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JOINT NATURE CONSERVATION COMMITTEE

ENVIRONMENTAL CHANGE REFLECTED IN THE STATE OF NATURE

Paper by Paul Rose

1. Introduction

- 1.1 The United Kingdom has been undertaking surveillance in relation to the state of biodiversity for several decades but has found it difficult to report effectively on the changing state of UK nature as a whole, notwithstanding that many excellent reports have been produced on the state of particular components of biodiversity.
- 1.2 There are now a number of powerful drivers which require a sufficiently comprehensive picture of the changing state of UK nature to be developed, including the need to track progress against the Gothenburg target of halting the decline of biodiversity by 2010, and the need to report on the conservation status of features of European Community interest under the Habitats Directive.
- 1.3 This paper is an initial collation of summary information from existing surveillance schemes to provide an overview of UK biodiversity. It endeavours to provide an assessment of overall trends in some of the main components of UK biodiversity and to draw conclusions. In the process of doing so, it recognises the limitations of many of these schemes and analyses in addressing future policy needs. The paper discusses these and identifies areas for further work. The paper is a work in progress, which will require further development and refinement, discussion is invited to assist this process.

2. Components of UK wildlife

- 2.1 For the purpose of assessing biodiversity status, the Convention on Biological Diversity considers the following components:
 - i. Genes
 - ii. Species
 - iii. Habitats
 - iv. Ecosystem services

- 2.2 To these, can also be added the consideration of the state of protected areas, since these support a significant component of the UK's biodiversity in terrestrial, freshwater and coastal areas.
- 2.3 Of the four components identified by the Convention on Biological Diversity (CBD), the status of genes in relation to wild species is almost impossible to assess. The CBD's focus at the genetic level has tended to be in relation to crop strains and livestock breeds. For wild species, genetic variability is one measure of the health of their populations. The use of genetic techniques for conserving individual species is increasing and there is also considerable potential to assess the current degree of genetic variability for selected groups of species in the UK. At the moment, however, we cannot report on the state of nature at the genetic level.
- 2.4 Ecosystem services (for example, the maintenance of the carbon and nitrogen cycles, carbon sequestration, and the retention and release of water) have been suggested as an ideal focus for the assessment of biodiversity status because they reflect ecosystem health. Unfortunately, ecosystem services have not been adequately defined, and, as yet, there is no commonly agreed technique for measuring them.
- 2.5 For practical reasons, therefore, this paper concerns itself with the wildlife components which we do have the ability to assess to some degree, namely: i) habitats, ii) species, and iii) protected areas.
- 2.6 In order to collate summary information on the state of nature, JNCC has drawn on the principal biodiversity surveillance schemes to which we have access, including Government schemes, schemes to which JNCC and/or the country agencies contribute, and schemes which are operated by JNCC or the agencies directly. This information base includes the Biological Records Centre and the data made available through the National Biodiversity Network.

3. Sources of information on Wildlife Status

- 3.1 Assessments of wildlife status are made using a huge variety of data. These data can generally be classified into one of three categories namely data on:
 - i. distribution;
 - ii. extent of habitat or population size;
 - iii. quality of habitat or health of population.
- 3.2 The data are produced through biological recording (unstructured records of occurrence), distribution atlas projects and organised survey/monitoring schemes. Organised survey and monitoring schemes are designed to detect changes in status over time (trends) and most schemes use recognised and well established analytical techniques to produce trends. Atlas studies give a snapshot of status at a particular point in time and consequently, even when two or more atlases have been produced, it is more statistically taxing to

design analytical techniques that produce reliable indications of trend. Biological records data are the most difficult type of data from which to produce trends but, given this is the only type of data we have for the majority of UK species, JNCC has started to develop techniques that produce trends from biological recording data.

- 3.3 In this paper, 'state' refers to measures of distribution, number/extent or health/quality. It also includes changes over time (trends) in these measures. This information is often available at a variety of geographic scales but this paper collates information at either the UK or GB scale. The paper also considers trends, given that the first milestone for conservation is to stop further decline. Once further decline has been halted, there will be a need to restore some species or habitats to viable, sustainable or target levels, and data on the status of biodiversity will provide information on progress against achieving these.

