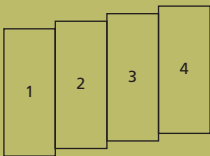


Biodiversity indicators in your pocket 2007





Published by Defra on behalf of the
UK Biodiversity Partnership



1: Orange-tip butterfly © Robert Thompson

2: Wasdale Head, Lake District, Cumbria © Andy Stott

3: Fishing boat, near Hastings, East Sussex © Defra

4: BTCV volunteer, International Biodiversity Day 2005 © David Mansell/BTCV

Biodiversity indicators in your pocket 2007

Measuring our progress towards halting biodiversity loss

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The UK biodiversity indicators

Biodiversity is the variety of life on earth. It includes not only the variety of individual species but also the genetic diversity within species and the range of ecosystems that support them. The UK government has committed to two important international targets to protect biodiversity:

1. In 2001, European Union Heads of State or Government agreed that biodiversity decline should be halted with the aim of reaching this objective by 2010. (For more information, see <http://ec.europa.eu/environment/nature/>.)
2. In 2002, Heads of State at the United Nations World Summit on Sustainable Development committed themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth (for more information see www.bond.org.uk/wgroups/wssd/index.htm and www.biodiv.org/2010-target/default.shtml).

This is the first time that a set of biodiversity indicators for the UK has been published. The indicators show changes in aspects of biodiversity such as the population size of important species or the area of land managed for wildlife. They will be used as part of the evidence to assess whether the targets set out above have been achieved.

Eighteen UK biodiversity indicators are described in this report, although four are currently under development and are presented without data. The indicators will be further developed and updated periodically as new data are made available over the next three years to provide a full set of indicators for assessing the 2010 targets. The indicators are grouped under six focal areas based on those identified by the Convention on Biological Diversity and the European Council:

- 1 Status and trends in components of biodiversity
- 2 Sustainable use
- 3 Threats to biodiversity

- 4 Ecosystem integrity and ecosystem goods and services
- 5 Status of resource transfers and use
- 6 Public awareness and participation

Whilst indicators are useful mechanisms for summarising messages, they can never describe all the changes in the UK's biodiversity. They are best seen, as their name suggests, as indicative of the general state of biodiversity. Whilst they will form the basis of the UK's assessment of progress towards the biodiversity targets, other factors and sources of information will also need to be taken into account.

Assessing indicators

Most indicators have a single measure which changes over time (area of land in agri-environment schemes, for example) but where data cannot logically be combined (for example biological and chemical river quality) the indicator will have more than one measure.





Not everyone is able to look at a graph and immediately understand how a measure has changed over time, so it is useful to be able to summarise what the indicators tell us.

Traffic lights (see box) are determined by identifying the period over which the trend is to be assessed and comparing the value of the measure in the base or start year with the value in the end year.

For the measures within the indicators on trends in populations of selected species, statistical analysis techniques have been developed in collaboration with the data providers and the assessment is based on this analysis. A green or red traffic light is only applied when we can be confident that the change is not simply a product of random fluctuations.

For some of the other indicators, it will be very clear whether there has been an improvement or a deterioration, and hence whether a green or red traffic light is warranted. However, where the

In order to highlight whether or not things are moving in the right or wrong direction, a set of 'traffic lights' is used:

-  improving
-  little or no overall change
-  deteriorating
-  insufficient or no comparable data

amounts of change are small it can be difficult to judge whether they are sufficient to indicate that there has been a clear improvement or deterioration. For these indicators, the assessment has been made by comparing the value of the measure in the base or start year with the value in the end year against a standard threshold. A three year average is used to calculate the base year, to reduce the likelihood of any unusual year(s) unduly influencing the assessment. Where an indicator value has changed by less than the threshold of 3 per cent, the traffic light has been set at amber. The choice of 3 per cent as the threshold is arbitrary but has proven to be helpful in deciding on the most appropriate traffic light.

The traffic lights only reflect the overall change in the measure from the base to latest year and do not reflect fluctuations during the intervening years.

Where data are available, two assessment periods have been used:

- 1 Long-term – an assessment of change since the earliest date for which data are available, although, if data do not precede 1996 a long term assessment is not made.
- 2 Short-term – an assessment of change since 2000 (or the closest date for which data are available)





















Overview of trends





The table on pages 6 and 7 summarises traffic light assessments both since 2000 and over the longer term for the 18 indicators and their 27 component measures. The indicators are divided into six focal areas. For example, indicator 2 (plant diversity) comprises three measures and falls within focal area 1.

The individual assessments for each measure can be combined to produce an overall assessment of change. This provides a summary of progress towards the 2010 targets without the need to combine the indicators themselves.

The pie charts on page 8 display the numbers of measures that have shown a significant improvement (green traffic light), a significant deterioration (red traffic light), little or no overall change (amber traffic light) or that have insufficient data for an assessment to be made (white traffic light). Assessments of change both since 2000 and over the longer term are shown.

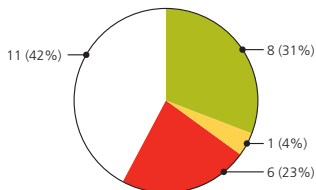
Focal area, indicator title and individual measure(s) (where applicable)		Long term change ¹	Change since 2000
Focal area 1. Status and trends of the components of biological diversity			
1a. Trends in populations of selected species (birds)	Farmland birds	1970	
	Woodland birds	1970	
	Seabirds	1970	
1b. Trends in populations of selected species (butterflies)	Butterflies of the wider countryside	1976	
	Specialist butterflies	1976	
2. Plant diversity	Open habitats	1990-98	
	Woodlands	1990-98	
	Boundary habitats	1990-98	
3. UK BAP Priority Species			
4. UK BAP Priority Habitats			
5. Genetic diversity			
6. Protected areas	Extent of protected areas	1996	
	Condition of species and habitat features		
Focal area 2. Sustainable use			
7. Sustainable woodland management			
8. Area of agri-environment land		1992	
9. Sustainable fisheries		1990	

