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JOINT NATURE CONSERVATION COMMITTEE

IMPACTS OF CLIMATE CHANGE ON NATURE CONSERVATION - PROGRESS REVIEW AND JNCC STATEMENT

Paper by Mike Harley, Climate Change Adviser, English Nature, on behalf of the Inter-Agency Climate Change Group

1. Introduction

- 1.1 In September 2001, the JNCC considered a paper (JNCC 01 D06) which recommended a number of short-term actions which would enable the country agencies and JNCC to begin to adapt to the impacts of climate change on the nature conservation resource.
- 1.2 Following JNCC's approval, the Inter-Agency Climate Change Group (IACCG) produced an 18 month work programme to take these actions forward and to deliver its research programme. The work programme was approved by the Chief Scientist's Group (CSG) in February 2002, and is reviewed and revised at three/four month intervals by IACCG, with changes notified to CSG. The current version of the work programme (July 2003) is appended at Annex 1.
- 1.3 This paper reviews the delivery of the programme. As part of the programme, IACCG has prepared a Statement on Climate Change and Nature Conservation for JNCC (Annex 2). This was considered by CSG in August 2003.

2. Modelling Natural Resource Responses to Climate Change (MONARCH)

- 2.1 Since 1999, the country agencies and JNCC have been key players in a major multi-partner study into the impacts of climate change on wildlife in Britain and Ireland (MONARCH). The project is coordinated by English Nature and the research led by the Environmental Change Institute at the University of Oxford.
- 2.2 MONARCH uses novel computer simulation techniques to predict the likely future distributions of wildlife over the next 50 years. The first phase of the research focused on predicting 'climate space' for species as they move in response to climate change; the results were published by the UK Climate Impacts Programme in November 2001. A second phase is adding greater sophistication to the approach by assessing the ability of species to disperse into new climate space, the constraints imposed on dispersal by land use and land cover change, and the implications for ecosystem function. Following testing this year in four case study areas in England, Wales, Scotland and Ireland, the modelling techniques will be further refined in a third phase for

wider application, including the review of targets in the UK Biodiversity Action Plan in 2005/06.

- 2.3 The project has achieved international recognition as being 'path-breaking' in providing constructive frameworks for informed decision-making in the adaptation of nature conservation policy and management practice to climate change impacts. Early results are influencing the development of nature conservation policy, including the content of JNCC's draft position statement (Annex 2).

3. Collaborative research with the Tyndall Centre for Climate Change Research

- 3.1 A programme of scientific research of technical, policy and practical value to the country agencies, JNCC and the Tyndall Centre is being undertaken through co-funded PhD studentships. Two topics are currently being studied.
- 3.2 The country agencies, Woodland Trust and Tyndall Centre are funding a student to explore the role of nature conservation in mitigating the effects of climate change. In the first year of the project, an innovative approach to quantifying the greenhouse gas consequences of conservation and other land management practices on UK Biodiversity Action Plan habitats has been developed. The research is now focused on scientifically assessing the approach at case study habitats and using the outcomes to inform policy and practical applications.
- 3.3 JNCC and the Tyndall Centre are funding a student to assess the implications of climate change for biodiversity in UK overseas territories. In the first 18 months of the project, an extensive research review has been undertaken and a draft report produced. This is of outstanding quality and will be made available to JNCC for possible publication at the end of the study. The focus of the research is now on coral reef/sea grass/mangrove systems in the Caribbean and how these are being impacted by climate and other environmental/anthropogenic drivers (including El Nino events, volcanicity and ecological/socio-economic change).

4. Raising Awareness

- 4.1 IACG is raising awareness in the country agencies, JNCC and with others of the significance of climate change for biodiversity and promoting a culture towards a more dynamic vision for nature conservation in which global environmental change is a key driver. A draft position statement (Annex 2) to take these messages forward has been prepared for JNCC approval.
- 4.2 IACCG has also prepared a climate change web page for the LCN/LA component of JNCC's web site. Once operational, further detail will be added, together with links to relevant information at other sites. A six-monthly web-based newsletter will also be produced.

- 4.3 Other recent influencing activities have included IACCG input into the JNCC/FCO-led 'CAFF' workshop (January 03), the IUCN/CI/ZSL 'Climate change and species' workshop (January 03) and the international 'Global climate change and biodiversity conference' (organised by English Nature, RSPB, Tyndall Centre, UNEP-WCMC and WWF-UK) (April 03). IACCG also propose running an inter-agency 'Climate change and nature conservation' workshop in 2004/05; this will serve to demonstrate how climate change impacts upon and cuts across all aspects of nature conservation, and that adaptive measures must be put in place to accommodate responses.