4. **Status of Habitats, Species, Marine Wildlife and Protected Areas**

Terrestrial and Freshwater Habitats

- 4.1 The principal surveillance scheme for habitats is Countryside Survey 2000 (CS2000) which provides information on the changes in extent of broad habitats between 1984 and 1990, 1990 and 1998 and between 1984 and 1998. Summary information derived from the individual surveys, in terms of the extent of the broad habitats is provided at Annex 1. Seven broad habitats have shown significant increases in extent between 1984 and 1998. These are Broad-leaved mixed and Yew woodland; Fen, Marsh and Swamp; Built up areas and Gardens; Neutral Grassland; Inland Rock; Montane; and Unclassified. The last three of these are habitats with rather small total areas and are consequently most prone to analytical biases. Improved Grass and Bogs have decreased significantly in extent in recent years. These conclusions relate to habitat extent and no conclusions can be drawn in relation to habitat quality.
- 4.2 While there is no comprehensive, readily available, measure of habitat quality outside of protected areas and, to some extent, BAP priority habitats, CS2000 was able to draw some conclusions:
- i. the habitat declines of the 1980s appeared to have halted or reversed in the 1990s;
 - ii. the loss of features such as hedges, walls and ponds, prevalent in the 1980s, appeared to have halted in the 1990s; (see Annex 2a).
 - iii. the loss of arable plant species has halted (see Annex 2b);
 - iv. plant species continued to decrease in some of the more natural habitat types, especially unimproved grassland (see Annex 2c);
 - v. streams and rivers improved in biological quality (see Annex 2d);

vi. there were indications of adverse eutrophication effects in many vegetation communities.

4.3 While Countryside Survey 2000 provides a useful overview of broad land use cover in the UK, and some measures of ecological quality, its value for conservation purposes has significant limitations. Considerable other information is potentially available, at the broad habitat level contained in a range of habitat inventories. At the moment this information is not readily accessible, but work is underway within JNCC/country agencies to enable access to this via the NBN.

BAP Habitats

4.4 In the UK Biodiversity Action Plan Report of 2002, trend information was reported for 29 (71%) priority habitats. It was left to the habitat specialists to interpret status and the comments made suggested that they generally included quality in their assessment at least as much, if not more, than extent. Six (13%) of the total of priority habitats were increasing, 6 (13%) stable, 14 (31%) showed a slowing decline and 3 (7%) were assessed as declining with no sign of the decline slowing. Summary data on trends in these BAP priority habitats are given in Annex 3. The only terrestrial habitat continuing to decline was ‘Lowland Beech and Yew Woodland’ which, interestingly, is a sub-component of one of the broad habitat types shown by CS2000 to be showing no negative changes. The fourteen priority habitats for which decline was slowing support the CS2000 conclusion that the losses of the 1980’s are being reduced in the 1990s.

Species

Plants

4.5 Recently, a red list for vascular plants has been published. This provides informative analyses of status and trends created from plant atlas and biological recording data using a comparison between the two published atlases (1962 and 2002). The report shows that 13% have declined by 20% or more (9% by 30% or more), while 13% of taxa have increased by 30% or more. It should be emphasised that these data reflect distributional changes rather than absolute abundance.

Decline information from the Vascular Plant Red List

Taxa assessed	Taxa declined by 30% or more		Tax increased by 30% or more		Total taxa identified as threatened	
	Number	%	Number	%	Number	%
1,756	162	9%	238	13%	345	20%

The main messages from the vascular plant red data book are:

- i. upland plants are declining due to overgrazing;
- ii. arable plants have almost disappeared in large parts of the country;
- iii. plants of unimproved grassland are disappearing, many are only hanging on in small fragments such as roadsides, and these are under severe pressure;
- iv. as a nation, we have been very successful at looking after our rarest species, but very unsuccessful at preventing widespread species suffering severe declines.

- 4.6 Recent data from the Bat Monitoring Programme and the Tracking Mammals Partnership provide trend data for 34 out of 63 species of terrestrial mammals; of these only 4 (11%) are declining. However, these data reflect population changes which have taken place since 1995. The status and trends of UK mammals report made an estimation of historic trends for mammals (i.e. trends over a longer time period roughly approximating to about 30 years), and this suggested 29 out of the 63 species were declining (46%), hinting that if we had longer time series we might have detected more declining species. Remarkably, all 16 species of bat are thought to have suffered historic declines, but of the 11 species for which post 1995 trends can be calculated, 6 are stable and 5 are increasing.