Focal area, indicator title and individual measure(s) (where applicable)		Long term change ¹	Change since 2000
Focal area 3. Threats to biodiversity			
10. Ecological impacts of air pollution	Area affected by acidity	 1996	
	Area affected by nitrogen	 1996	
11. Invasive species			
12. Spring Index		Not assessed	Not assessed
Focal area 4. Ecosystem integrity and ecosystem goods and services			
13. Marine Trophic Index			
14. Habitat connectivity			
15. River quality	Biological	 1990	
	Chemical	 1990	
Focal area 5. Status of resource transfers and use			
16. Expenditure on UK biodiversity			
17. Expenditure on global biodiversity			
Focal area 6. Public awareness and participation			
18. Conservation volunteering			

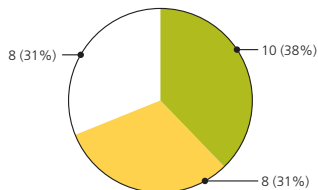
-  improving
-  little or no overall change
-  deteriorating
-  insufficient or no comparable data

¹ The earliest available year is used as the baseline for assessment of long term change. The base year used for each measure is shown in the table. Where data are unavailable, or do not precede 1996, a long term assessment is not calculated.

Long term change*



Changes in measures since 2000*



■ Showing improvement ■ Showing little or no overall change ■ Showing deterioration □ Insufficient data

*Based on 26 measures, comprising 17 indicators (1 measure comprising 1 indicator is not assessed).

All measures

Of the 26 measures, 10 (38 per cent) show improvement since 2000, compared with 8 measures (31 per cent) showing improvement over the longer term. Those showing improvement since 2000 include UK BAP priority species, extent of protected areas, sustainable fisheries, and expenditure on both UK and global biodiversity.

Those measures showing long term deterioration are populations of farmland and woodland birds, populations of specialist butterflies, and plant diversity in open habitats, woodlands and boundary habitats. None of the measures have deteriorated since 2000, suggesting that there may be some reversal in the long term deterioration seen in the 6 measures (23 per cent).

Focal areas

As well as overall summaries based on all 27 measures and 18 indicators, separate summaries for each focal area are shown which are based on the indicators and measures within that focal area. Due to the number of measures within focal areas 5 and 6 (two measures and one measure respectively), summaries of these focal areas have not been produced.

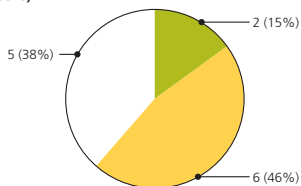
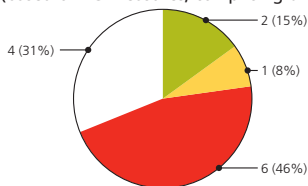
There were long term declines for 6 measures (46 per cent) within focal area 1, reflecting the very large declines in bird and butterfly populations seen in the 1970s and 80s. Since 2000 these long term declines appear to have been arrested, with all assessed measures showing either improvement or little or no overall change since 2000. These conclusions should be viewed with some caution as changes are more difficult to assess over the short term.

Within other focal areas there is little difference between the long term and 'since-2000' assessments i.e. most 'since-2000' traffic lights mirror the longer term assessments. Exceptions are within focal areas 3 and 4 where one measure in each showing long term improvement shows little or no overall change since 2000. All other changes are due to differences in data availability for long term and since 2000 assessments.

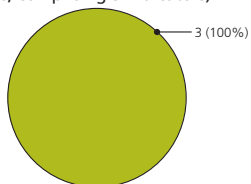
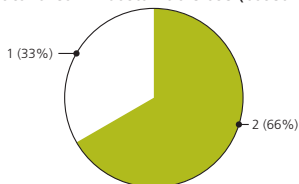
Long term change

Changes in measures since 2000

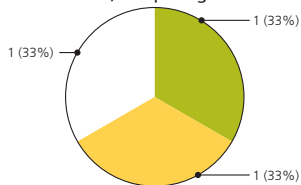
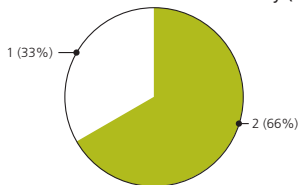
Focal area 1 – Status and trends of the components of biological diversity (based on 13 measures, comprising 6 indicators)



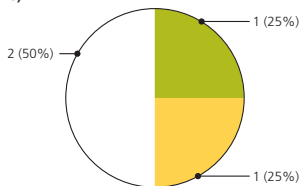
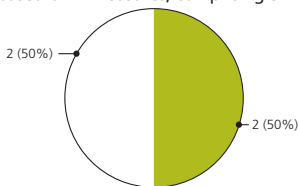
Focal area 2 – Sustainable use (based on 3 measures, comprising 3 indicators)



Focal area 3 – Threats to biodiversity (based on 3 measures, comprising 2 indicators)



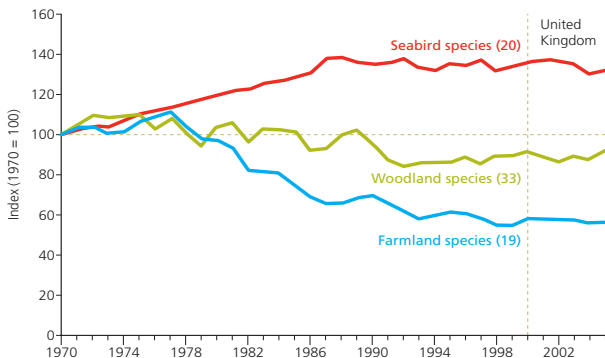
Focal area 4 – Ecosystem integrity and ecosystem goods and services (based on 4 measures, comprising 3 indicators)



