

UK Biodiversity Partnership
Standing Committee Meeting

Thursday 22nd September 2005

**UK Biodiversity Indicators for the
2010 target**

Paper UKBPSC 05-08

UK Biodiversity Indicators for the 2010 Target

Consultation paper prepared by the UK Biodiversity Indicators Working Group

Purpose of this paper

1. The purpose of this paper is to review and recommend candidate indicators to be used in association with the UK Biodiversity Action Plan to assess overall progress towards achievement of the target to halt/significantly reduce the rate of biodiversity loss by 2010. This paper has been prepared for consultation with the country biodiversity groups in advance of the UK Biodiversity Standing Committee meeting on 22 September 2005.

Context

The 2010 targets

2. In 2002, the UK along with all other Parties to the UN Convention on Biological Diversity (CBD), made a commitment “*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.*” This commitment was subsequently endorsed by world leaders at the World Summit on Sustainable Development.

3. At its meeting in Gothenburg in 2001, the European Council agreed to halting biodiversity decline with the aim of reaching this objective by 2010. This commitment has also been incorporated in the EU Sustainable Development Strategy and the Sixth Environment Action Programme. The Pan-European Ministerial ‘Environment for Europe’ process adopted a similar target at Kiev in 2003.

The global and European biodiversity indicator frameworks

4. The CBD Conference of the Parties (COP7)¹ decided that in order to assess progress at the global level towards the 2010 target, and to communicate effectively about trends in biodiversity, a limited number of trial indicators will be developed and used for a global assessment. As far as is feasible it is intended that the indicators will be capable of application at global, regional, national and local levels as tools for the implementation of the CBD and of national biodiversity strategies and action plans. Parties are therefore invited to use or establish national indicators to assess progress towards national and/or regional targets. The COP7 also agreed a framework of seven focal areas covering the different objectives of the Convention and 21 related global indicators. The Second Global Biodiversity Outlook will report in 2006 on global trends in biodiversity using these indicators.

5. In the Europe, following a major stakeholder conference in Malahide in May 2004, the Environment Council² decided to develop a set of headline biodiversity indicators to assess the 2010 target in Europe. The Council adopted the CBD indicator framework with some modifications³. The European Environment Agency has subsequently established the *Streamlining European Biodiversity Indicators 2010 (SEBI2010)* project to implement this decision. The SEBI2010 project will

¹ Decision VII/30

² 10997/04 28th June 2004

³ CBD Focal Area ‘Status of traditional knowledge, innovations and practices’ was not adopted by EU. EU added a new Focal Area on ‘Public opinion’. Titles of EU Focal Areas were abbreviated.

promote consistent biodiversity indicators and monitoring required under the Lisbon Agenda, the Sustainable Development Strategy, the Habitats and Birds Directives and the EU Biodiversity Strategy. SEBI2010 also contributes to the action plan developed as a follow-up to the Kiev Resolution on Biodiversity and hence responds to commitments by the Council of Europe and the Pan-European Biological and Landscape Diversity Strategy (PEBLDS).

6. Whilst the exact form of both the CBD and EU indicator initiatives is not yet determined there is an expectation that there will be requirements for UK national-level reporting to be aligned with these international frameworks. The UK is participating actively in these international work programmes to ensure that any such reporting requirements do not pose unacceptable burdens on the UK and other Member States/Parties. The overall objective is to reduce the burden of international reporting whilst making it more effective.

UK Biodiversity Action Plan

7. The Millennium Biodiversity Report '*Sustaining the Variety of Life*' acknowledged the importance of indicators to measure future progress of the UK BAP and relied heavily on the existing biodiversity-related indicators used in the UK Government's '*Quality of Life Counts*' (QOLC)⁴ indicators for sustainable development. The Biodiversity Group recommended that the UK continued to work with other countries, within the framework of the CBD, to develop a suite of indicators which could be used to assess the state of biodiversity generally and progress towards the achievements of the primary aims of the UK BAP.

8. Since that time, whilst consistent targets and indicators have been agreed at global and European levels, devolution has brought about a much stronger focus on country-level targets and delivery in the UK. The Government's new sustainable development strategy⁵ contains fewer biodiversity-related measures shared at the UK level, and country biodiversity and other sector strategies within the UK are developing a range of different indicators.

9. At its meeting on 9th March 2005, the UK Standing Committee endorsed proposals to develop a small "basket" of headline indicators at UK level to enable reporting on progress towards the 2010 target. It was agreed that these should be focussed on biodiversity outcomes but could include a small number of indicators of process – eg policy change, particularly where there was likely to be a lag between achieving the desired change and the biological outcome of this change. They should use existing data sources and avoid creating new burdens on the four administrations, while conforming to EU & CBD frameworks as closely as possible, with the further principal aim that the indicators should be enduring providing a good communication vehicle for biodiversity beyond 2010.

Recommendations: candidate headline indicators for the 2010 target

10. The UK Biodiversity Indicators Working Group (see Annex A) met on 4th May 2005 to review potential indicators, following the guidance provided by the Standing Committee. The Working Group reviewed indicators already being used and

⁴ www.sustainable-development.gov.uk/indicators/index.htm

⁵ Securing the future: delivering UK sustainable development strategy, HMSO, 2005

developed within the UK and EU and selected the best candidates for inclusion in the set of UK headline indicators (Table 1). In addition to the criteria set by the Standing Committee the Working Group considered policy relevance, public resonance, technical feasibility, scientific credibility, scalability and sensitivity. Table 1 also shows the current usage of the proposed indicators at the UK and country levels.

11. The Working Group recommends:

- the provisional adoption of 18 headline indicators, 12 of which are currently ready for application and 6 of which will require further development and testing. Further details of the proposed indicators and summaries of pros and cons for each indicator are included in Annex B.
- that, in line with EU and CBD timescales and the Countdown 2010 initiative, a first set of UK headline indicators is collated and published towards the end of 2006.
- that, to be most efficient, work on further development and testing of the headline indicators should be undertaken on a UK basis, including breakdowns for country-level application where appropriate
- active UK participation in the European and CBD indicator initiatives to share the UK experience and promote the solutions that work in the UK. However, the proposed UK headline indicators should be kept under review to take into consideration these ongoing developments and to seek to maintain alignment with international efforts.

12. The Working Group requests that resources are made available, through the participation of members of the Group and for commissioned development work, to enable these task to be completed.

Andrew Stott
NRRRA SD, Defra
on behalf of the UK Biodiversity Indicator Working Group
10th June 2005

Table 1. Listing of candidate UK indicators and relationships with the EU indicator framework and existing indicator initiatives in the UK

EU/CBD ⁶ Focal Areas	EU Indicators	Candidate UK Indicators (<i>indicators shown in italics require further development</i>)	Already used or proposed in:				
			UK	Eng	Sco	Wal	N.I.
Status and trends of the components of biological diversity	Trends in abundance and distribution of selected species	1. Trends in populations of wild birds: (a) farmland birds; (b) woodland birds; (c) coastal and sea birds	✓	✓	✓	✓	✓
		2. Plant diversity in the wider countryside		✓	✓		✓
	Change in status of threatened and/or protected species	3. Status of BAP Priority Species	✓	✓	✓	✓	✓
	Trends in extent of selected biomes, ecosystems and habitats	4. Status of BAP Priority Habitats	✓	✓	✓	✓	✓
	Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance	<i>5. Trends in genetic diversity of cultivated plants</i>			✓		✓
	Coverage of protected areas	6 (a) Extent of SACs, SPAs and SSSI/ASSIs; (b) Proportion of features of SACs and SPAs in favourable condition.		✓			✓
Sustainable use	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management	7. Proportion of woodland area under certified management	✓	✓			
		8. Area of land under agri-environment scheme agreement	✓	✓		✓	✓
		9. Proportion of commercially exploited fish stocks around the UK harvested sustainably.	✓	✓	✓		

⁶ CBD Focal Area 'Status of traditional knowledge, innovations and practices' has been not adopted by EU. EU added a new Focal Area on 'Public opinion'.