Trends in British Mammals

Historic Trend	Number	%	Non Native	Recent Trend (post 1995)	Number	%	Non Native
Unknown	12	19	7/8	Unknown	29	46	13/14
Mixed	11	17	5	Mixed	0	0	0
Increase	10	16	7	Increase	17	27	6
Stable	1	2	0	Stable	13	21	2
Decline	29	46	3	Decline	4	6	1
TOTAL	63		22/23		63		22/23

Birds

- 4.7 The former Common Bird Census, and more recently, the Breeding Bird Survey gives trends for some 90 of the more widespread and common breeding terrestrial bird species over a period of some 30 years. Over this period, 30 (34%) species have declined by more than 25%, as compared with 28 (31%) species which have increased by more than 25%. Over the last eight years, 28 (31%) species have declined by more than 10% while 45 (51%) species have increased by more than 10%. The headline sustainable development indicator shows that declines are particularly pronounced for farmland-dependant species but relate also to birds of woodlands.
- 4.8 Currently, 25 seabird species breed in the UK. Censuses are carried out at approximately 15 year intervals, the last of which was Seabird 2000. These censuses are supplemented by a monitoring programme based on samples; the Seabird Monitoring Programme. Populations of the various species have varied considerably over the last 30 years, and, of the 20 species for which

there is data for this period, 10 species (50%) increasing by more than 25% and 2 (10%) decreasing by more than 25%. The trend over the last 15 years is less encouraging, with 8 species (40%) increasing by more than 10% and 7 (35%) decreasing by more than 10%. The reasons for this are probably complex and not fully understood. A summary of these data is given at Annex 4.

- 4.9 Of the 33 passage and wintering waterbird species for which population trends covering the last 15-25 years have been modelled in Great Britain, the great majority have shown stable or increasing populations. Five species (15%) have shown a decline in excess of 25% over a 25 year period, while 13 species (39%) have shown increases over 25%, with a further 3 species showing similar increases over *ca* 15 years. For each of the declining species, the reason for the decline is believed to be different. These data are summarised in Annex 5.

Butterflies

- 4.10 There are two principal sources for butterfly trends; first, the Butterfly Monitoring Scheme (BMS), based on over 100 weekly transects counts and second, the published butterfly distribution atlases. The BMS results from 1976 until now generate annual population indices for those species covered by the schemes, while the butterfly atlas date classes (pre-1970, 1970-1982 and 1995-1999) give hectad counts for each recording period. within the BMS, for 33 resident and regular migrant butterflies for which trends can be calculated, 10 species show significant declines ($P < 0.05$) and 6 show significant increases. The latest butterfly atlas showed that the recent distributions (up to 1999) of most habitat specialist butterflies have declined, while the distributions of most wider countryside species have expanded (largely due to climate changes) or remained stable.

Other invertebrates

- 4.11 Biological recording data is available for many thousands of species in other taxonomic groups such as lower plants, beetles, spiders etc. Traditionally, these data have proved very difficult to analyse with any degree of confidence but work to develop new analytical techniques as part of the JNCC wildlife statistics project has been applied to the biological recording data and the results are in the process of being consulted on with the owners of the data. Very roughly speaking, this analysis gives simple trends (based on comparing the first half of the time series with the second) for 1304 invertebrate taxa. Of these 6% appear to be increasing by more than 25% over the last 25 years and 20% decreasing by more than 25% over the last 25 years. These figures exclude 419 taxa for which there are insufficient data to draw conclusions.

Changes in status based on new analytical techniques applied to data invertebrate taxa distribution data within the BRC. [Preliminary results]

Dataset	Number of [taxa] with sufficient data						Total
	decline more than 25%	decline less than 25%	% decline >25%	increase less than 25%	increase more than 25%	% increase >25%	
Aquatic Heteroptera Recording Scheme	0	20	0	16	6	14	42
Carabid Recording Scheme	33	178	12	53	3	1	267
Cranefly Recording Scheme	2	57	1	80	0	0	139
Hoverfly Recording Scheme	74	86	28	57	12	5	229
Mollusc Recording Scheme	4	26	6	40	0	0	70
Odonata Recording Scheme	5	20	14	11	0	0	36
Orthoptera Recording Scheme	5	22	14	6	2	6	35
Spider Recording Scheme	141	159	29	127	59	12	486
Totals	264	568	20	390	82	6	1304

BAP species

- 4.12 For BAP priority species, 97 (25%) continue to decline, but for 30 of these (8%) the decline appears to be slowing. This still leaves 67 species for which more than 10 years of BAP priority action has been insufficient to slow the decline. This result indicates the enormity of the threat faced by UK's most endangered species. The 67 includes a total of 32 insect species and some well known and widespread species, such as the bullfinch, skylark, red squirrel, common skate, juniper and several types of bumblebee.

2002 Trend in BAP priority species						
Increasing	Stable	Decline (slowing)	Decline cont/accelerating	Extinct	No trend	unknown
6.4%	19.4%	7.7%	17.1%	4.1%	10.2%	35.0%

- 4.13 An important finding of BAP priority species reporting in 1999 was that widespread priority species are more likely to be in decline, while more restricted range priority species are more likely to be stable or increasing. This pattern persists in 2002, reflecting the success of targeted conservation efforts for those species restricted to a few sites, where site protection and appropriate habitat management can sometimes achieve relatively rapid results. In 1999, only two widespread priority species were increasing (the otter and lesser horseshoe bat); by 2002 these were joined by the song thrush, nightjar, tree sparrow and Shepherd's needle, bringing the total to six.