■ Showing improvement
 ■ Showing little or no overall change
 ■ Showing deterioration
 ■ Insufficient data

1a. Trends in populations of selected species (wild birds)

Wild bird populations: farmland birds, woodland birds and seabirds, 1970-2005



Note: Figures in brackets show the number of species included in each category

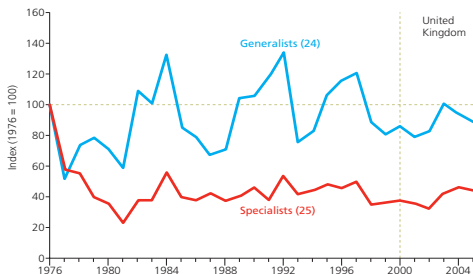
Source: Royal Society for the Protection of Birds, British Trust for Ornithology, Defra, Joint Nature Conservation Committee

Bird populations			
Since 1970		Since 2000	
Farmland birds	✗	Farmland birds	≈
Woodland birds	✗	Woodland birds	≈
Seabirds	✓	Seabirds	≈

- Bird populations are considered to be a good indicator of the broad state of wildlife and the countryside.
- Between 1970 and 2005 there was a decrease in the populations of farmland birds and woodland birds of 44 per cent and 9 per cent respectively. Over the same period the population of seabirds increased by 32 per cent.
- Since 2000 populations of farmland birds, woodland birds and seabirds have been fairly stable.

1b. Trends in populations of selected species (butterflies)

Butterfly populations: butterflies of the wider countryside and habitat specialists, 1976-2005



Note: Figures in brackets show the numbers included in each category

Source: Butterfly Conservation, Centre for Ecology and Hydrology, Defra, Joint Nature Conservation Committee

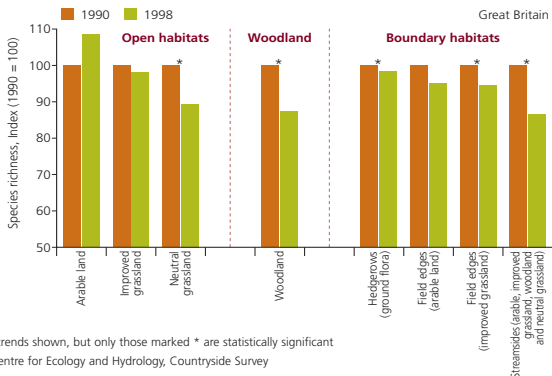
Butterfly populations

Since 1976		Since 2000	
Wider countryside (generalist) butterflies	≈	Wider countryside (generalist) butterflies	≈
Specialist butterflies	✗	Specialist butterflies	≈

- Butterfly populations are considered to be a good indicator of the broad state of wildlife and the countryside.
- Since 1976, populations of habitat specialists and butterflies of the wider countryside (generalists) have declined by 56 per cent and 12 per cent respectively. Since 2000 specialists have increased by 19 per cent and generalists by 3 per cent.
- Populations of butterflies can fluctuate markedly on a year to year basis, therefore, unlike other indicators, traffic light assessments cannot be calculated on the basis of single or three-year comparisons. Instead assessments are based upon analysis of the underlying trends.
- These analyses show that since 1976 there has been a decrease in the populations of specialists and little or no overall change in the population of generalists. Since 2000, there has been little or no overall change for either measure.

2. Plant diversity

Plant diversity in the wider countryside, 1990 and 1998

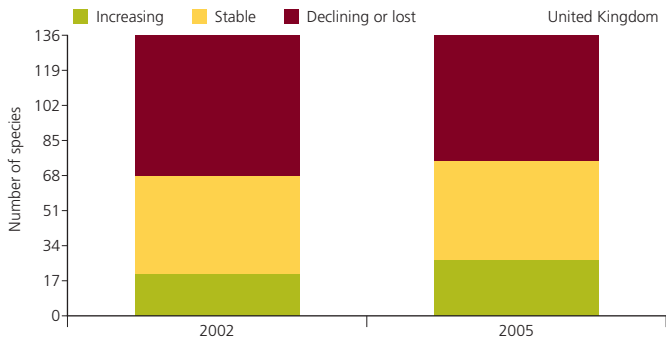


Plant diversity			
Since 1990		Since 2000	
Open habitats	✗	Open habitats	●●●
Woodland	✗	Woodland	●●●
Boundary habitats	✗	Boundary habitats	●●●

- This indicator presents change in plant species richness for a range of habitats in Great Britain.
- Within open habitats there was no significant change in plant diversity in improved grassland or arable fields between 1990 and 1998. In contrast, plant diversity in neutral grassland fields declined by 10 per cent.
- In woodlands, ground flora plant diversity has declined by 12 per cent during this period.
- Within boundaries there were significant reductions in diversity of hedgerow ground flora, field margins and streamsidies of 2, 3 and 12 per cent respectively between 1990 and 1998.
- These data will be updated in 2007, enabling changes since 1998 to be assessed.

3. UK BAP Priority Species

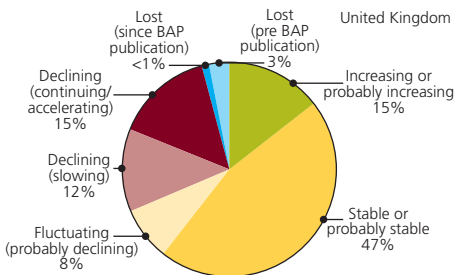
Status of UK Biodiversity Action Plan Priority Species and species-groups, 2002 and 2005



Based on 188 species and 1 species-group for which the status was known in both 2002 and 2005. A further 194 species and 9 species-groups showed no clear trend or were not assessed in one or both years.

Source: Joint Nature Conservation Committee, Natural England

UK Biodiversity Action Plan Priority Species trends, 2005



Based on 288 species and 1 species-group for which the status was known in 2005.