EU/CBD Focal Areas	EU Indicators	Candidate UK Indicators (<i>indicators shown in italics require further development</i>)	Already used or proposed in:				
			UK	Eng	Sco	Wal	N.I.
Threats to biodiversity	Nitrogen deposition	10. Ecological impacts of air pollution	✓				
	Number and costs of invasive alien species	11 (a) Number of invasive alien species; (b) <i>Costs of invasive alien species</i>			✓		
	Impact of climate change on biodiversity	12. <i>Timing of biological events</i>			✓		
Ecosystem integrity and ecosystem goods and services	Marine trophic index	13. <i>Marine trophic index</i>					
	Connectivity/fragmentation of ecosystems	14. <i>Habitat networks</i>					
	Water quality in aquatic ecosystems	15. Rivers of good chemical and biological quality	✓	✓	✓	✓	✓
Status of access and benefits sharing	Percentage of European patent applications for inventions based on genetic resources and/or traditional knowledge that disclose the source of these resources and knowledge	No indicator proposed					
Status of resource transfers and use	Funding to biodiversity: <ul style="list-style-type: none"> • in economic and development cooperation (response) • in EU research, monitoring and management 	16. <i>Public sector environmental protection expenditure on biodiversity in the UK</i>					
		17. <i>UK Government funding for conservation of global biodiversity</i>					
Public opinion	Public awareness and participation	18. Volunteer time spent in conservation and number of people volunteering for conservation activity		✓	✓		✓

ANNEX A Membership of UK Biodiversity Indicators Working Group

Present at workshop on 4th May, 2005

Andrew Stott (Defra) Chair
Sarah Webster (Defra)
Rocky Harris (Defra)
Martyn Ibbotson (Defra)
Dominic Whitmee (Defra)
James Williams (JNCC)
Ed Mackay (SNH)
Simon Bareham (CCW)
Richard Weyl (EHS)
Stuart Rogers (CEFAS)
Jeff Kirby (Just Ecology)
Brian Ford-Lloyd (Univ Birmingham)
Richard Gregory (RSPB/Link)

Apologies

Fiona Mettam (Defra)
Beth Greenaway (Defra)
Paul Leonard (Defra)
Paul Rose (JNCC)
Ian Maclean (JNCC)
Peter Brotherton (EN)
Nigel Maxsted (Univ Birmingham)

Other consultees

Simon Gillam (FC)
Shaun Mowat (Defra)
Glenys Parry (Defra)
Joanna Elliot (DfID)

APPENDIX B INDICATOR FACT SHEETS

EU/CBD Focal Area	Status and Trends in the Components of Biological Diversity
EU Indicator	Trends in abundance and distribution of selected species
Candidate UK Indicator	1. Populations of wild birds: (a) farmland birds; (b) woodland birds; (c) coastal and sea birds
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	Populations of common birds are considered to be a good indicator of the broad state of biodiversity because they occupy a wide range of habitats, tend to be near the top of the food chain and considerable long-term data have been collected. Defra has a Public Service Agreement (PSA) target to reverse the long-term decline in the number of farmland birds in England and the Forestry Commission England has a target to reverse the long-term decline in the number of woodland birds. Individual Biodiversity Action Plan (BAP) targets to reverse declines have also been published for 26 priority bird species covering a range of different habitats in the UK.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	This indicator is a multi-species index that has been compiled in conjunction with the RSPB and BTO from a range of sources, principally the annual Common Bird Census and Breeding Bird Survey. The indicator includes common native breeding birds for which reliable, long-term data are available. The indicator contains separate indices for farmland birds (19 species), woodland birds (33 species) and sea birds (15 species). Data are available from 1970. The most recent data are for 2003. Updates are published annually. Country and regional breakdowns are also available.
Availability eg. already published, development work needed, potential improvements etc.	Available now. Updated annually. Could be developed further to include trends for other taxa, eg butterflies and moths, river flies, bumblebees and bats.
Main advantages	Resonance with public; high political profile; annual update; good reliability; consistent data for UK; volunteer data collection;
Main disadvantages	Complexity of multi-species index and interpretation of trends (ie could show improving trends despite declines in some species); some statistical limitations in providing sub-UK breakdowns; specific conservation measures aimed at achieving policy targets may mean the birds become a 'special case' rather than being representative of a wider range of biodiversity.
Recommendation	Adopt. Further development needed to include other taxa.
Linkages	<ul style="list-style-type: none"> UK SDFI (20) Bird Populations <u>England</u>: EBS H1 Populations of Wild Birds; A1 farmland birds; W1 wetland birds; F1 woodland birds; T1 town/garden birds; M1 coastal and sea birds. <u>Scotland</u>: ISDS S2 Abundance of terrestrial breeding birds; S3 Abundance of non-breeding waterbirds; S4 Abundance of breeding seabirds; S7 Terrestrial insect abundance; S13 Estuarine fish species diversity; NHI 11 Wild Birds (terrestrial, water and sea) <u>Wales</u>: Recent short-term changes in the abundance of widespread breeding birds by major habitat group; Long-term changes in the ranges of birds by major habitat group. <u>N Ireland</u>: BINI 1. Populations of wild birds – headline; 14. Status of marine biodiversity; 27. Population of Irish Hares <u>EU</u>: Trends in Abundance and Distribution of Selected Species. SEBI2010 process yet to decide indicator but strong candidates include the European Common Birds indicator and something similar based on butterflies. Trends in common birds has been adopted by the EU as a 'Long-List

	Structural Indicator' and 'Sustainable Development • <u>CBD</u> : Trends in Abundance and Distribution of Selected Species
Author	James Williams (JNCC)

EU/CBD Focal Area	Status and trends in the components of biological diversity
EU Indicator Topic	Trends in abundance and distribution of selected species
Candidate UK Indicator	2. Plant diversity in the wider countryside – ‘wild flower index’
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>The indicator shows longer term changes diversity and composition of vascular plants in the wider countryside using the results of the Countryside Survey. The indicator is a direct measure of species diversity which is closely associated with the abundance and distribution of common plants.</p> <p>Priority species and habitats, and the special features of designated sites, cannot be effectively conserved without regard to the surrounding matrix of the wider countryside. Vascular plants are sensitive to longer term changes in land management practices, air pollution and climate change. Government policies for safeguarding the wider countryside include cross-compliance and best practice, agri-environment schemes, environmental impact assessment, regulation of hedgerow removal and catchment management.</p> <p>Expressed in terms of trends in diversity of common wild flowers in meadows, woods, hedgerows and heaths, the indicator has high public resonance.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>As part of the national Countryside Survey a repeat survey of vegetation plots has been undertaken in 1978, 1990 and 1998. Over 15,000 plots were surveyed in 1998. The next survey is scheduled to take place in 2006/07. Data are currently available for GB, and separately for England and Scotland. Development work for the next Countryside Survey should provide comparable data for Wales and Northern Ireland. Data are statistically and scientifically robust. Analysis of trends are available for the main terrestrial Broad Habitat types (arable, grassland, field boundaries, watercourses, woodland, upland heaths and bogs). In scientific terms the indicator is a measure of botanical diversity within habitat patches ie γ-diversity.</p>
Availability eg. already published, development work needed, potential improvements etc.	Indicators from previous surveys already published. Next survey will report in 2008. Development work necessary to include Northern Ireland.
Main advantages	<ul style="list-style-type: none"> • Policy relevant: • Analytically sound: • Easy to understand: trends (i.e. changed status) can be described and interpreted clearly, for a non-specialist audience. • Based on existing data and long time series: commitment to undertake survey in 2006/07.
Main disadvantages	<ul style="list-style-type: none"> • Relatively infrequent updates • Trends currently only available for GB
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • <u>England</u>: EBS A4, W4, F4 Trends in plant diversity; Also SFFS Trends in plant diversity • <u>Scotland</u>: ISDS S5 Vascular plant diversity, S6 Woodland structure diversity; NH1 3 Habitat condition in the wider countryside. • <u>N Ireland</u>: BINI 2 Vascular plant diversity (to be developed). • <u>EU</u>: no consistent data at European scale. • <u>OECD</u>: • <u>CBD</u>: no consistent data at global scale.
Author	Andrew Stott (Defra)