Marine Wildlife

- 4.14 The reports ‘*Charting Progress: an Integrated Assessment of the State of UK Seas*’ and *Review of Marine Nature Conservation -Working Group report to Government* summarise what is known about the state of the UK marine biodiversity.
- 4.15 The Continuous Plankton Recorder survey has been operating in UK waters for over 70 years. Results from the survey indicate that major biological changes have taken place in the plankton around the British Isles in recent decades with a pronounced regime shift occurring after the mid-1980s that is reflected in the plankton, nutrients and current fluxes. A northerly movement of warmer water plankton by 10° latitude over the last 40 years has been recorded, and a similar retreat of colder water plankton to the north. There has been an increase in the flow of warmer oceanic water into the North Sea. Marine ecosystems around the UK appear to have moved into a warmer dynamic regime that may be leading to a greater transport of dead planktonic material to the benthos and faster carbon turnover. The change in plankton composition is likely to adversely affect cod breeding and stocks in UK waters.
- 4.16 No collation of information on the extent of broadscale (or other) habitats across the UK Continental Shelf has yet been undertaken. The Irish Sea Pilot calculated that, for the Irish Sea, sands and coarse sediments accounted for 61% of the area, muddy sands and sandy muds 22%, muds 10%, and rocky habitats about 3%. The percentages will be different for the UK as a whole, but the Irish Sea results are indicative. Trends in the biological status of these habitats are uncertain, but repeated bottom trawling, as occurs in the parts of the North Sea and the Irish Sea, is likely to have altered the characteristic benthic communities. At the moment, there are no national surveillance programmes capable of reporting on the status and trends of UK marine habitats.
- 4.17 Twenty-eight species of cetaceans have been recorded from UK waters in the latter part of the 20th century and 10 of these are recorded frequently, the remainder intermittently or rarely. There is no surveillance programme for these species, although a recording scheme (mainly from coastal locations) is in operation. The large whales include some of the most globally-threatened species, and for many whale species their status in UK waters is unknown. The smaller species, notably harbour porpoise and certain of the dolphins, are subject to incidental take in capture fisheries. Only two species of seals are resident in the UK; these have had mixed fortunes in recent years but populations are now strong and have stabilised.
- 4.18 Of the UK fish species targeted by demersal fisheries, 60% are considered outside safe biological limits, while 33% are of unknown status. Less than 10% of whitefish stocks are currently being harvested within safe biological limits. Because of their low reproductive rates, sharks, skates, rays and a number of deep water fish populations are considered at risk from commercial

fishing. The status of the numerous non-commercial fish species is very imperfectly known.

- 4.19 The status of the estimated 7,300 species of marine invertebrates and macro-algae has not been comprehensively documented, and for most species is insufficiently known.
- 4.20 The 'State of UK Seas' report concluded:
- i. the status of commercial fish stocks is unacceptable with many stocks being fished outside safe limits;
 - ii. there have been unacceptable negative changes to plankton communities attributable to climate change;
 - iii. status and trends for cetaceans are unknown but bycatch figures are still worrying;
 - iv. after mixed fortunes seal populations have stabilised.
- 4.21 Quite clearly, the knowledge about status and trends of marine species and habitats is insufficient to inform marine conservation action and policy adequately. Establishing a simple estimate of the marine wildlife resource from which to start appears to be a logical first step hence the JNCC emphasis on marine mapping work.

Protected Areas

- 4.22 Common Standards Monitoring of designated sites is currently collecting the results of the last year of its first six year cycle and full results are not yet available. However, interim results submitted by country agencies to JNCC provide some pointers.
- 4.23 For habitat features, interim results indicate that some 42% are in favourable condition, with a further 22% showing signs of recovery from an unfavourable state. Only some 11% of habitat features have been assessed as declining although this may be an underestimate given that this is the first monitoring cycle and also that declines are not estimated for features in favourable condition. Comparing types of habitat features, Acid Grassland, Calcareous Grassland, Dwarf Shrub Heath and Rivers/Streams seem to be faring relatively badly, while Inshore sublittoral sediments, Littoral Sediment, Littoral Rock, Supralittoral Rock and Mosaics seem to be doing better.
- 4.24 For species features, considerably fewer have been assessed than for habitat features, but, of these, 70% are in favourable condition. Looking at the species groupings making up these assessments, only for Vascular Plants and Lower Plants is the number of features which are favourable less than in the unfavourable category. Only 11% of species features are listed as declining (but with the same provisos as for habitat features as in paragraph 4.24).