93 species and 9 species-groups are not included, of which the status of 56 is unknown, a further 38 species show no clear trend and 8 are no longer classified as true species.

Source: Joint Nature Conservation Committee, Natural England

Species status

Long term



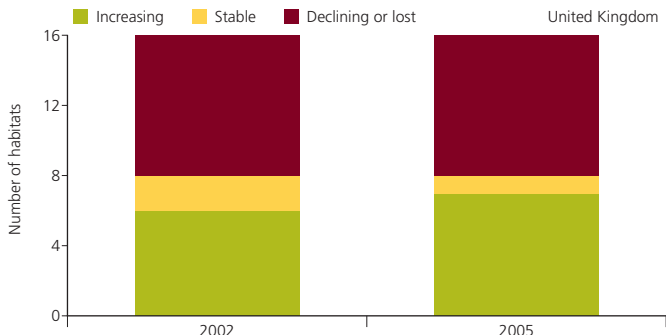
Since 2002



- The UK Biodiversity Action Plan is the UK's national biodiversity strategy, prepared in response to the UN Convention on Biological Diversity.
- The overall plan contains 391 action plans for 381 priority species and 10 priority species-groups. Priority species are those species in most urgent need of conservation action in the UK. The status of these species was assessed in 2002 and 2005.
- The status of 188 species and one species-group were reported in both 2002 and 2005. Of these, 33 species were assessed as 'increasing' in 2005, up from 25 species in 2002. The number of species assessed as 'declining or lost' fell from 95 in 2002 to 81 in 2005.
- In 2005, the status of 288 species and one species group was reported. Of these species, 42 (15 per cent) were assessed as 'increasing or probably increasing', 134 species and one species-group (47 per cent) were assessed as 'stable or probably stable' and 89 (31 per cent) assessed as 'declining or lost'. The remaining 23 species (8 per cent) were assessed as 'fluctuating (probably declining)'.

4. UK BAP Priority Habitats

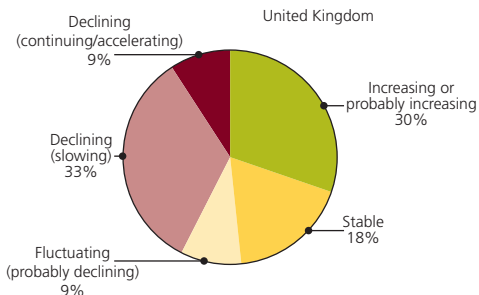
Status of UK Biodiversity Action Plan Priority Habitats, 2002 and 2005



Based on 16 habitats for which the status was known in both 2002 and 2005. A further 29 habitats showed no clear trend or were not assessed in one or both years.

Source: Joint Nature Conservation Committee, Natural England

UK Biodiversity Action Plan Priority Habitat trends, 2005



Based on 33 habitats for which the status was known in 2005.

12 habitats are not included, of which the status of 11 is unknown and the status of 1 shows no clear trend.

The total includes habitats assessed as fluctuating for ease of comparison with other Defra publications.

Source: Joint Nature Conservation Committee, Natural England

Habitat status

Long term



Since 2002



- The UK Biodiversity Action Plan is the UK's national biodiversity strategy, prepared in response to the UN Convention on Biological Diversity.
- The overall plan contains individual plans for 45 priority habitats in most urgent need of conservation action. The status of these habitats was assessed in 2002 and 2005.
- The status of 16 habitats was reported in both 2002 and 2005. There were only two changes in the assessments of these habitats. One habitat (lowland beech and yew woodland) was assessed as 'increasing' in 2005, but in 2002 it was assessed as 'declining'. However, another habitat (lowland calcareous grassland) was assessed as 'declining' in 2005, but 'stable' in 2002. The overall trend is therefore unchanged between the years.
- In 2005 the status of 33 habitats was reported. Of these habitats 10 (30 per cent) were assessed as 'increasing or probably increasing', 6 (18 per cent) assessed as 'stable', 14 (42 per cent) as 'declining' and the remaining 3 (9 per cent) as 'fluctuating (probably declining)'.

5. Genetic Diversity

Trends in genetic diversity of livestock breeds and cultivated plants

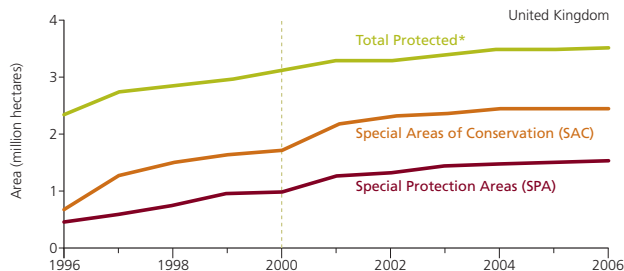
This indicator is under development, therefore no data or assessments are presented.

The following text outlines the development work underway to produce an indicator by 2008.

- Genetic diversity is an important component of biodiversity.
- The UK indicator will focus on genetic diversity in livestock breeds and in national collections of cultivated plants. These provide a resource from which to develop new strains or breeds and in some cases retain genetic material lost from the wild.
- At European level an indicator of farm animal genetic diversity is already under development. This is likely to present data on number of breeds, number of endangered breeds and number of conservation programmes for endangered breeds.
- For the UK indicator, a number of other refinements to the farm animal genetic diversity indicator are under consideration. These include measures such as rate of inbreeding in selected farm animals, that are more closely related to genetic diversity.
- For the cultivated plant component of the UK indicator, four options are being investigated: a measure of genetic diversity in crop plant collections, in wild crop relatives, in horticultural varieties in cultivation or collections, and in ex-situ collections of wild plants.