5. **Influencing Biodiversity Action Plans**

- 5.1 The need to accommodate explicitly likely climate change impacts into Biodiversity Action Plans at both national and local scales (SAPs, HAPs, LBAPs) has been recognised by IACCG and others. For example, following debate within the Scottish Biodiversity Group, the Scottish Executive has let a short contract to CEH to consider the incorporation of climate change impacts in Scottish Biodiversity Action Plans. IACCG will take examples of good practice from this work to inform wider action.
- 5.2 The Conservation Policy Working Group of the MONARCH Steering Group (upon which IACCG is represented) has identified the Biodiversity Action Plan process as one of five core areas for detailed consideration. This will be the subject of the group's next meeting, which will be led by Defra in November this year.
- 5.3 One of the five key objectives in the third phase of MONARCH is to use research outputs to inform the review of UK Biodiversity Action Plan targets in 2005/06 (2.2). A selection of appropriate priority species will be run through the models and the results used to inform the review and give indicative guidance on the threats that climate change pose to biodiversity. In addition, a priority habitat will be chosen to exemplify how MONARCH methodologies can inform the planning and management of landscapes to accommodate climate change impacts.

6. **Advice and guidance**

- 6.1 IACCG provides advice and guidance to help develop more flexible approaches to the conservation of both designated sites and the wider countryside in order to allow species and habitats to adapt to climate change.
- 6.2 English Nature is leading a multi-partner bid for European Regional Funds under Interreg 3b to fund a trans-national project: 'How can North West Europe manage its wildlife and wildspaces in a time of changing climate and sea level and what are the implications for spatial planning?' A project officer has recently (September 03) been appointed to work with UK and European partners to develop the bid. If successful, the project will begin in spring 2004.

- 6.3 IACCG, IUCN, RSPB, UNEP-WCMC and WWF have drafted an information paper on adaptive management and climate change. The paper, 'Global change and biodiversity: adapting for the future', will be presented to the World Parks Congress (September 03), CBD SBSTTA-9 (November 03) and the subsequent CBD COP (February 04). A longer paper expanding on the key messages will be progressed in November and will form the basis of an international workshop to be held in spring/summer 2004 (possibly at the Royal Institute for International Affairs in London).
- 6.4 IACCG contributed a case study on MONARCH to a major CBD report on biological diversity and climate change. The report, 'Interlinkages between biological diversity and climate change and advice on the integration of biodiversity considerations into the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol', will be subject to in-depth review at CBD SBSTTA-9 (November 03) and UNFCCC COP-9 (December 03). The published version is expected to be available shortly thereafter.

7. Regulatory and policy changes

- 7.1 Working with colleagues in the country agencies, JNCC, Defra, the devolved administrations and other organisations, IACCG is exploring ways in which the effects of climate change, particularly habitat compositional change, might be adequately reflected in the delivery of commitments under UK and European wildlife legislation and wider European and global multilateral environmental agreements.
- 7.2 In considering the interpretation of 'conservation status' in the context of climate change and exploring the incorporation of climate change impacts into guidance on 'common standards monitoring', it was concluded that, as both are concerned with the status/condition of species, habitats and sites without attributing cause and effect, it would be inappropriate to pursue these from a climate change perspective.
- 7.3 IACCG will, however, continue to seek opportunities to influence policy change in statutory and spatial planning frameworks to accommodate climate change impacts at nature conservation sites.

8. Agri-environment schemes

- 8.1 Working with land use policy specialists in the country agencies and JNCC, IACCG is providing advice to increase the level of support for species and habitat management under agri-environment schemes, and an extension of such schemes to cover the whole countryside as a means of providing ecological links between fragmented habitats and, hence, facilitating species' movements under climate change.

- 8.2 Liaison with land use policy specialists in English Nature, for example, resulted in climate change issues being raised for consideration in Defra's review of agri-environment schemes (2002) and is informing EC's mid-term review of CAP. Similar messages will be required to influence the reform of CAP in 2006.
- 8.3 IACCG, along with RSPB and the Woodland Trust, has a seat on the newly-established Rural Climate Change Panel of Defra's Rural Affairs Forum. The first meeting of the panel was held in July 2003 under the Chairmanship of Elliot Morley (Minister for Environment and Agri-Environment). Influencing CAP was agreed as a major area of activity.