- 4.25 The full statistics from the first 6 year cycle of Common Standards Monitoring will be provided to the Joint Committee at its December 2005 meeting.

5. Conclusions

- 5.1 Current UK biodiversity surveillance and data recording schemes have been in operation over different timescales and have used different methodologies and analytical techniques. Also, they can measure different things, for example changes in distribution (atlas data), compared to changes in population levels (e.g. the wetland bird data). It is not surprising that their results can differ and that their interpretation is not always easy. This problem tends to be compounded when data are summarised. However, it is when data are considered as a whole that it becomes possible to see the bigger picture.
- 5.2 Taken as a whole, the data indicate that, over the last 30 to 40 years, terrestrial (including freshwater) habitats and species in the UK appear to have declined by about 20%-30%. The more rigorous trend analysis techniques are more robust and suggest that this decline has been closer to 30%. For some species, however, the overall picture is not quite so gloomy; bird species and populations, with some notable exceptions, have fared significantly better.
- 5.3 The major part of the observed declines appear to have taken place during the period between 1960 and the mid-80s. This period saw substantial losses of habitats, the intensification of agricultural practices (including the use of fertilisers and pesticides), increased land drainage, the channelisation of water courses and eutrophication of waterbodies, the reduction in extent of hedgerows and loss of farm ponds, and the coniferisation of broadleaf woodlands; particularly in eastern and southern Britain.
- 5.4 In the uplands, the principal changes were increased grazing levels as a consequence of incentive payments (often leading to the loss of heather moorland), major afforestation schemes, and, in some areas, the effects of acidification.
- 5.5 Improved bird protection laws brought in during the 1950s and 60s helped populations of some exploited and persecuted bird species to recover from previously depressed levels. Improved legal protection from the mid-1970s for certain threatened species of other wild animals and plants is also likely to have achieved positive benefits.
- 5.6 From the mid-1980s, lowland habitat losses were reduced, and measures to improve both water and air quality resulted in a levelling out of biodiversity declines. There is likely to be a time lag between the halting of habitat loss and the stabilising of biodiversity as a whole, while biodiversity reaches a new equilibrium with the carrying-capacity of the habitat.
- 5.7 During the 1990s, a range of conservation-related measures had been introduced which, cumulatively, helped to stabilise, and in some areas increase, the biodiversity carrying-capacity of lowland Britain. Also, focused

conservation action took place to assist recovery for many of the most threatened habitats and species.

- 5.8 In the uplands, there has been a substantial slowing down of habitat loss (e.g. due to afforestation), and evidence of some (chemical) recovery from the effects of acidification. Land management problems (including grazing levels) remain and issue, however.
- 5.9 While the biodiversity declines of the 1960s to 1980s appear to have levelled out during the 1990s in response to the slowing of habitat losses and the taking of conservation measures, for some elements of biodiversity (e.g. farmland birds and arable weeds) current levels are now low and there is a need to achieve recovery. Moreover, the effects of some factors, for example ammoniacal nitrogen, are still prevalent and are depressing the biological diversity of some habitats.
- 5.10 Declines in biodiversity tend to have been more pronounced in widespread habitats and species, than for scarce ones, probably reflecting the intensity of conservation effort and the greater difficulty of achieving recovery, but this is not universally true for all analyses.
- 5.11 Designated features within protected areas appear to have declined much less than in the wider environment. The figure for the proportion of designated features within protected areas below target (favourable condition) status is the best indicator of feature condition on protected areas that we have at the moment (as opposed to trends). Current indications are that 58% of habitats and 30% of species features in designated areas are below target condition.
- 5.12 In the marine environment, the main changes appear to have been brought about by the warming of the UK's seas, which became apparent in the mid-1980s, and the effects of over-fishing which intensified from the 1970s onwards, and for which the measures which have been taken have not yet led to recovery.
- 5.13 Climate change does not yet appear to have had significant impacts on terrestrial and freshwater habitats, although some wetland habitats are potentially at risk from water loss and eutrophication, and coastal habitats from erosional impacts. However, some species populations, including butterfly and wintering wading birds, seem to be responding with distributional changes.

6. Discussion and future work

- 6.1 The UK is particularly lacking on status information for habitats and for the marine environment more generally. Work is underway to improve the data for habitats and marine but progress is understandably low. Establishing an initial estimation of the total habitat/marine wildlife resource is a common first step being taken forward through the MESH and habitat inventory projects. Both the marine and terrestrial work is also looking at remote sensing

techniques for future monitoring and, terrestrially, how the next Countryside Survey can better serve these needs.

