment.

The report was produced on behalf of Link2Nature as the environmental Thematic Delivery Partnership in the Wiltshire Family of Partnerships. For more information please visit www.link2nature.org.uk



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