EU/CBD Focal Area	Status and trends in the components of biological diversity
Indicator Topic	Change in status of threatened and/or protected species
Candidate UK Indicator	3. Status of BAP Priority Species
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	The 1994 UK Biodiversity Action Plan established an outcome-oriented approach to conserving biodiversity with clear biological targets for [N] priority species. This key aspect of environmental policy for safeguarding the natural character of the UK delivers directly towards international commitments to halting biodiversity loss by 2010. The status of BAP priority species provides an indicator of change within a wide range of ecosystems and natural processes throughout the UK, including the surrounding seas. By virtue of their scarcity or recent decline, priority species are likely to be especially sensitive to adverse pressures and may therefore signal the potential for more widespread damage if such pressures are allowed to persist unchecked. Includes species with high public appeal. Measures of success for species include expanding populations or distribution of species. Progress is assessed by Lead Partners , acting as champions for conservation action.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Assessment on implementation of species action plans commenced in 1999 and was undertaken more comprehensively in 2002 . The next assessment is underway in 2005 , establishing a 3-yearly reporting cycle. Results can be reported consistently at the UK / country / habitat scale. A reliable trend has not yet been established. For about a third (35%) of priority species, their status remained unknown in 2002. An added complication arises through the periodic review of targets, such as in 2004-05 , which introduces an element of discontinuity within the time series. Nevertheless, the changed status of priority species can be defined in each reporting round and knowledge of their status will continue to improve through more targeted monitoring.
Availability eg. already published, development work needed, potential improvements etc.	Results of 2002 assessment published. Results of 2005 assessment due to be published in 2006. Currently some data used to indicate status and progress for individual species action plans is not held and maintained centrally. However continued development and promotion of the National Biodiversity Network should improve access to data.
Main advantages	<ul style="list-style-type: none"> • Policy relevant: trends illustrate <i>outcomes</i> that are relevant to international and domestic policy objectives / target levels (in terms of corroboration / early warning / prediction). • Analytically sound: data strengths and weaknesses can be described, with sources referenced. • Easy to understand: trends (i.e. changed status) can be described and interpreted clearly, for a non-specialist audience. • Based on existing data: utilises available data, albeit semi-quantified and often reliant on expert judgment, with a regular reporting cycle of three years established • Interpreted at the appropriate geographical level: consistent at UK, country and habitat scales.
Main disadvantages	<ul style="list-style-type: none"> • The list of species to which this indicator applies may change over time as a result of changing priorities and assessment criteria in the UK BAP. • BAP priorities not solely a scientific assessment of status and threat, may lack consistency with 'Red List' indicators developed at European and global levels. • Incomplete and out-of-date information on species populations and

	distribution.
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • <u>UK</u>: SDI 21 Biodiversity Conservation (a) priority species status. • <u>England</u>: EBS H3 Status of BAP Priority Species • <u>Scotland</u>: ISDS S1a Status of UK BAP priority species; S8a Proportion of notified species populations in favourable condition on protected sites; SNH 1 BAP action plan outcomes; 2 Condition of notified features on designated sites • <u>Wales</u>: % of BAP species which are identified as stable or increasing • <u>N Ireland</u>: 26. Status of BAP priority habitats and species – headline; 5,10,12,16 & 23. Status of woodland , farmland, freshwater / wetland, peatland and coastal / marine BAP priority species and habitats • <u>EU</u>: Change in status of threatened and/or protected species. SEBI2010 process yet to decide indicator but candidates include changes in European red listed species or possibly some sort of regional red list index. In the longer term conservation status assessments for species listed on the Habitats Directive is a candidate. • <u>CBD</u>: Change in status of threatened species. Proposed use of IUCN Red List indicator with modifications.
Author	James Williams (JNCC), Peter Brotherton (EN)

EU/CBD Focal Area	Status and trends in the components of biological diversity
EU Indicator Topic	Trends in extent of selected biomes, ecosystems and habitats
Candidate UK Indicator	4. Status of BAP Priority Habitats
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	The 1994 UK Biodiversity Action Plan established an outcome-oriented approach to conserving biodiversity with clear biological targets for 45 priority habitats. This key aspect of environmental policy for safeguarding the natural character of the UK delivers directly towards international commitments to halting biodiversity loss by 2010. The status of BAP priority habitats provides an indicator of change within a wide range of ecosystems and natural processes throughout the UK, including the surrounding seas. By virtue of their scarcity or recent decline, priority species are likely to be especially sensitive to adverse pressures and may therefore signal the potential for more widespread damage if such pressures are allowed to persist unchecked. Some BAP habitats have high public appeal. Measures of success for habitats include increasing extent and improving condition. Progress is assessed by Lead Partners , acting as champions for conservation action.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Assessment on implementation of species action plans commenced in 1999 and was undertaken more comprehensively in 2002 . The next assessment is underway in 2005 , establishing a 3-yearly reporting cycle. Results can be reported consistently at the UK / country / habitat scale. A reliable trend has not yet been established. For a third of priority habitats, their status remained unknown in 2002. An added complication arises through the periodic review of targets, such as in 2004-05 , which introduces an element of discontinuity within the time series. Nevertheless, the changed status of priority habitats can be defined in each reporting round and knowledge of their status will continue to improve through more targeted monitoring.
Availability eg. already published, development work needed, potential improvements etc.	Results of 2002 reporting round published. Results of 2005 reporting round due in 2006. Currently some data used to indicate status and progress for individual habitat action plans is not held and maintained centrally. However continued development and promotion of monitoring schemes and the National Biodiversity Network should improve access to data.
Main advantages	<ul style="list-style-type: none"> • Policy relevant: trends illustrate <i>outcomes</i> that are relevant to international and domestic policy objectives / target levels (in terms of corroboration / early warning / prediction). • Analytically sound: data strengths and weaknesses can be described, with sources referenced. • Easy to understand: trends (i.e. changed status) can be described and interpreted clearly, for a non-specialist audience. • Based on existing data: utilises available data, albeit semi-quantified and often reliant on expert judgment, with a regular reporting cycle of three years established • Interpreted at the appropriate geographical level: consistent at UK, country and habitat scales.
Main disadvantages	<ul style="list-style-type: none"> • The list of habitats to which this indicator applies may change over time as a result of changing priorities and assessment criteria in the UK BAP. • Incomplete and out-of-date information on habitat extent and condition.
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • UK: SDI (21) Biodiversity Conservation (b) priority habitat status.

	<ul style="list-style-type: none">• <u>England</u>: EBS H3 Status of BAP Priority Habitats• <u>Scotland</u>: ISDS S1b Status of UK BAP priority habitats in Scotland (and sustainable development indicator 10: biodiversity)• <u>Wales</u>: Biodiversity index (% of BAP habitats identified as stable or increasing is an interim recommendation of the Sustainable Development Indicators Working Group)• <u>N Ireland</u>: 26. Status of BAP priority habitats and species.• <u>EU</u>: Trends in extent of selected biomes, ecosystems and habitats• <u>CBD</u>: Trends in extent of selected biomes, ecosystems and habitats
Author	Ed Mackey (SNH)

EU/CBD Focal Area	Status and trends in the components of biological diversity
EU Indicator	Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance
Candidate UK Indicator	5. Trends in genetic diversity of cultivated plants – crop wild relatives and landraces
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>Genetic diversity is one of the three main components of biological diversity (the other two being species and ecosystems). As part of the CBD's Global Strategy for Plant Conservation the UK is signed-up to the global target of conserving 70% of the genetic diversity of crops and other major socio-economically valuable plant species by 2010. A high priority for additional work in the UK is the production of a checklist of species to be covered by this target, in particular crop species grown in this country (landraces) and crop wild relatives native to the UK⁷.</p> <p>Two components to be considered: (a) Baseline (2004) inventory of all crop wild relative species (includes agricultural and horticultural crops, forestry, ornamental and medicinal and aromatic plant taxa) and the proportion of species in different Red List categories. (b) Status (2004) of British landraces⁸ and obsolete cultivars (primarily for cereal and forage crops and to a limited degree for vegetables) and trends between 1972 and 2002 using various sub-indicators including landraces/cultivars that are nationally listed, decline in numbers of farmers growing landraces etc.</p> <p>Crop wild relatives have an important role to play in food security and a high value to the horticulture industry. Conservation of landraces is important for the maintenance of traditional farming practices and associated habitats, especially in more remote communities such as those of the Scottish Isles</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>Data sources: Defra research report project code GC0134 and PGR Forum (www.pgrforum.org).</p> <p>Lack of time series and update frequency are problems that affect the identification of trends rather than status.</p> <p>The data are reliable and scientifically credible. The crop wild relative and landrace inventories have been produced using clearly defined strategies and fixed criteria.</p>
Availability eg. already published, development work needed, potential improvements etc.	<p>Already published: British catalogue of crop wild relative species (Defra research contract report GC0134); British inventory of landraces of cereals, forages and some vegetables (Defra research contract report GC0134); The Vascular Plant Red Data List for Great Britain (JNCC); Millennium Genebank Catalogue (Flynn, S., Turner, R.M., and Dickie, J.B. 2004. Seed Information Database http://www.rbgkew.org.uk/data/sid)</p> <p>Further development work required to determine most effective trend indicator in relation to the GSPC target.</p>
Main advantages	<ul style="list-style-type: none"> • Inventory recently completed for UK • Provides a marker for genetic diversity which could otherwise be overlooked • Addresses priorities for action identified in UK response to GSPC