- 6.2 For many species, biological recording is the only information available to give an indication of trends but not at a high level of confidence. More confidence can be obtained by using the excellent expert knowledge available in the UK but this is time consuming to tap into. The recent work on the Vascular Plant Red Data Book, Status and Trends of UK Mammals and Species Status Assessment are all excellent examples of how expertise can improve the interpretation of, and confidence in, biological recording data.
- 6.3 There are a number of important purposes of recording and collating information on the UK State of Nature. These include enabling:
 - i. the identification of current conservation priorities for the purposes of directing effort, financial resource and policy action where it is most needed;
 - ii. the development of strategic approaches to nature conservation in order to maintain the scale and range of biodiversity in an effective way;
 - iii. to serve as early warning mechanisms to identify emerging and potentially important pressures on biodiversity before they become major problems;
 - iv. to underpin national and international obligations to report on UK biodiversity.
- 6.4 It should be recognised also that not all the important policy needs for such information may be sufficiently understood at the moment, and the identification of these is likely to need further work.
- 6.5 In order to make information on the status of biodiversity policy-relevant requires that the status can be interpreted in terms of threats, actions or policies. Undertaking research and expert consultation to establish and quantify the links between the species and habitats, and the factors driving the change in status, is paramount to making policy-relevant interpretation of the results and achieving the full benefit of our survey and monitoring activities. Work on indicators has made some progress in this area but rarely is the link between the wildlife status and the driver of change made explicit enough to lead directly into a mitigating response. For example, in the headline sustainability indicators, it is clear that farmland birds have declined, and hence we have not achieved sustainable development yet, but there is no suggestion as to how farmland bird trends might be associated with any of the other headline indicators. This is the type of modelling analysis that the research community is starting to develop and the wildlife statistics project intends to apply. This is an area in which rapid progress needs to be made.

- 6.6 Resources for recording and collating biodiversity-related information, and the information on the impacts effecting biodiversity, and on policy and practical measures to sustain it, are always likely to be limited. It may be necessary to make difficult, and possibly contentious, decisions to redirect resources to balance the information recording and collation effort more effectively. Also we need to consider further the degree to which we should use data to obtained for one element of biodiversity as a proxy for others for which we do not have information. There may be an issue here between evidence-based decisions, and the employment of the precautionary principle. All these issues require further considerations.
- 6.7 From the work undertaken to date it is concluded that JNCC needs to:
- i. refine this current synopsis where possible to include further available habitat and other data and improve interpretation;
 - ii. promote systematic surveillance of both terrestrial and marine habitats;
 - iii. collate available information on the state and trends in human impacts and, where possible, response measures;
 - iv. identify the range of policy needs for 'state of nature' information and consider whether current data schemes are appropriate for meeting these;
 - v. make the wealth of information available to the UK more policy-relevant by linking changes in wildlife status to threats, actions policies and indicators;
 - vi. make more use of information on the status of UK wildlife in setting and implementing policy, in taking decisions and in reporting at all geographic scales and across all sectors;
 - vii. emphasise trends occurring in the short term and start to develop a coherent suite of medium and longer-term biodiversity targets (taking account of BAP targets, Favourable Conservation Status, etc) and use data to measure progress towards achieving these;
 - viii. consider further the respective roles of 'evidence-based' and 'precautionary' approaches in the development of policy advice;
 - ix. consider further the desirability of using state measures at the gene and ecosystem services levels to determine where these may be appropriate.

ANNEX 1

Table 4.1 Extent and Change in extent of Broad Habitats from Countryside Survey 2000

Broad Habitat	Extent (ha)			Change		
	1984	1990	1998	1984-1990	1990-1998	1984-1998
Improved grass	5902.7	5503.1	5481.6	-410.4	-103.1	-477.1
Arable and horticultural	5282.5	5242.6	5248.9	-70.8	86.9	-11.1
Neutral grass	467.4	566.1	612.6	151.1	8.8	152.7
Broadleaf, mixed and yew woodland	1316.6	1369.8	1470.8	64.5	67.5	142.5
Conifer woodland	1243.0	1365.3	1373.8	65.1	-9.1	85.9
Bog	2302.8	2317.9	2218.3	-102.7	-18.8	-120.5
Dwarf shrub heath	1387.7	1557.3	1487.0	12.4	-57.3	-57.3
Acid grass	1476.2	1451.0	1295.5	81.2	-154.4	-103.9
Fen, marsh and swamp	427.7	454.6	547.2	27.8	98.5	127.1
Bracken	439.0	451.8	438.9	-25.7	28.2	3.2
Calcareous grass	75.1	81.2	64.7	5.9	-14.6	-10.7
Inland rock	37.6	52.2	55.5	12.9	6.6	17.9
Montane	40.6	49.8	49.1	18.5	0.0	18.6
Standing open water and canals	284.4	206.2	190.3	0.9	1.4	1.1
Rivers and streams	69.8	65.8	64.2	-2.0	-1.0	-3.0
Littoral rock	0.1	0.1	0.1	0.0	0.0	0.0
Littoral sediment	149.1	142.0	138.1	1.8	-1.5	0.1
Supralittoral rock	83.1	78.8	77.0	-2.2	-2.0	-4.4
Supralittoral sediment	54.2	53.2	53.0	-8.6	2.7	-5.2
Built up and gardens	1267.8	1212.6	1330.8	66.3	60.5	133.4
Boundary and linear features	490.6	497.5	497.9	17.0	-3.2	9.0
Unclassified	0.4	73.5	94.8	94.7	4.7	100.5
Sea	304.4	298.5	302.9	2.1	-0.7	1.3