6. Protected areas

Extent of national and internationally important protected areas: i) total extent; ii) SACs; iii) SPAs, 1996-2006

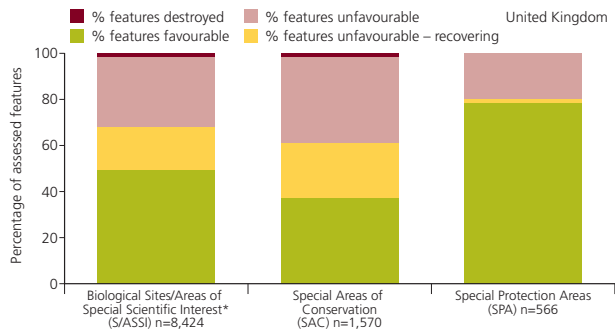


*Includes Biological Areas/Sites of Special Scientific Interest (A/SSSI), SACs and SPAs.

There is overlap between all categories of designation but each site only contributes once to the total area.

Source: Joint Nature Conservation Committee, Natural England, Countryside Council for Wales, Environment and Heritage Service (Northern Ireland), Scottish Natural Heritage

Proportion of biological features of protected areas in favourable or unfavourable condition, 1999-2006



Source: Joint Nature Conservation Committee, Natural England, Countryside Council for Wales, Environment and Heritage Service (Northern Ireland), Scottish Natural Heritage

Extent of protected areas

Since 1996		Since 2000	
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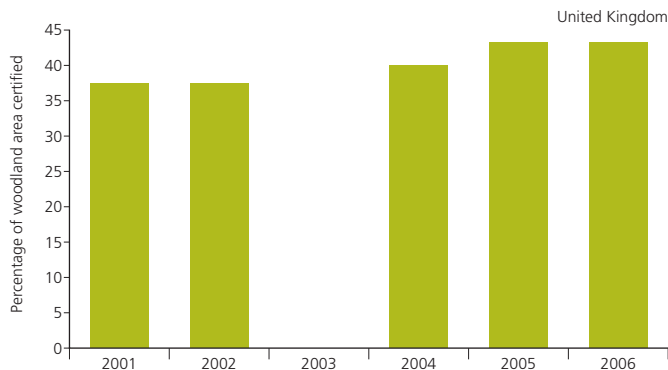
Condition of features

Long term		Since 2000	
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- This indicator shows extent and status of land, freshwater and coastal sea area protected under 3 designations: Sites of Special Scientific Interest (SSSI) (Areas of Special Scientific Interest in Northern Ireland, ASSI), Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Designation is a key mechanism for halting and reversing loss of biodiversity.
- There is considerable geographical overlap in the three designations; some sites may fall under all three classifications whereas others may fall under only one. However, in the figure above, each site contributes only once to the overall total.
- The total area of land and sea protected in the UK has increased between 1996 and 2006 from 2.3 million to 3.5 million hectares – an increase of 50 per cent. Since 2000 there has been an 11 per cent increase.
- Sites are designated with the aim of conserving specific biological or geomorphological features (this indicator presents results for biological features only). There is no overlap between the classifications as each feature is assessed separately under a single designation.
- Features were monitored between 1999-2005 to assess whether conservation objectives were being met. A total of 8,424 such features were assessed in biological A/SSSIs, 1,570 in SACs and 566 in SPAs. This indicator represents the status of a proportion (53 per cent for A/SSSIs, 71 per cent for SACs and 44 per cent for SPAs) of the features on these sites.
- The Government has set a target for 95 per cent of features to be in either favourable or recovering towards favourable condition by 2010. On the basis of the information available at April 2006, condition of features under all three types of designation were below the target.

7. Sustainable woodland management

Percentage of woodland under certified management, 2001 to 2006



Source: Forestry Commission

Percentage of woodland certified

Long term



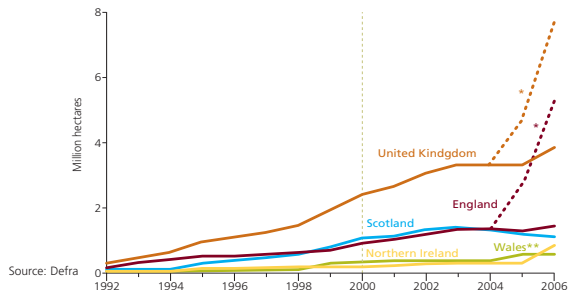
Since 2001



- Certification of woodland promotes responsible management to ensure that wood products are harvested sustainably and important wildlife habitats are not negatively affected.
- Across the UK the percentage of woodland under certified management schemes increased from 37 per cent in 2001 to 44 per cent in 2006.
- Within the UK in 2006 the percentage of woodland certified in England was 31 per cent, 43 per cent in Wales, 52 per cent in Scotland and 75 per cent in Northern Ireland.

8. Area of agri-environment land

Area of land under agri-environment schemes, 1993-2006



*2005 and 2006 figures for England and the UK shown by dashed lines include areas under newly introduced Entry Level Schemes in England. The method used to calculate the area of these schemes differs to other schemes, so they are not directly comparable.

**There were no data available for the Welsh entry level scheme Tir Cynnal in 2005 or 2006.

There is some double counting in these figures as some entrants in Higher Level Schemes are also entered in Entry Level Schemes.