9. **Adapting to the effects of climate change**

- 9.1 To build effective assessment of risk from climate change into site-specific conservation objectives and interpretation of effect into monitoring networks, action is needed by IACCG to influence monitoring programmes both within and outside the country agencies - building on work to date with the Environmental Change Network (ECN). A continuum in terms of decreasing technical sophistication exists between ECN sites, the embryonic ECN Biodiversity Network, country agency validation networks and SSSI condition assessment. However, further development will not take place until the Scottish Executive/Defra review of surveillance and monitoring schemes and their effectiveness in detecting climate-induced changes in biodiversity is completed (later this year).
- 9.2 IACCG is working with the Tyndall Centre to scope a project (possibly a CASE studentship) to develop a conceptual framework and set of rules for implementing intervention measures to help biodiversity adapt to the impacts of climate change. This might include, for example, consideration of the sustainability of existing habitats and communities, the influx of non-native species, the creation of new habitat to aid dispersal, the restoration of ecological damage following extreme weather events, and the relationship between climatic variables and responses of species and ecosystems. The project would draw heavily on the outputs of MONARCH and other relevant research activities, and on data from ECN and other monitoring networks. The results would have wide-ranging policy relevance at all levels of government and in the nature conservation community.

10. **IACCG membership**

Mike Harley (Chair), English Nature
Simon Bareham, CCW
Howard Platt, EHS
Wyn Jones, JNCC
Noranne Ellis, SNH

Inter-Agency Climate Change Group (IACCG) - Work programme for period February 2002 to March 2004 (revised July 2003)

| Objectives/Tasks | Lead contact(s) | Contracts | Costs | Start date | End date | Comments/notes |
|--|-----------------------|---|-----------------|------------|-----------------------|---|
| Objective 1: Modelling Natural Resource Responses to Climate Change (MONARCH) | | | | | | |
| Scientific research to further understanding of the likely impacts of climate change on the nature conservation resources of Britain and Ireland. (Phase 1 report published in November 2001) | | | | | | |
| Task 1.1: MONARCH 2.1 | Mike Harley | Research team led by Environmental Change Institute, Oxford | £134K | (Q3 01/02) | Q2 02/03 | Project funded by consortium of 13 government agencies and NGOs in Britain and Ireland. |
| Task 1.2: MONARCH 2.1 (extension) | Mike Harley | | £130K | Q3 02/03 | Q4 02/03 | |
| Task 1.3: MONARCH 2.2 | Mike Harley | | £174K | Q1 03/04 | Q4 03/04 | |
| Task 1.4: MONARCH 3 | Mike Harley | | £320K (2 years) | Q1 04/05 | Q4 05/06 | Project development in Q2 03/04 |
| Objective 2: Collaborative research with Tyndall Centre for Climate Change Research | | | | | | |
| Co-funded scientific research of technical, policy and practical value to the statutory nature conservation agencies, JNCC and Tyndall Centre (undertaken through PhD studentships). | | | | | | |
| Task 2.1: The role of nature conservation in mitigating climate change | Mike Harley | Tyndall Centre, UEA | £24.5K | Q2 02/03 | Q2 05/06 | Project 50% funded by CCW, EHS, English Nature, SNH and Woodland Trust. |
| Task 2.2: Implications of climate change for biodiversity in UK Overseas Territories | Mike Harley | Tyndall Centre, UEA | £21.5K | Q4 01/02 | Q4 04/05 | Project 50% funded by JNCC. |
| Objective 3: Raising awareness | | | | | | |
| Raise awareness in the statutory nature conservation agencies, and with others, of the significance of climate change for biodiversity, and promote a culture change towards a more dynamic vision for nature conservation in which global environmental change is a key driver. | | | | | | |
| Task 3.1: Climate change webpage | Mike Harley/Wyn Jones | None | None expected | Q2 02/03 | Q3 02/03/ Q3 03/04 | Establish on JNCC website as part of wider LCN/LA webpage programme (Q3 02/03); add detail in Q3 03/04. |