⁷ Ref to UK response to GSPC

⁸ Insert definition of landrace

Main disadvantages	<ul style="list-style-type: none"> • No recent trend data • Not previously considered within UK BAP. • Lacks immediate public resonance
Recommendation	Further development required.
Linkages	<p><u>NI</u>: BINI (28) Genetic biodiversity – to be developed; (29) Surviving plant cultivars and domestic livestock breeds of historic importance – to be developed.</p> <p><u>EU</u>: Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance. SEBI2010 process yet to decide indicator</p> <p>CBD: As above</p>
Author(s)	Brian Ford-Lloyd and Nigel Maxted (Univ Birmingham), Andrew Stott (Defra)

EU/CBD Focal Area	Status and trends in the components of biological diversity
EU Indicator	Coverage of Protected Areas
Candidate UK Indicator	6(a) Extent of Special Areas for Conservation (SACs), Special Protection Areas (SPAs) and biological Sites/Areas of Special Scientific Interest (SSSIs); (b) Proportion of features of SACs and SPAs in favourable condition
Indicator type	(a) Response; (b) State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>Designation and management of protected areas are key mechanisms for halting (and reversing) the loss of biodiversity at both the EU (SACs and SPAs) and UK levels (SSSIs/ASSIs). These protected areas cover the most valuable areas for native biodiversity in the UK with associated legal mechanisms for safeguarding habitats and species.</p> <p>Indicator (a) shows the cumulative extent (ha) of these areas over time. Proportion of land area is inappropriate as marine areas are included in SACs and SPAs.</p> <p>Indicator (b) shows the degree to which habitat and species selection features are safeguarded on SACs and SPAs. It is envisaged that this will be extended to all SSSI/ASSI features and management areas when data become available at a UK level. In England, Defra has a target to achieve favourable condition on 95% of SSSIs, by area, by 2010. In Northern Ireland, the DOE has a target to maintain or improve the conservation condition of 95% of the features underlying the designation of internationally important wildlife sites and Areas of Special Scientific Interest (ASSI) by 2013.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>Trends in extent of SACs and SPAs and SSSI/ASSIs is readily available for all UK countries from the date the legislation came into effect (1981 onwards), updated as new designations are made and collated annually.</p> <p>Common Standards Monitoring is being developed by the Country Agencies and JNCC and is designed to report of the condition of features within both SACs and SPAs and SSSIs/ASSIs. The results for SACs and SPAs are being published on an annual basis (as part of a six-year rolling programme) across all UK countries. Similar data for SSSIs/ASSIs is being gathered and comparable data across UK will available in due course.</p>
Availability eg. already published, development work needed, potential improvements etc.	Information on the designation of SACs, SPAs and SSSIs/ASSIs and the condition of their features is collated on an annual basis by the Country Agencies and JNCC. Further work is being undertaken to ensure that comparable site condition monitoring for SSSI/ASSI features is available for all UK countries.
Main advantages	<ul style="list-style-type: none"> • Extent of protected areas is a simple measure of response and is comparable with EU and global indicators. • Favourable condition is a direct measure of the biodiversity status of the most important national and international sites in UK. • Both indicators have high policy relevance. • Data are collected for existing reporting obligations. • Data are available annually
Main disadvantages	<ul style="list-style-type: none"> • Extent of protected areas is a response/process indicator and does not necessarily mean that designations are effective. • Only data on condition of selection features is available for UK. This differs from area of management units in favourable condition as used in England for the PSA targets and EBS indicators.
Recommendation	Adopt both sub-indicators
Linkages	<ul style="list-style-type: none"> • <u>England</u>: EBS H2 Area of SSSIs in favourable condition in England, plus breakdown for different habitats.

	<ul style="list-style-type: none"> • <u>Scotland</u>: NSI 5 The effectiveness of protected areas • <u>Wales</u>: KESW Area of Environmentally Protected Areas by type (National Parks, ESAs, SSSIs) • <u>N Ireland</u>: BINI Condition of ASSIs (also related to individual habitat groups) • <u>EU</u>: Proportion of surface areas designated only under the EC Birds and Habitats Directives, protected only by national instruments, and covered by both • <u>CBD</u>: Coverage of protected areas
Author(s)	Richard Weyl (EHS)

EU/CBD Focal Area	Sustainable use
EU Indicator	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management
Candidate UK Indicator	7. Proportion of woodland area under certified management
Indicator type	Response
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	As part of the CBD's Global Strategy for Plant Conservation the UK is signed-up to the global target of managing at least 30% of production lands consistent with the conservation of plant diversity by 2010 ⁹ . In the UK 12% of the land area is wooded and about 60% of this woodland is non-native conifer mostly planted for commercial timber production. This indicator measures the area of woodland in the UK shown to be managed sustainably. The indicator is complementary to the trends in species and habitats indicators which reveal the outcome of woodland management.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Data on land certified under the Forest Stewardship Council scheme and other relevant schemes is collected and annually updated by Forestry Commission and DARDNI. Available back to 2001 at least. Country estimates available. Reliable as far as it goes, although there will be other areas which are sustainably managed but have not been certified (either because of the perceived cost or because they are not used to produce timber). Includes areas of ancient and semi-natural woodland.
Availability eg. already published, development work needed, potential improvements etc.	Already published, as one of the UK Indicators of Sustainable Forestry. Potentially possible to extend coverage to some other woodlands, but some areas which are sustainably managed for their social and environmental benefits would still not be covered.
Main advantages	Data already available. Updated annually. Recognises and promotes Forest Stewardship Council and other certification schemes.
Main disadvantages	Not possible to include all sustainably managed areas in the indicator; does not cover most of farm woodland. Consistency with standards elsewhere in EU not known.
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • UK: ISF (A6) Area of sustainable managed woodland • England: EBS F5 Area of ancient woodland under approved management regime. • Scotland: NHI 15 Land and sea under positive management • Wales: • N Ireland: • EU: • MCPFE (pan-European) indicator 3.5: Forests under management plans (Proportion of forest and other wooded land under a management plan or equivalent) • CBD:
Author(s)	Rocky Harris, Andrew Stott (Defra)

⁹ UK response to GSPC

EU/CBD Focal Area	Sustainable use
EU Indicator	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management
Candidate UK Indicator	8. Area of land under agri-environment scheme agreement
Indicator type	Response
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	As part of the CBD's Global Strategy for Plant Conservation the UK is signed-up to the global target of managing at least 30% of production lands consistent with the conservation of plant diversity by 2010 ¹⁰ . In the UK around 70% of the land area is farmed and many semi-natural habitats and farmland species rely on agricultural grazing or cropping. This indicator measures the area of land where subsidies are paid in order to protect and enhance biodiversity, landscapes and historic features and promote public access. The indicator is complementary to the trends in species and habitats indicators which reveal the outcome of management of farmland.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Data on agri-environment schemes are available from Defra, Welsh Assembly Government, Scottish Executive and DARDNI. Time series go back to the introduction of schemes in the 1980s although the scope of regimes has changed over that time. Annual updates possible. Regimes have varied and may continue to vary slightly between the different countries, although the general scope is the same.
Availability eg. already published, development work needed, potential improvements etc.	Some data already published at country level but needs compilation.
Main advantages	Data already available. Updated annually. Shows major investment in sustainable management of the farmed countryside.
Main disadvantages	Schemes have wide range of environmental objectives not exclusively biodiversity and it is difficult to extract the biodiversity component. Link between payment of grant and management regime needs to be validated, although it is part of the regime specification. Standard of management regime required for grant purposes may vary for different types of farm and for different countries – or even over time. Consistency with standards elsewhere in EU not known.
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • <u>UK</u>: SDI Farming and environmental stewardship – to be developed. • <u>England</u>: EBS H4 Area of land under agri-environment scheme management, A5 Extent and condition of farmland habitat features; [SFFS....] • <u>Scotland</u>: NHI 15 Land and sea under positive management • <u>Wales</u>: KESW no of agri-environment agreements and area covered. • <u>N Ireland</u>: BINI (6) Area of land under agri-environment schemes; BINI (7) Extent and condition of farmland habitat features. • EU: • OECD: • CBD:
Author(s)	Rocky Harris, Andrew Stott (Defra)