Land covered by agri-environment schemes

Since 1992



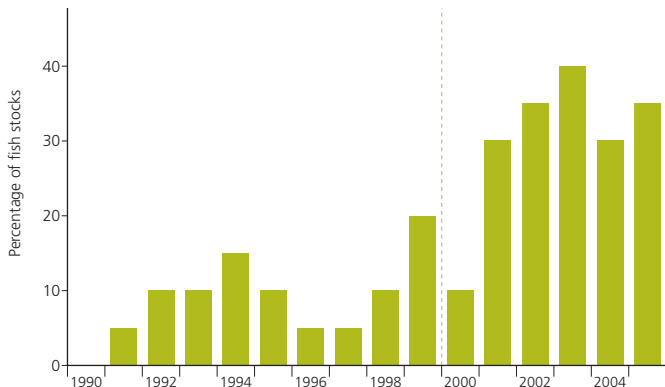
Since 2000



- Environmental schemes require farmers to implement beneficial management and demonstrate good environmental practice on the farm.
- In 2006 the total area of land in agri-environment schemes in the UK reached nearly 7.6 million hectares, up from 0.3 million hectares in 1992 and almost three times the 2000 figure of 2.7 million hectares.
- The majority (68 per cent in 2006) of these schemes are within England.
- The large UK increase between 2004 and 2006 is largely attributable to the introduction of Entry Level Environmental Stewardship (ELS) in England. Caution is required when comparing 2005 and 2006 England and UK figures with previous years, because the area covered by ELS agreements is calculated in a different way to previous agri-environment schemes.
- In addition to agri-environment land, the indicator includes relatively small areas under organic farming schemes. Some land could be in both organic and agri-environment schemes (or even under more than one agri-environment scheme). The indicator therefore represents the area within schemes and may over-estimate the actual area of land managed for biodiversity.

9. Sustainable fisheries

Percentage of fish stocks harvested sustainably and at full reproductive capacity, 1990 to 2005



Note: Based on 22 stocks for which status has been assessed throughout the period. Figures relate to finfish stocks only and are derived from ICES ACFM stock assessment reports.

Source: International Council for the Exploration of the Sea, Centre for Environment, Fisheries and Agriculture Science

Fish stocks harvested sustainably

Since 1990



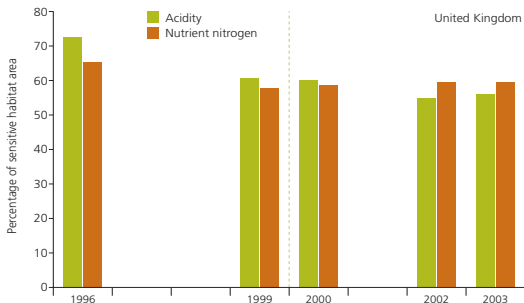
Since 2000



- Sustainable fisheries will help to ensure our marine ecosystems remain diverse and resilient and provide a long term and viable fishing industry.
- Between 1990 and 2000 the percentage of assessed fish stocks considered to be harvested sustainably was no more than 20 per cent. Since then it has increased, to 35 per cent in 2005.
- Despite these increases, these trends show that around 65 per cent of assessed fish stocks in seas around the UK have suffered reduced reproductive capacity and are harvested unsustainably.

10. Ecological impacts of air pollution

Area of sensitive UK habitats exceeding critical loads for acidification and eutrophication, 1996 to 2003



Since 2000 inclusion of nitric acid deposition increases the area of critical load exceedence compared to earlier periods; 3-year average deposition is used to reduce substantial year to year variability. Methodology changes in 2001 preclude the production of the 3-year averages for that year.

Source: Centre for Ecology and Hydrology

Area affected by acidity			
Since 1996	✓	Since 2000	✓
Area affected by nitrogen			
Since 1996	✓	Since 2000	≈

- Critical loads are thresholds above which the deposition of pollutants causing acidification and eutrophication (i.e. elevated nutrient status through the addition of nitrogen) causes significant harm to the environment. The pollutants come mainly from burning fossil fuels and waste from farm animals. Around a third of UK land area is sensitive to acid deposition, and a third to eutrophication (with some sensitive to both).
- In 1996, the percentage of sensitive habitat area where acid deposited exceeded critical loads was 73 per cent. Between 2000 and 2003 this declined from 60 per cent to 56 per cent.
- The percentage of sensitive habitat area subject to critical loads of nitrogen pollution remained at 59 per cent between 2000 and 2003, down from 66 per cent in 1996.

11. Invasive species

Number and impact of invasive non-native species

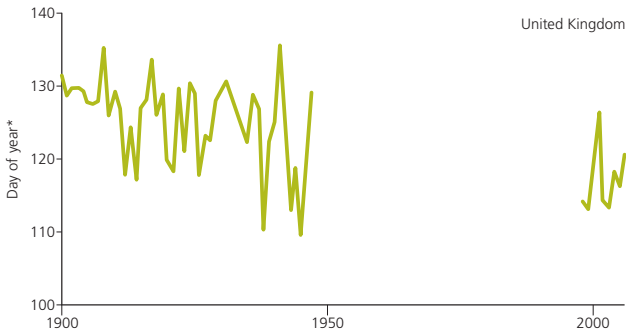
This indicator is under development, therefore no data or assessments are presented.

The following text outlines the development work underway to produce an indicator by 2008.

- Non-native species are those that have been introduced to the UK by accidental or deliberate action and are outside their natural range.
- The number of non-native species has been increasing in Great Britain over the past century.
- Some introductions are considered benign, some positive, while some non-native species become invasive. Invasive non-native species can harm native species, damage economic interests, threaten public health and may be subject to programmes of management or control (e.g. coypu, zebra mussel, ruddy duck, Japanese knotweed).
- The UK has an international obligation to address invasive non-native species under the Convention on Biological Diversity.
- This indicator will summarise 1) the abundance of non-native species in Great Britain, and 2) attempt to quantify their impact on biodiversity.
- The abundance of non-native species will be measured using available data sets for selected species in Great Britain.
- There are several options available for measuring the impact of non-native species including quantifying the proportion of non-native species that become invasive, quantifying the cost of controlling them and documenting the range change of non-native species.

12. Spring Index

Index of the timing of biological events, 1900-1947 and 1998-2006



*Number of days after January 1st (e.g. day 121 = May 1st).