| Objectives/Tasks | Lead contact(s) | Contracts | Costs | Start date | End date | Comments/notes |
|---|-----------------------|----------------------|---------------------|------------|----------|---|
| Task 3.2: IACCG newsletter | Mike Harley | None | Minimal (see notes) | Q3 03/04 | Ongoing | Produce two issues per year, essentially electronically (webpage, above) but with limited paper run. |
| Task 3.3: Climate change information notes (SNH) | Noranne Ellis | None | None | Q4 01/02 | Q2 03/04 | To disseminate these through IACCG webpage. |
| Task 3.4: Papers to statutory nature conservation agencies | All IACCG members | None | Minimal (see notes) | - | Ongoing | Provide regular updates on progress and emerging issues to inform strategic decision making and positioning (including three-monthly reports to CSG); subject to agreement, produce inter-agency 'Position Statement on Climate Change' in 03/04. |
| Task 3.5: Influencing others | All IACCG members | None | None | - | Ongoing | Prepare papers for and give presentations to other key audiences. |
| Objective 4: Influencing Biodiversity Action Plans | | | | | | |
| Promote the need to accommodate explicitly likely climate change impacts into the Biodiversity Action Plan process at both national and local scales (Species Action Plans, Habitat Action Plans, Local Biodiversity Action Plans) and into the development and implementation of site monitoring protocols and activities. | | | | | | |
| Task 4.1: The Biodiversity Action Plan process | (i) All IACCG members | None | None | Q4 01/02 | Ongoing | Influence inclusion of climate change in BAP process in statutory nature conservation agencies; use examples of good practice from Scottish Biodiversity Group to inform wider action. Explore use of MONARCH methodologies to model vulnerability of SAP species and HAP habitats, and consider cost implication. |
| | (ii) Mike Harley | Possible (see notes) | See notes | Q1 02/03 | Q1 02/03 | |
| Objective 5: Advice and guidance | | | | | | |
| Provide advice and guidance to help develop more flexible approaches to the conservation of both designated sites and the wider countryside in order to allow species and habitats to adapt to climate change. | | | | | | |
| Task 5.1: Inform conservation management | All IACCG members | None | None | Q4 02/03 | Ongoing | Provide information to inform management of special sites and development of landscape-scale programmes under climate change. |

| Objectives/Tasks | Lead contact(s) | Contracts | Costs | Start date | End date | Comments/notes |
|--|-------------------|-----------|-------|------------|----------|--|
| Task 5.2: Consultations | All IACCG members | None | None | - | Ongoing | Respond to relevant consultations, providing information, advice and opinion, as appropriate (Mike Harley for IACCG; all for respective agencies). |
| <p>Objective 6: Regulatory and policy changes</p> <p>Work with Defra, the devolved administrations and others to press for regulatory and policy changes which will allow the effects of climate change, particularly habitat compositional changes, to be adequately reflected in the delivery of commitments under UK and European wildlife legislation and wider European and global multilateral environmental agreements (MEAs).</p> | | | | | | |
| Task 6.1: Interpreting 'conservation status' | Wyn Jones | None | None | Q3 02/03 | Q3 02/03 | Engage with designations specialists in statutory nature conservation agencies, Defra and devolved administrations to explore issue and assess need for guidance on how to interpret 'conservation status' in context of climate change. |
| Task 6.2: Common standards monitoring | Wyn Jones | None | None | Q3 02/03 | Q4 02/03 | Explore ways of incorporating climate change considerations into guidance on common standards monitoring. |
| Task 6.3: Influencing wildlife policy | All IACCG members | None | None | Q4 02/03 | Ongoing | Seek opportunities to influence policy changes in statutory framework to accommodate climate change impacts at nature conservation sites. |
| <p>Objective 7: Agri-environment schemes</p> <p>Work with Defra, the devolved administrations and others to seek an increase in the level of support for species and habitat management under agri-environment schemes, and an extension of such schemes to cover the whole countryside as a means of providing ecological links between fragmented habitats and, hence, facilitating species movements under climate change.</p> | | | | | | |
| Task 7.1: Opportunities for species dispersal | All IACCG members | None | None | Q1 02/03 | Ongoing | Liaise with land use policy specialists in statutory nature conservation agencies to inform advice to EC, Defra and devolved administrations about need for incentive schemes to provide opportunities for species dispersal under climate change. |

| Objectives/Tasks | Lead contact(s) | Contracts | Costs | Start date | End date | Comments/notes |
|---|-------------------|-----------|-------|------------|----------|---|
| <p>Objective 8: Adapting to the effects of climate change</p> <p>Scope the development of a conceptual framework and a set of rules for implementing intervention measures to help biodiversity adapt to the impacts of climate change; this would include consideration of the sustainability of existing habitats and communities, the influx of non-native species, the restoration of ecological damage following extreme weather events, and the relationship between climatic variables and responses of species and ecosystems (for example, through the Environmental Change Network).</p> | | | | | | |
| Task 8.1: Intervention measures | All IACCG members | None | None | Q3 02/03 | Q4 03/04 | Review policy and practical outputs of MONARCH 1 and draw out key adaptation issues (Wyn Jones); present these for consideration by IACCG (Q4 02/03). Scope development in light of outputs of MONARCH 2 and other relevant activities by Q4 03/04. |
| Task 8.2: Encouraging acquisition and use of data | All IACCG members | None | None | Q1 02/03 | Ongoing | Encourage acquisition and use of ECN data, extension of ECN network and development of similar data collection schemes (e.g. validation networks). |