¹⁰ UK response to GSPC

EU/CBD Focal Area	Sustainable use
EU Indicator	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management
Candidate UK Indicator	9. Proportion of commercially exploited fish stocks around the UK at full reproductive capacity and harvested sustainably
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	This indicator measures the extent to which the management regime is effective in maintaining sustainable fish stocks. The indicator is complementary to the trends in species and habitats, and trophic level indicators which reveal the outcome of fisheries management.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Date collated by CEFAS/Defra. Back to 1998. Updated annually. Not particularly meaningful to disaggregate to countries. Not all stocks are assessed every year and hence changes can be difficult to interpret.
Availability eg. already published, development work needed, potential improvements etc.	Already published. It might be possible to estimate area based measures for aquaculture and shellfish.
Main advantages	Data already available. Updated annually. Already accepted as UK Sustainable Development Strategy Framework indicator.
Main disadvantages	The indicator relates to number of stocks rather than area. Area might be possible to estimate but because of seasonal closures the resulting indicator can be volatile. Because not all stocks are assessed every year, changes can be difficult to interpret. Does not cover fish farming and shellfish etc.
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • UK: SDFI (27) Fish stocks around the UK within sustainable limits. • England: EBS H6 UK fish stocks fished within safe limits; W6 No of rivers with sustainable salmon stocks. • Scotland: ISDS S11 Salmonid counts; S14 Proportion of commercially exploited fish stocks fished within safe limits; NHI 13 Proportion of commercially exploited fish stocks fished within safe biological limits; 15 Land and sea under positive management • Wales: • N Ireland: • EU: • CBD:
Author(s)	Rocky Harris, Andrew Stott (Defra)

EU/CBD Focal Area	Threats to biodiversity
EU Indicator	Nitrogen deposition
Candidate UK Indicator	10. Ecological impacts of air pollution.
Indicator type	Pressure
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>Critical load thresholds indicate where the deposition of pollutants causing acidification and eutrophication (e.g. excessive algae growth in freshwaters) will result in significant harm to the environment. Such pollutants arise predominantly from burning of fossil fuels and waste from farm animals. The indicator shows % area of UK habitats sensitive to acidification and eutrophication where critical load is exceeded.</p> <p>Highly relevant as most appropriate quantitative assessment indicator for environmental effects of acidification and nitrogen deposition. Good signals and easy to communicate at a scientific and political level at a range of geographic resolutions.</p> <p>Links well to other initiatives e.g. UK strategy indicators supporting the UK Sustainable Development strategy, where the same indicator is used.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Data available from Centre for Ecology and Hydrology. Data available for UK for 1996, 1999, 2000, 2002. Data updated annually [from 2002 onwards?]. Capable of disaggregation for countries and at various scales down to 5km ² . Moderate to good reliability and good scientific credibility.
Availability eg. already published, development work needed, potential improvements etc.	Readily available. Published as UK Sustainable Development Strategy indicator. Developmental work and improvement ongoing. A more representative way of presenting the data could be % of UK semi natural habitat (eg BAP priority habitats or designated sites) where critical load is exceeded which gives equal weight to each unit/site.
Main advantages	<ul style="list-style-type: none"> • Follows international standards • Adopted by UK Government as sustainable development indicator. • Uses existing data collection network and modelling techniques. • Spatially coherent indicator that integrates nitrogen deposition and habitat sensitivity. Simply using emissions/deposition critical loads or air quality alone does not provide a comprehensive synthesis of exposure and effect. Although these other factors may be useful indicators in their own rights for different purposes.
Main disadvantages	<ul style="list-style-type: none"> • Gives a weighting that implies each 1 km square exceeded is of equal value without accounting for conservation interests. • Technically complex, requires additional explanation of consequences for biodiversity. • Includes both acid and nitrogen deposition which show opposite trends.
Recommendation	Adopt existing indicator, consider further development
Linkages	<p><u>UK</u>: SDFI area of UK habitats sensitive to acidification and eutrophication where critical load is exceeded; SDI emissions of air pollutants.</p> <p><u>Scotland</u>:</p> <p><u>Wales</u>:</p> <p><u>N. Ireland</u></p> <p>Linkages can be taken from the supporting paperwork to EU Headline indicator http://www.sustainable-development.gov.uk/performance/indicators-home.htm</p> <p>Critical Loads Focal Centre, http://critloads.ceh.ac.uk</p> <p>United Nations Economic Commission for Europe, Convention on Long Range Transboundary Air Pollution, http://www.unece.org/env/lrtap/welcome.htm</p>
Author(s)	Simon Bareham (CCW)

EU/CBD Focal Area	Threats to biodiversity
EU Indicator	Number and costs of invasive alien species
Candidate UK Indicator	11. Number and costs of invasive alien species
Indicator type	(a) State (b) Pressure
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>(a) Numbers of invasive alien (=non-native) species present in different taxonomic groups. This could be supplemented by trend data (at a simple level the number increasing in abundance compared with those stable or declining) and measures of extent (at simplest number of occupied hectads).</p> <p>(b) Costs of invasive alien (=non-native) species given as financial summaries. These costs should be broken down according to categories such as direct economic losses, preventive measures, management and remedial actions, losses for biodiversity (expressed again in financial terms).</p>
Data sources, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>(a) Main data sources are the Biological Records Centre, British Trust for Ornithology, Wildfowl and Wetland Trust, the National Biodiversity Network Gateway and the Marine Life Information Network. Some time series are available (ranging from annual to 10-20 year cycles), typically at hectad spatial scales, population estimates/indices available for some birds and mammals (with known precision), good data quality and scientific analyses.</p> <p>(b) General cost estimates from the Defra <i>Review of Non-native Species Policy</i> (2003) and example forward projections are given in <i>A New Agenda for Biosecurity</i> (2005 in prep). Needs more developmental work to reach sufficient precision and reliability.</p> <p>Data for non-native species are held and analysed separately for Great Britain and Northern Ireland. Non-native species are being assessed on an all-Ireland basis. At this stage the proposed indicator is for GB-only.</p>
Availability e.g. already published, development work needed, potential improvements etc.	<p>(a) An audit of non-native species has been published for Scotland by Scottish Natural Heritage and a similar audit is in preparation for England contracted by English Nature. These audits give total numbers of non-native species in those groups for which the information is available for terrestrial and freshwater organisms. Range and abundance estimates are available for some non-native species, together with time series data on a small subset (notably birds). Further work is needed to improve the quantification of the range and abundance of those species causing significant problems.</p> <p>(b) Costs estimates are available for some non-native species in the Defra <i>Review of Non-native Species Policy</i> (2003) and example forward projections are given in <i>A New Agenda for Biosecurity</i> (2005 in prep) by Waage <i>et al.</i> (Imperial College under contract to Defra). Cost estimates are crude at present, both for direct economic impacts and for addressing these problems. Generally accepted economic costs for the impacts of non-native species upon native characteristic biodiversity are not currently available (because the value of biodiversity itself is not expressed in financial terms at present in an agreed way).</p>
Main advantages	<ul style="list-style-type: none"> • Data readily available • Published interpretations of significance of non-native species are available for many taxonomic groups • Time series data for some species assist with interpretation and assessing the current state • Financial costing will put the issues of non-native species problems (and their benefits where these obtain) on a common footing with other major

	factors that affect the environment and the national economy
Main disadvantages	<ul style="list-style-type: none"> • Impacts of many non-native species not precisely known • Financial costs poorly known for most non-natives species • Rationale for financial valuation of biodiversity not yet available in a form which is generally agreed and endorsed by different sectors • Historic time series of costs not known • Northern Ireland not included in proposed indicator
Recommendation	Adopt – further development required on costs.
Linkages	<ul style="list-style-type: none"> • UKBAP states where non-native species are affecting priority species • SEBI 2010 is adopting a similar approach across Europe • European database on alien invasive species led by Phil Hulme (CEH) is summarising available data for Europe • Coordination work by Defra Programme Board (to be convened) on dealing with non-native species issues in Britain (including a planned audit of bodies currently responsible for non-native species issues, which should generate more accurate costs estimates) • For Northern Ireland, non-native species work is being taken forward jointly with the Republic of Ireland following an initial joint review that reported in 2004
Author(s)	Ian McLean (JNCC)