Source: Royal Meteorological Society, UK Phenology Network

Contextual indicator

- This is a contextual indicator that shows how changes in climate, particularly temperature, can lead to changes in the timing of biological events.
- The UK Spring Index is calculated from the annual mean observation date of the following four biological events: first flowering of hawthorn, first flowering of horse chestnut, first recorded flight of the orange tip butterfly and first sight of a swallow.
- The 1900-47 data were mostly collected by the Royal Meteorological Society and the 1998-2006 data by the UK Phenology Network.
- While the indicator has fluctuated from year to year, on average spring events in the UK occurred earlier in the year between 1998-2006 than between 1900-47. The mean dates of hawthorn, horse chestnut and orange tip were 10-12 days earlier between 1998-2006 compared with the period 1900-47. There has been little or no change in the mean date for arrival of the first swallow.
- These changes in the Spring Index are strongly linked to increases in temperature in March and April.

13. Marine Trophic Index

This indicator is under development, therefore no data or assessments are presented.

The following text outlines the development work underway to produce an indicator by 2008.

- The Marine Trophic Index is usually calculated from data on commercial fish landings.
- Each species of fish or invertebrate is assigned a number dependent upon its position in the food chain: herbivores such as many invertebrate species are given a low number whereas top predators such as hake and whiting are given a higher number.
- The average value for all species gives an index measuring the complexity of the food chain. A decrease in the index signifies an increasing proportion of the catch consisting of invertebrates and fish that are low in the food chain.
- Possible consequences of reduced food chain complexity are a loss of ecosystem resilience to environmental pressures such as climate change and threats to the supply of fish for human consumption.
- A marine trophic index for the UK covering the period 1950 to 2004 could be calculated using data from the Food and Agriculture Organisation fish landings database. However, there is some debate about which sources of data or methods of calculation would provide the best indicator.
- Therefore, a number of modifications to the method have been proposed. These will be tested to provide a more widely accepted index for seas around the UK.

14. Habitat connectivity

Connectivity for selected UK semi-natural habitats

This indicator is under development, therefore no data or assessments are presented.

The following text outlines the development work underway to produce an indicator by 2008.

- Habitat fragmentation is a process by which habitats are divided and separated into smaller patches. There is evidence that fragmentation reduces biodiversity across a range of habitats.
- The UK is already highly fragmented. This indicator will therefore measure *functional* connectivity.
- Functional connectivity measures how well habitat patches are connected and depends on both the degree of physical separation between habitat patches and on the ease of species movement and dispersal between patches. It is possible to have high functional connectivity of patches in a physically fragmented habitat, depending on the ease with which species can move through the surrounding landscape.
- Functional connectivity can be measured using computer modelling to map the habitat network. These maps show patches of a habitat (within a non-habitat area) that are considered functionally connected.
- An example of this is presented opposite. The map shows areas of coniferous woodland in Wales. Within this woodland, habitat patches of a butterfly species (small pearl bordered fritillary) are shown in green. The degree of functional connectivity around these habitats is shown in a grey-to-blue gradient. Where the area of functional connectivity of one patch overlaps with that of another, the patches are considered to be functionally connected.

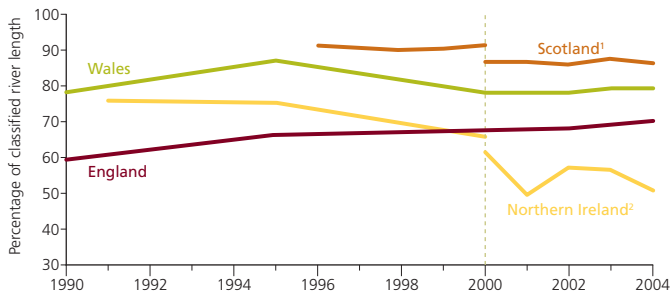


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- Mapping of habitat networks in this way enables calculation of a number of variables suitable for use in an indicator: number of networks, area of networks and area of largest network. Comparison with variables derived from historical maps allows for the calculation of a trend.
- The example shown here is based on a single species, but for practical purposes hypothetical species profiles representing the requirements of a range of actual UK species would be used, thereby producing habitat networks for hundreds of species.
- Habitats to be analysed will include woodland, wetland and possibly heathland, semi-natural grassland and urban green space.

15. River quality

Rivers of good biological quality, 1990 to 2004

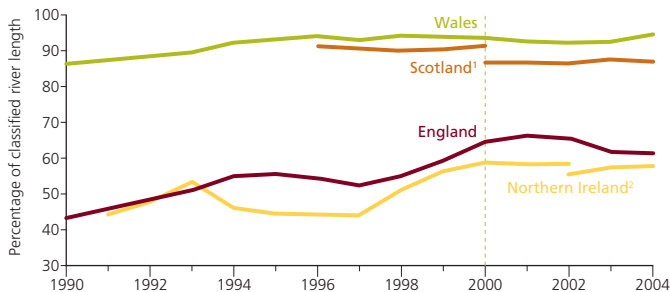


1. Scottish river classification is based on a combined chemical, biological and aesthetic assessment and is not directly comparable with other countries. The Scottish classification network changed in 2000.

2. Northern Ireland classified network significantly expanded in 2000. 2000 figures are shown for both the new and the old basis.

Source: Environment Agency, Scottish Environmental Protection Agency, Environment and Heritage Service (Northern Ireland)

Rivers of good chemical quality, 1990 to 2004



1. Scottish river classification is based on a combined chemical, biological and aesthetic assessment and is not directly comparable with other countries. The Scottish classification network changed in 2000.

2. Northern Ireland classified network significantly expanded in 2002. 2002 figures are shown for both the new and the old basis.