ANNEX 2

Joint Nature Conservation Committee

STATEMENT ON CLIMATE CHANGE AND NATURE CONSERVATION

Changes in climate have affected the world, and the distribution and abundance of its plants and animals, throughout the geological record. However, during the 20th Century, the rate of warming increased dramatically with the 1990s being the warmest decade on record. This coincided with industrial and social development increasing the level of greenhouse gases in the atmosphere and accelerating what is essentially a natural process. A report by the Intergovernmental Panel on Climate Change (IPCC, 2001) concluded that 'there is now strong evidence that most of the warming over the last 50 years is attributable to human activities'.

This warming trend is set to continue for at least the first half of the 21st Century, even if a global stabilisation of greenhouse gases is achieved. IPCC expect average global temperatures to rise between 1.4 and 5.8°C by 2100, depending on future levels of greenhouse gas emissions. Warming is being accompanied by changing precipitation patterns and increased frequencies of extreme weather events, such as floods, droughts and storms. Sea levels will continue to rise as ice sheets and glaciers melt, and as sea water expands in response to higher temperatures.

Climate change is presenting a series of important and immediate challenges to nature conservation. There is already clear evidence to show that plants and animals are being affected. This includes changes in populations, ranges, migration patterns, and seasonal and reproductive behaviour of a number of species. Such effects are likely to become more apparent and extensive as climate continues to change; species' extinctions and detrimental effects on habitats are likely to become increasingly common.

The Joint Nature Conservation Committee is working with other organisations in the UK and overseas to understand the scientific and policy implications of climate change for nature conservation. The aim of our climate change programme is to evaluate the impacts of 'inevitable' climate change on the nature conservation resources of the UK and its Overseas Territories, and propose actions to accommodate these, either by complementing existing activities or through new approaches.

The Joint Nature Conservation Committee is:

1. Commissioning and supporting scientific research to further our understanding of the likely impacts of climate change on plant and animal species and their habitats, on geological/geomorphological processes, and on the functioning of ecological systems at the landscape scale.
2. Establishing relationships with relevant climate change programmes in governmental and non-governmental organisations in the UK and overseas; where appropriate, seeking to influence the direction of research in these programmes and ensuring complementarity with our own programme.

3. Using the results of scientific research to adapt nature conservation policy and practice to the immediate challenges created by climate change, and strengthening the case for planning the long-term conservation of species and their habitats over wide geographic areas, including:
 - i. highlighting the critical importance of designated nature conservation sites (international, national and local) in accommodating the ecological effects of climate change; these sites have a crucial role to play in allowing the geographical ranges of species to alter in response to climate change, since it is unlikely to be practicable to retain all of the pre-existing features unchanged;
 - ii. reinforcing the need for more dynamic approaches to nature conservation management, both within designated sites and in the wider countryside, in particular providing effective ecological links between areas of semi-natural habitat to facilitate the movement of species as climate changes;
 - iii. promoting the inclusion of climate change impacts in the Biodiversity Action Plan process, especially the planned revision of UK targets in 2005, and in the development of nature conservation objectives;
 - iv. raising awareness within the nature conservation community, government and other key sectors of the significance of climate change for species and their habitats, and identifying how and when to adapt our approach to nature conservation to reflect future changes;
 - v. advocating an increase in the level of support for species and habitat management under agri-environment schemes to accommodate the impacts of climate change, and the extension of such schemes to provide links between habitats within fragmented landscapes;
 - vi. producing practical guidance on managing the effects of climate change on species and their habitats, for example, the long-term sustainability of existing systems, the survival of threatened native species, the control of non-native species, the restoration of ecological damage following extreme weather, and the need for adaptive measures to accommodate inevitable geological/geomorphological and ecological changes.
4. Supporting policy measures and cultural changes to reduce the long-term emission of greenhouse gases to the atmosphere and so help mitigate the effects of climate change in the second half of the 21st Century, in accord with sustainable development principles and in support of the Kyoto Protocol (Framework Convention on Climate Change) and the Convention on Biological Diversity.

Research into climate change and its impacts is an important and fast-moving area of study. The contents of this Statement, therefore, reflect our current knowledge and understanding. It will be reviewed and updated as new evidence emerges.