EU/CBD Focal Area	Threats to biodiversity
EU Indicator	Impact of climate change on biodiversity
Candidate UK Indicator	12. Timing of biological events – ‘Spring index’
Indicator type	Pressure
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>The proposed indicator would be based on phenology, <i>i.e.</i> the timing of biological events, <i>e.g.</i> hawthorn (first flower), swallow (first seen) <i>etc.</i> The index will be presented either as a composite index (<i>e.g.</i> mean dates for several chosen events) or indices will be presented separately for each event within one diagram. The index will demonstrate, for example, a significant advancement of spring and how this is correlated with changes in mean spring temperatures.</p> <p>A phenology based index is highly relevant to the UK BAP and is important in the context of climate change research and mitigation. Phenology is already hugely popular (<i>e.g.</i> UK Phenology Network (UKPN), BBC Springwatch <i>etc.</i>), is easily communicated and observed by the general public, and therefore has considerable resonance. A phenology index will be good at identifying areas for targetted research and will provide evidence on which to base policy decisions.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>There are long-term datasets from a large number of locations for these events, though, in some case, some lengthy gaps in the time series. Update frequency is currently good (usually annual), and most datasets are available on a UK basis with country and regional breakdowns possible. Phenology data are scientifically credible provided they are interpreted and presented correctly and provided that sample sizes are sufficient at the scale of presentation. Phenology data are, in general, available now, and several initiatives are likely to further improve data availability, <i>e.g.</i> consolidation and further development of UKPN, Defra’s commissioned research on an integrated UK butterfly monitoring programme.</p>
Availability eg. already published, development work needed, potential improvements etc.	<p>New developmental work is needed to: (a) select the phenological events for inclusion in this index; (b) select the spatial scales for presentation; (c) determine whether a composite index is desirable, or whether to present the indices individually; (d) generate the index and an appropriate form of presentation. Development of similar indices is in progress in Scotland.</p>
Main advantages	<ul style="list-style-type: none"> • As close to ‘cause and effect’ as we can probably get, <i>i.e.</i> the observed changes in phenology are likely to be climate driven and not driven by other factors (<i>e.g.</i> habitat, land use change). Good measure of threat. • Can be based on multiple taxa, <i>e.g.</i> plants, birds, insects, amphibians <i>etc.</i> • Easy to communicate, high education and public awareness value. • Data available annually, relatively low cost. • Public participation in data collection. Popular appeal.
Main disadvantages	<ul style="list-style-type: none"> • Does not measure <u>impact</u> on biodiversity, merely describes a change that may or may not have important consequences for the species and habitats concerned. Policy message not clear. • May be counter intuitive – warmer/earlier springs may be regarded as beneficial by some audiences. • Potential high year-to-year variability. • Relates to only one aspect of climate change – winter/spring warming.
Recommendation	Further development required
Linkages	<ul style="list-style-type: none"> • <u>UK</u>: SDFI (1) Greenhouse gas emissions • <u>England</u>: EBS C1 Changes in the abundance of climate sensitive species at ECN sites in England (<i>additional indicators under consideration</i>) • <u>Scotland</u>: NHI 7 Phenological change • <u>Wales</u>: None.

	<ul style="list-style-type: none">• <u>N Ireland</u>: None.• <u>EU</u>: Impact of climate change on biodiversity• <u>CBD</u>: No separate indicator on climate change but SBSTTA recommendation that other state indicators are interpreted with respect to climate change impacts.
Author(s)	Jeff Kirby (Just Ecology)

EU/CBD Focal Area	Ecosystem integrity and ecosystem goods and services
EU Indicator	Marine trophic index
Candidate UK Indicator	13. Marine trophic index
Indicator type	State (but can also be used to assess pressure)
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>The Marine Trophic Index (MTI) is calculated from a combination of data on fish/invertebrate landings and information on diets. It is based on the position of an organism in the food chain (ie trophic level - number of energy transfer steps to that level). The MTI is indicative of ecosystem integrity; declining trophic levels indicating shortened food chains, fewer big predators and a less well-balanced/stable ecosystem.</p> <p>This index is very relevant to the UK BAP and marine conservation objectives in terms of species protection, sustainable management and healthy ecosystems for goods and services. It is a good measure of ecosystem integrity in the marine environment, clearly demonstrating impacts of fisheries. It is relatively easily communicated, but other measures such as 'fish size' may have better resonance with the general public than 'trophic level'. There is high public interest in the sustainability of food stocks and the general health of the marine environment.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>The methodology used to calculate MTI exists and can be calculated from existing fisheries catch data (FAO, FishBase etc.) from 1950 to two years before present. There is on-going data collection, and therefore data sustainability is good. Filters can be applied to exclude certain levels/species from the calculation of MTI, should this be desirable.</p> <p>However, there are issues related to the scale and nature of data collection, such as the reliability of commercial catch statistics and the fact that UK seas are a shared resource. The use of data from research vessels may provide an alternative data source or a means of validation.</p>
Availability eg. already published, development work needed, potential improvements etc.	<p>An MTI index could be generated but would be based on data collected at the European scale, for sea areas fished by several nations. The indicator is therefore most appropriate at an international/regional level rather than for just UK waters.</p> <p>Additional developmental work is needed to: (a) check on data availability and resolve scale issues; (b) decide on the species/levels to include, whether any filters need to be applied, and whether any supplementary presentation is needed for rare species; (c) validate and interpret the index.</p> <p>Development of similar indices is underway for the purposes of environmental integration under the Common Fisheries Policy (which is Defra/EU funded) and the SEBI2010 project led by EEA. The UK should take advantage of this activity, and coordinate the requirements of broader biodiversity reporting with the output of this activity. It is similarly important to note that European coordination would be essential if a MTI was to be developed as the required catch data for any region are generated by several countries.</p>
Main advantages	<ul style="list-style-type: none"> • MTI tells us about an important aspect of marine biodiversity, and some large fish have high public appeal. • The index is also likely to be a good surrogate for changes in other components of the marine environment. • An indicator based on fish is achievable - there is probably insufficient data for most other groups to deliver such a functional indicator without considerable investment in data collection and understanding. • Relatively easily communicated and understood.

	<ul style="list-style-type: none"> • High education and public awareness value. • Provides good policy signals with respect to overexploitation of fisheries. • Data available annually from existing sources. • In use already at CBD and EU levels and being promoted for use nationally.
Main disadvantages	<ul style="list-style-type: none"> • Unable to generate for UK marine environment only since available data relate to blocks of international waters. Need common approach in Europe. • It is a composite indicator of the availability and abundance of fish, and behaviour of fishing fleets. • Quality of fish landings data is important and may not be 100% reliable. Research vessel data may be an alternative data source. • Does not measure relative abundance. • Possibly too complex - fish size measures could be used as a surrogate. • Some rare species, e.g. basking sharks, may be perceived as being of less importance than some common species because of their low trophic level ranking.
Recommendation	Further development, in liaison with European partners (funding may be required). Better to have common approach in Europe.
Linkages	<ul style="list-style-type: none"> • UK SDS Indicator (27) Fish stocks around the UK within sustainable limits. • England: H6 UK fish stocks fished within safe limits; M4 Status of marine biodiversity – to be developed (<i>additional indicators under consideration</i>) • Scotland: ISDS S10 Marine plankton abundance; S14 Proportion of commercially exploited fish stocks fished within safe limits; S13 Estuarine fish species diversity; NHI 12b Indicator (unspecified) for the sea • Wales: None. • N Ireland: None. • EU: Marine Trophic Index – no details available • CBD: Marine Trophic Index (see the Subsidiary Body on Scientific, Technical and Technological Advice Note - UNEP/CBD/SBSTTA/10/INF/18).
Author(s)	Jeff Kirby (Just Ecology)