ANNEX 2: SELECTED OTHER FEATURES RECORDED BY COUNTRYSIDE SURVEY 2000

Table 2a Length and change in length of linear features

Linear Feature	Length (km/1000)			Change		
	1984	1990	1998	1984-1990	1990-1998	1984-1998
Hedge	562.60	467.51	468.22		0.64	-131.1
Remnant/relict hedge	58.38	69.34	57.64		-14.74	
Wall	225.20	195.56	193.08		-4.03	-29.86
Line of trees/shrubs and relict hedge and fence	0	60.03	81.10		17.18	
Line of trees/shrubs and relict hedge	0	73.37	96.56		21.81	
Bank/grass strip	79.93	88.30	82.38		-1.09	16.5
Fence	606.64	611.48	656.94		34.24	55.53
Total boundary features	1532.74	1565.64	1635.93		53.95	

Table 2b: Average number of species (species richness) found in CS2000 vegetation survey plots on field boundaries associated with arable fields, and which contained the crop and weed vegetation type in 1990 and 1998

	1990	1998
England and Wales (*)	7.96	10.95

Table 2c: Average number of species (species richness) found in CS2000 survey plots containing infertile grassland vegetation in 1990 and 1998

	1990	1998
England and Wales (**)	18.94	17.38
Scotland	17.68	17.13

Table 2d: Change in the percentage of CS2000 sites (i.e. rivers and streams) in the two best grades ('a' and 'b') of biological condition between 1990 and 1998, by Environmental Zone

	Percentage of sites in top two grades	
	1990	1998
EZ1	30.4	45.6
EZ2	40.7	55.5
EZ3	42.5	57.4
EZ4	31.6	49.1
EZ5	28.3	48.4
EZ6	45.7	83.0

ANNEX 3

2002 Trend in BAP priority species					
Increasing	Stable	Decline (slowing)	Decline cont/ accelerating	No trend	unknown
Wetland woodland	Upland calcareous grassland	Upland heathland	Lowland beech and yew woodland	Sabellaria alveolata reefs	Upland mixed ashwoods
Upland oakwood	Ancient and/or species-rich hedgerows	Tidal rapids	Lophelia pertusa reefs	Aquifer fed naturally fluctuating water bodies	Upland hay meadows
Reedbeds	Mesotrophic lakes	Sheltered muddy gravels	Coastal saltmarsh		Sublittoral sands and gravels
Native pine woodlands	Maerl beds	Purple moor grass and rush pastures			Serpulid reefs
Lowland heathland	Lowland calcareous grassland	Maritime cliff and slopes			Seagrass beds
Cereal field margins	Coastal and floodplain grazing marsh	Lowland wood-pasture and parkland			Saline lagoons
		Lowland raised bog			Sabellaria spinulosa reefs
		Lowland meadows			Mudflats
		Lowland dry acid grassland			Mud habitats in deep water
		Limestone pavements			Modiolus modiolus beds
		Fens			Machair
		Eutrophic standing waters			Littoral and sublittoral chalk
		Chalk rivers			Coastal vegetated shingle
		Blanket bog			Coastal sand dunes

ANNEX 4

Breeding seabird numbers in Britain and Ireland. Most figures are for 1998-2002 (Mitchell *et al.* 2004) but those for Northern gannet and roseate tern include more recent updates. All counts are of pairs unless otherwise stated