Source: Environment Agency, Scottish Environmental Protection Agency, Environment and Heritage Service (Northern Ireland)

Biological river quality

Since 1990		Since 2000	
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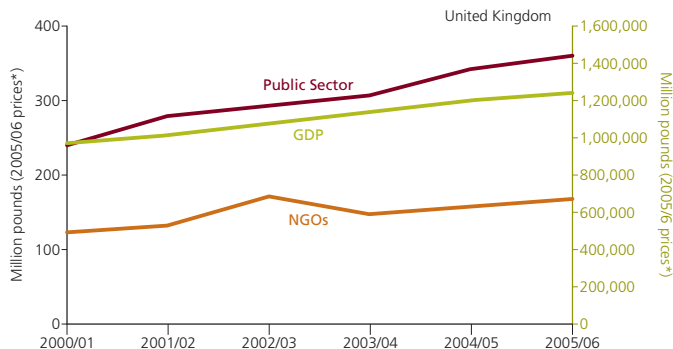
Chemical river quality

Since 1990		Since 2000	
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- In 2004 the percentage of rivers of good biological quality in England was 70 per cent, up from 60 per cent in 1990 and 67 per cent in 2000. In 2004, 51 per cent of rivers in Northern Ireland and 79 per cent of rivers in Wales were of good biological quality.
- 62 per cent of English rivers were of good chemical quality in 2004, representing an increase since 1990 (then 43 per cent) and a small decrease since 2000 (then 64 per cent). In Northern Ireland 58 per cent of rivers were of good chemical quality in 2004 compared with 44 per cent in 1991 and 59 per cent in 2000. In all years since 1993 over 90 per cent of rivers in Wales have been of good chemical quality.
- In Scotland, the percentage of rivers of good quality has remained stable at around 87 per cent between 2000 and 2004, based on a combined chemical, biological and aesthetic assessment.
- The traffic light assessments above are based on the biological and chemical quality of river lengths in England and Wales only. It is not possible to produce aggregate UK measures.
- This indicator will in due course be changed to reflect assessments of ecological status as required by the EU Water Framework Directive.

16. Expenditure on UK biodiversity

Expenditure on biodiversity in the UK by the public sector and non-governmental organisations, 2000/01-2005/06



*Deflated using implied UK GDP deflator

Source: Defra

UK biodiversity spending

Long term



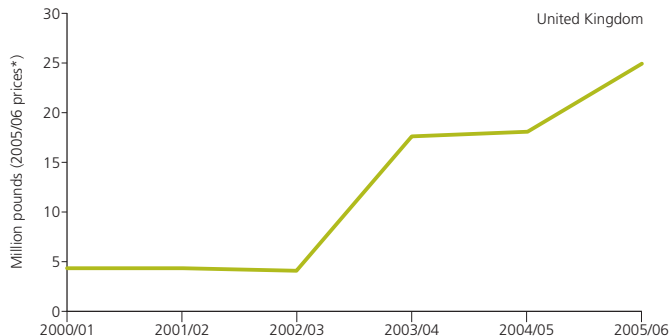
Since 2000/01



- Spending is one way of assessing the priority that is given to biodiversity within Government and within the voluntary sector.
- Since 2000/01 there has been a year on year increase in biodiversity expenditure from the public sector in real terms, resulting in an overall increase of 33 per cent. Over the same period GDP increased by 22 per cent.
- Spending from non-governmental organisations fluctuated between 2000/01 and 2005/06, peaking in 2002/03. During this period there was an overall increase of 26 per cent.
- In 2005/06, £360 million pounds of public sector funding went on biodiversity. Net of public sector funding, NGOs spent about £170 million.

17. Expenditure on global biodiversity

UK Government funding for conservation of global biodiversity, 2000/01-2005/06



*Deflated using implied UK GDP deflator

Source: Defra

Global biodiversity spending

Long term



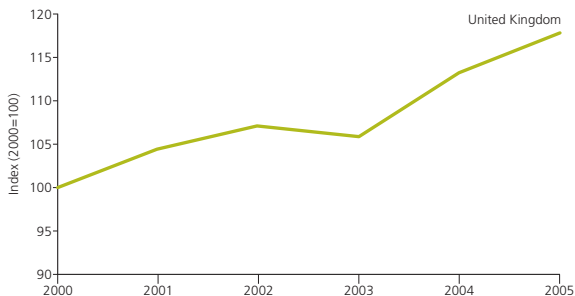
Since 2000/01



- Spending is one way of assessing the priority that is given to global biodiversity within the UK Government, and such funds are essential for the implementation of the Convention on Biological Diversity in developing countries.
- Between 2000/01 and 2005/06 there was a four-fold (456 per cent) increase in real terms of UK funding for global biodiversity. During the same period there was a 22 per cent increase in UK GDP.
- This increase in UK Government spending on global biodiversity was mainly driven by contributions to the Global Environment Facility (2003/04) and the Global Opportunities Fund (2005/06).

18. Conservation volunteering

Volunteer time spent in biodiversity conservation in selected charities in the UK, 2000-2005



Source: Royal Society for the Protection of Birds, British Trust for Conservation Volunteers, Wildlife Trusts

Conservation volunteering

Long term



Since 2000



- The amount of time people spend volunteering to assist in conservation reflects society's commitment to and understanding of biodiversity.
- This indicator presents an index of the number of hours worked by volunteers in three major UK conservation charities: the Royal Society for the Protection of Birds (RSPB), the British Trust for Conservation Volunteers (BTCV) and the Wildlife Trusts. Volunteering activities include land management and public education by volunteer reserve wardens for RSPB and Wildlife Trusts, the number of people attending BTCV conservation tasks and the number of people taking part in bird surveys on a voluntary basis.
- Between 2000 and 2005 there was an 18 per cent increase in time spent volunteering. In 2005 the total time spent was equivalent to around 500,000 working days.
- The indicator is based on a limited data set. The indicator will be further developed to integrate data from a wider range of organisations and activities.

Enquiries about indicators or this publication

This publication has been produced by Environment Statistics and Indicators (ESI) Division, Defra in conjunction with the UK Biodiversity Policy Unit (Defra), the Natural Environment Science Division (Defra) and the Joint Nature Conservation Committee.

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For further details on all the indicators, including data sources and assessment methods, please visit the Joint Nature Conservation Committee (JNCC) website www.jncc.gov.uk/biyp.

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