EU/CBD Focal Area	Ecosystem integrity and ecosystem goods and services
EU Indicator	Connectivity/fragmentation of ecosystems
Candidate UK Indicator	14. Habitat Networks
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>Habitat fragmentation at a variety of scales has been linked widely with the decline of many species globally. In the UK, semi-natural woodland and open habitats biodiversity have declined in recent decades despite protection through designation (SSSI and NNR). The long-term viability of woodland biodiversity, which evolved within a highly connected and extensive habitat, is threatened by fragmentation towards smaller and more isolated woodlands. Many ecologists have advocated the maintenance and improvement of connectivity between fragmented woodland populations. There is now a growing interest in the use of habitat networks to expand and link isolated habitats.</p> <p>The conservation of biodiversity on protected areas within a fragmented landscape needs to take account of habitat characteristics in the 'wider countryside'. For example, the Scottish Forestry Strategy sets out to develop forest habitat networks (FHNs) through the restoration and improvement of existing woodland and the incorporation of targeted new planting. Such measures aim to reverse the effects of fragmentation on woodland biodiversity through the expansion and restoration of habitats to protect and enhance functional connectivity for woodland and open ground species. Functional connectivity may be applicable to habitat networks in general, recognising the relative balance of habitats within ecological mosaics and ecotones of diversity where they come together.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>The concept of species conservation through habitat networks has developed rapidly since the signing of the Convention on Biological Diversity in 1992. This has prompted a new international acceptance and emerging agreement of the need to conserve biological diversity using an approach which includes the planning, establishment and adaptive management of protected-area networks.</p> <p>The landscape ecology paradigm of patch, matrix and corridor was introduced in the mid-1980s and the idea of 'greenways' in the early 1990s¹¹. Research on the function of ecological networks in relation to the landscape patch mosaic occurs at a range of spatial scales, and has focussed on the functional connectivity of habitat.</p> <p>Focal species modelling tools to guide development is attracting increasing interest. The Forest Research spatial decision support system model BEETLE (Biological and Environmental Evaluation Tools for Landscape Ecology) uses the approach to assess the functional connectivity of habitat for specific and generic focal species. This project will indicate the presence and spatial extent of FHNs at the national and regional scale.</p>
Availability eg. already published, development work needed, potential improvements etc.	<p>Data not currently available.</p> <p>At the inter-national scale, following an agreement between 55 European countries in 1995, the European Ecological Network began a program to develop habitat networks based on data at a resolution of 1 km from the CORINE biotope database and the general soil type distribution in Europe. At</p>

¹¹ Forman, R.T.T. & Godron (1986). *Landscape Ecology*. John Wiley & Sons, London; Smith, D.S. & Hellmund, P.C. (Eds) (1993). *Ecology of Greenways*. University of Minnesota Press, London.

	<p>the regional scale, habitat networks for wide-ranging species have been assessed in the design and planning of nature reserves and conservation.</p> <p>The CBD note on Connectivity / fragmentation of ecosystems describes an approach of measuring fragmentation using area metrics of habitat and non-habitat.</p> <p>The habitat networks model allows connectivity and fragmentation to be displayed in the form of spatially explicit maps - habitat networks for species or groups of species at a range of scales depending on the input data. This is considered to be a much better basis for describing fragmentation, especially where the degree of fragmentation is already large. It is one of the major international areas of development in landscape ecology. In Scotland the BEETLE model is being considered as a monitoring tool to assess the degree of fragmentation in forests, and establish trends over time.</p>
Main advantages	<ul style="list-style-type: none"> • Policy relevant: trends illustrate outcomes that are relevant to international and domestic policy objectives. • Analytically sound: although frontier research rather than established science, data strengths and weaknesses can be described, with sources referenced.
Main disadvantages	<ul style="list-style-type: none"> • Technically complex: requires careful explanation for a non-specialist audience.; however, trends have not been described as yet. • Consistent data not available: Currently based on research studies, no national level trends established.
Recommendation	Further development and demonstration required. Commission research.
Linkages	<ul style="list-style-type: none"> • England: No relevant indicators but during consultations on biodiversity indicators for the England Biodiversity Strategy, two additional cross-sectoral issues were proposed, including the impact of habitat fragmentation on dispersal of species. JIGSAW challenge funding has provided the financial incentive to link fragmented native woodlands. • Scotland: No relevant indicators but a forest habitat network is being created. An SNH Scientific Advisory Committee workshop on habitat networks is to be held on 23-24 June 2005. • Wales: No relevant indicators but a woodland habitat network is being developed for Wales. • N Ireland: No relevant indicators • EU: Connectivity / fragmentation of ecosystems • CBD: Connectivity / fragmentation of ecosystems
Author(s)	Ed Mackey (SNH)

EU/CBD Focal Area	Ecosystem integrity and ecosystem goods and services
EU Indicator	Water quality in aquatic ecosystems
Candidate UK Indicator	15. Rivers of good chemical and biological quality
Indicator type	State
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>Unpolluted water courses are essential for the maintenance aquatic habitats and are a measure of healthy ecosystems.</p> <p>Biological testing provides a more comprehensive picture of the health of rivers and canals than is provided by chemical testing alone. However, chemical quality is important from the point of view of the provision of ecosystem goods and services such as drinking water.</p> <p>Simple message has good resonance.</p> <p>Relates to obligations under EU Water Framework and Habitats Directives.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	<p>Source: UK environment agencies. Updated annually. England and Wales back to 1980s, but comprehensive data for Northern Ireland only back to 2000/2002. Data for Scotland is on a slightly different basis and is only available on that basis back to 2000. Individual country estimates accepted as reasonably robust although intensity of sampling varies across the UK.</p>
Availability eg. already published, development work needed, potential improvements etc.	<p>Already published as UK Sustainable Development Strategy Framework indicator.</p> <p>Significant development work would be needed to cover other water bodies (e.g. lakes, groundwater, coastal waters). The survey of bathing water could be used as the basis of an indicator for coastal waters.</p> <p>The implementation of the Water Framework Directive will in due course replace the above and will lead to a slightly different indicator, based on monitoring the ecological status of freshwater and coastal water bodies from 2007. The monitoring will be consistent across the UK and with other EU member states. Aggregation across different types of water bodies could still be a problem.</p>
Main advantages	<p>Comprehensive. Public resonance. Annual data series. Broadly consistent across countries. Already accepted as UK Sustainable Development Strategy Framework indicator.</p>
Main disadvantages	<p>Subject to a step change once Water Framework Directive monitoring is established (but this could be some years after the start in 2007).</p> <p>Does not cover other types of water bodies (including coastal and marine). Other sources of data would need to be used.</p>
Recommendation	Adopt
Linkages	<ul style="list-style-type: none"> • UK: SDS Framework Indicator (30) • England: EBS H5 Biological quality of rivers; W5 Nutrient levels in rivers and lakes; • Scotland: ISDS S9 Status of otter in freshwater habitats; S11 Salmonid counts; S12 Freshwater invertebrate diversity; NHI 12a Ecological status of waterbodies • Wales: KESW Chemical and biological river water quality; • N Ireland: H17 Biological quality of rivers; H18 Nutrient levels in rivers and lakes; H19 Numbers of rivers with sustainable salmon stocks. • CBD: • EU:
Author(s)	Rocky Harris (Defra)

EU/CBD Focal Area	Status of access and benefit sharing
EU Indicator	European patent applications for inventions based on genetic resources and/or traditional knowledge
Candidate UK Indicator	No candidate indicator proposed
Indicator type	Response?
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	The fair and equitable sharing of benefits arising out of the use of genetic resources is the third main objective of the CBD. The UK has recently become a party to the International Treaty on Plant Genetic Resources for Food and Agriculture. However access and benefit sharing (ABS) can only be, at best, a secondary promoter for conservation of biodiversity.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Not applicable
Availability eg. already published, development work needed, potential improvements etc.	No relevant data currently published nor available.
Main advantages	Development of an indicator would demonstrate UK commitment to the third main objective of the CBD.
Main disadvantages	<ul style="list-style-type: none"> • Any indicator premature at this stage: negotiations on the international regime for access and benefit sharing (ABS) just initiated and unlikely to be concluded significantly before 2010. • Meaningful, quantifiable status and trend indicators currently impossible to devise. • ABS has very low public resonance. • Proposed EU indicator presupposes that global community agrees to the EU formal proposal to the World Intellectual Property Organisation that disclosure of origin of genetic resources in patent applications should be compulsory – not likely to be agreed in the short/medium term.
Recommendation	Premature to include an ABS indicator, but this should be kept under review pending developments at EU and global levels.
Linkages	<ul style="list-style-type: none"> • EU indicator on % of Patent Applications disclosing origin, not operative nor likely to be in foreseeable future. • CBD not yet determined any ABS indicators
Author(s)	Martyn Ibbotson (Defra)