Species	UK	Republic of Ireland	Total population	% change since previous survey (coastal populations only)	
				Seafarer (1969-70)	SCR (1985-88)
Northern fulmar	505,073	32,918	537,991	+74	0
Manx shearwater ¹	299,722	32,545	332,267		
European storm-petrel ¹	25,710	99,065	124,775		
Leach's storm-petrel ¹	48,047	310	48,357		
Northern gannet ²	212,835	31,136	243,971	+77	+31
Great cormorant	9,133	4,548	13,681		
coastal component ³	7,487	4,073	11,560	+44	+7
European shag	28,880	3,426	32,306	-5	-25
Arctic skua	2,136	0	2,136	+106	-37
Great skua	9,634	1	9,635	+213	+26
Mediterranean gull	110	3	113		
Black-headed gull	138,014	3,876	141,890		
coastal component ³	77,326	2,066	79,392	+6	+2
Common gull	48,720	1,060	49,780		
coastal component ³	20,889	586	21,475	+65	+39
Lesser black-backed gull	113,808	2,876	116,684		
coastal component ³	89,261	2,062	91,323	+83	+42
Herring Gull	143,656	5,521	149,177		
coastal component ³	141,701	5,413	147,114	-57	-17
Great black-backed gull	17,470	2,243	19,713		
coastal component ³	17,450	2,241	19,691	-12	-6
Black-legged kittiwake	379,895	36,100	415,995	-7	-23
Sandwich tern	12,490	1,762	14,252	+18	-11
Roseate tern ⁴	97	715	812	-66	+48
Common tern	12,012	2,485	14,497	-3	-2
Arctic tern	53,388	2,735	56,123	+7	-29
Little tern	1,947	206	2,153	+12	-25
Common guillemot ⁵	1,421,376	138,108	1,559,484	+139	+32
Razorbill ⁵	188,641	27,446	216,087	+29	+23
Black guillemot ⁶	39,316	3,367	42,683		
Atlantic puffin	581,110	19,641	600,751	+33	+19

¹ Not surveyed during Operation Seafarer and SCR.

² Northern gannet figures are from the complete survey of north-east Atlantic colonies in 1994-95 (Murray and Wanless 1997) with updates for colonies counted subsequently.

³ Inland colonies were not surveyed during Operation Seafarer or SCR.

⁴ Roseate tern figures are from 2003 (this report).

⁵ Counts are of individuals.

⁶ Counts of pre-breeding adults were not carried out during Operation Seafarer and were not conducted in the Republic of Ireland during the SCR.

ANNEX 5

Great Britain	First winter	Last winter	5-year	Percentage change		
				5-year	10-year	Max-year
Little Grebe (LG)	85/86	00/01	15	69		544
Great Crested Grebe (GG)	82/83	00/01	11	22		67
Cormorant (CA)	86/87	00/01	-1	13		163
Mute Swan (MS)	74/75	00/01	14	31	98	
Bewick's Swan (BS)	74/75	00/01	-15	-37	99	
Whooper Swan (WS)	74/75	00/01	57	27	132	
European White-fronted Goose (EW)	74/75	00/01	-49	-58	-50	
Dark-bellied Brent Goose (DB)	74/75	00/01	-13	-24	90	
Shelduck (SU)	74/75	00/01	-20	-22	7	
Wigeon (WN)	74/75	00/01	-3	27	73	
Gadwall (GA)	74/75	00/01	24	77	699	
Teal (T)	74/75	00/01	6	11	94	
Mallard (MA)	74/75	00/01	-12	-28	-27	
Pintail (PT)	74/75	00/01	-18	-30	-24	
Shoveler (SV)	74/75	00/01	3	3	60	
Pochard (PO)	74/75	00/01	-12	-8	-28	
Tufted Duck (TU)	74/75	00/01	8	13	8	
Goldeneye (GN)	74/75	00/01	-14	-6	5	
Red-breasted Merganser (RM)	74/75	00/01	-18	7	80	
Goosander (GD)	74/75	00/01	-25	-6	56	
Coot (CO)	82/83	00/01	11	24		31
Oystercatcher (OC)	74/75	00/01	0	-12	8	
Avocet (AV)	74/75	00/01	73	223	>2000	
Ringed Plover (RP)	74/75	00/01	-16	-25	-28	
Grey Plover (GV)	74/75	00/01	-17	2	196	
Knot (KN)	74/75	00/01	6	-5	15	
Sanderling (SS)	74/75	00/01	18	18	-6	
Dunlin (DN)	74/75	00/01	-24	-26	-39	
Black-tailed Godwit (BW)	74/75	00/01	17	65	188	
Bar-tailed Godwit (BA)	74/75	00/01	-24	-22	-13	
Curlew (CU)	74/75	00/01	14	17	31	
Redshank (RK)	74/75	00/01	6	1	-1	
Turnstone (TT)	74/75	00/01	-7	-25	-10	