EU/CBD Focal Area	Status of resource transfers
EU Indicator	Funding to biodiversity: <ul style="list-style-type: none"> • in economic and development cooperation • in EU research, monitoring and management
Candidate UK Indicator	16. Public sector environmental protection expenditure on biodiversity in the UK
Indicator type	Response
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	The Office of National Statistics (ONS) estimate of Public Sector Environmental Protection Expenditure on the protection of biodiversity and landscape potentially provides data showing trends in public funding for biodiversity in the UK. The estimate could be presented as an overall sum and as a percentage of total public sector expenditure.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	The basis of the estimates is the Treasury Public Expenditure Statistics Analysis (PESA). By ONS' own admission the figures are rough and ready - there are obvious gaps and some large lumps of spending which they allocate out to different environmental issues in a fairly arbitrary way.
Availability eg. already published, development work needed, potential improvements etc.	ONS estimates are calculated on an annual basis from 2001-02. Further work is required to validate the data and develop an indicator.
Main advantages	<ul style="list-style-type: none"> • Direct policy relevance • Easily understood • Data already collected
Main disadvantages	<ul style="list-style-type: none"> • Expenditure not directly related to outcomes • Difficult to track and classify expenditure on biodiversity; • Local government, academic, private and voluntary body funding not included • Requires further development
Recommendation	Develop and test indicator methodology.
Linkages	<ul style="list-style-type: none"> • EU: • OECD: • CBD:
Author(s)	Andrew Stott, Rocky Harris (Defra)

EU/CBD Focal Area	Status of resource transfers
EU Indicator	Funding to biodiversity: <ul style="list-style-type: none"> • in economic and development cooperation • in EU research, monitoring and management
Candidate UK Indicator	17. UK Government funding for conservation of global biodiversity
Indicator type	Response
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	<p>An objective of the UK Government's World Summit on Sustainable Development Biodiversity Delivery Plan is to ensure that biodiversity is given due consideration in the development aid process, including in Poverty Reduction Strategies. Adequate access to resources is essential for the effective implementation of the CBD in developing countries as part of more general development aid and poverty alleviation. The UK contributes significantly to the conservation of global biodiversity through various initiatives including: the Global Environment Facility (GEF); DFID direct bilateral aid programmes (though there is no earmarking of aid for biodiversity conservation); the joint FCO/DFID Overseas Territories Environment Programme (OTEP); FCO's Sustainable Development Global Opportunities Fund (SD GOF); and Defra's Darwin Initiative and Flagship Species Fund. In addition we have contributed to other projects such as the Great Apes Survival Project (GRASP) as well as through our many contributions to the work of the international biodiversity conventions.</p> <p>Existing financial systems do not enable full identification and quantification of all biodiversity-related expenditure. However, it is possible to quantify trends for some important elements of expenditure. Initially it is proposed to include: (1) UK contributions to GEF; (2) Estimated DfID bilateral expenditure on forestry programmes and contributions to multilateral organisations working on forestry; (3) the FCO/DfID OTEP fund; (4) FCO's SD GOF; (5) Defra's Darwin Initiative and (6) Defra's Flagship Species Fund. Trends of expenditure in these areas give a clear signal of UK Government commitments to global biodiversity.</p>
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	Data sources: DfID, FCO and Defra Annual Reports and on request to the funding bodies. [Time series – to be confirmed]
Availability eg. already published, development work needed, potential improvements etc.	Data currently available for the 5 items of expenditure. Development work needed to collate the information and present as an indicator. Future development work needed to provide more comprehensive identification of biodiversity-related bilateral development aid.
Main advantages	<ul style="list-style-type: none"> • Policy relevant • Used by EU and CBD • Data available
Main disadvantages	<ul style="list-style-type: none"> • Data coverage incomplete • Shows resource transfers not outcomes (CBD indicators include global outcomes – ie status of global biodiversity - but these are not included within UK indicators)
Recommendation	Further development required.
Linkages	<ul style="list-style-type: none"> • EU: Development of indicator included in SEBI2010 initiative • CBD: Adopted for immediate testing by CBD (see UNEP/SBSTTA/10/INF/22)
Author(s)	Andrew Stott (Defra)

EU Focal Area	Public opinion
EU Indicator	Public awareness and participation
Candidate UK Indicator	18. Volunteer time spent in conservation and number of people volunteering for conservation activity.
Indicator type	Response
Brief description, incl. relevance to UK BAP, policy signals, ease of communication, resonance etc	The number of people volunteering to assist in conservation work and in the amount of time people spend reflects individuals commitment to and understanding of biodiversity. Action at the local level is an essential part of conservation, and should help in communicating the idea that biodiversity conservation is something which individuals can do something about.
Data source, incl. time series available, update frequency, available spatial scales, reliability, scientific credibility etc	The RSPB, Marine Conservation Society and the Wildlife Trusts are three important users of volunteer labour across the UK. Volunteer hours worked for the RSPB date back to at least 1995, and the number of volunteers for the Marine Conservation Society have been recorded since 1999 and 2000 respectively for indicator P2 of the England Biodiversity Strategy. These are UK figures and are available each year. [Can be disaggregated to country level?]
Availability eg. already published, development work needed, potential improvements etc.	Further work would be helpful potentially to expand the number of organisations who contribute to this indicator – the greater the sample size, the more reliable the trends. Both volunteer hours and numbers are useful indicators, but it is important that the information is presented in such a way to make the difference clear.
Main advantages	<ul style="list-style-type: none"> ○ Demonstrates action rather than just awareness ○ Simple to understand ○ Datasets already exist
Main disadvantages	<ul style="list-style-type: none"> • Reflects activity of organised enthusiasts rather than those who are taking part in individual or small group activity; • Not all-inclusive – only covers a small number of national conservation organisations and does not include local groups.
Recommendation	Adopt but develop to include wider range of organisations
Linkages	<u>England:</u> EBS P2 Volunteer time spent in conservation activity <u>Scotland:</u> ISDS E4 Number and range of people volunteering on natural heritage conservation activities; NHI (10) Public satisfaction and involvement. <u>N. Ireland:</u> BINI 32 Number of people taking practical action to support, protect or enhance biodiversity
Author(s)	Fiona Mettam and Sarah Webster

Acronyms used in the annex and linked indicator initiatives:

ABS	Access and Benefit Sharing – CBD Cross-cutting Programme of Work	http://www.biodiv.org/programmes/socio-eco/benefit/
BINI	Biodiversity Indicators for Northern Ireland – Environment and Heritage Service	Not published online. Data sourced from: Biodiversity Indicators for Northern Ireland. Recommendations to the Northern Ireland Biodiversity Group. December 2004. Natural Heritage, Environment and Heritage Service. Only the NI Biodiversity Strategy available online. http://www.ehnsi.gov.uk/natural/biodiversity/biodiversity.shtml
CBD	(UN) Convention of Biological Diversity	http://www.biodiv.org/default.shtml
EBS	England Biodiversity Strategy: Baseline Assessment – Defra	www.defra.gov.uk/wildlife-countryside/biodiversity/biostrat/indicators/h3.htm
ECN	Environment Change Network	
GSPC	Global Strategy for Plant Conservation - CBD Cross-Cutting Programme of Work	http://www.biodiv.org/programmes/cross-cutting/plant/default.asp
ISDS	Indicators of Sustainable Development for Scotland – Scottish Executive	www.scotland.gov.uk/Topics/Environment/17108/7859
ISF	Indicators for Sustainable Forestry – Forestry Commission	http://forestry.gov.uk/sdindicators
KESW	Key Environmental Statistics for Wales – Welsh Assembly Government	http://www.wales.gov.uk/keypubstatisticsforwalesheadline/content/environment/2005/hdw200501252-e.htm
MCPFE	Ministerial Council on	www.forestry.gov.uk/website/oldsite.nsf/byunique/ahen-5jfdmc
NHI	Natural Heritage Indicators - Scottish Natural Heritage	www.snh.org.uk/trends http://www.snh.org.uk/data/boards_and_committees/main_board_papers/7%20july/8-indicators.pdf
OECD	Organisation for Economic Cooperation and Development Agri-Environment Indicators	http://www.oecd.org/document/20/0,2340,en_2649_33795_1889748_1_1_1_1,00.html
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice - CBD	http://www.biodiv.org/convention/sbstta.asp
SDFI	Sustainable Development Framework Indicator adopted by UK Government and Devolved Administrations – Defra	http://www.sustainable-development.gov.uk/publications/uk-strategy/uk-strategy-2005.htm
SDI	Sustainable Development Indicator adopted by UK Government – Defra	http://www.sustainable-development.gov.uk/indicators/national/index.htm
SEBI2010	Streamlining European Biodiversity Indicators 2010 – European Environment Agency	http://biodiversity-chm.eea.eu.int/information/indicator/F1090245995
SFFS	Sustainable Food and Farming Strategy – Defra	http://www.defra.gov.uk/farm/sustain/default.htm
UKPN	UK Phenology Network	http://www.phenology.org.uk/