





**Brighton & Hove
City Council**

Overview & Scrutiny Commission

Title:	Overview and Scrutiny Commission Ad- hoc panel on Climate Change
Date:	2 December 2009
Time:	7.00pm
Venue	Committee Room 3, Hove Town Hall
Members:	Councillors: Mackerron (Chair) Janio Mitchell Wakefield-Jarrett
Contact:	Tom Hook Head of Overview & Scrutiny 20-1084/ Karen Amsden karen.amsden@brighton-hove.gov.uk

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AGENDA

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| 6. | PROCEDURAL BUSINESS | 1 - 2 |
| 7. | CHAIRMAN'S COMMUNICATIONS | |
| 8. | MINUTES OF THE LAST MEETING | 3 - 16 |
| 9. | FUTURE MEETINGS | |

The next meeting of the Panel will be held on 11th January 2010 at 4pm.

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| 10. | WITNESSES | 17 - 44 |
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The Panel will hear from:

Graham Tubb: Head of Energy Policy, SEEDA
Jorn Peters: Regional Planner, South East England Partnership Board
Tony Whitbread: Chief Executive, Sussex Wildlife Trust

Attached papers:

1. Biographies of Graham Tubb and Jorn Peters
2. Jorn Peters: Regional planning addressing climate change adaptation
3. Tony Whitbread: Weathering the changes
4. Tony Whitbread: Ecosystem assessment, climate change and the value of biodiversity

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| 11. | ANY OTHER BUSINESS | |
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Dates of 2 further meetings to be confirmed.

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Meeting papers can be provided, on request, in large print, in Braille, on audio tape or on disc, or translated into any other language as requested.

For further details and general enquiries about this meeting contact Karen Amsden, (01273 291084 – email Karen.amsden@brighton-hove.gov.uk) or email scrutiny@brighton-hove.gov.uk

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To consider the following Procedural Business:

A. Declaration of Substitutes

No substitutes are permitted on ad hoc scrutiny panels.

B. Declarations of Interest

- (1) To seek declarations of any personal or personal & prejudicial interests under Part 2 of the Code of Conduct for Members in relation to matters on the Agenda. Members who do declare such interests are required to clearly describe the nature of the interest.
- (2) A Member of the Overview and Scrutiny Commission, an Overview and Scrutiny Committee or a Select Committee has a prejudicial interest in any business at a meeting of that Committee where –
 - (a) that business relates to a decision made (whether implemented or not) or action taken by the Executive or another of the Council's committees, sub-committees, joint committees or joint sub-committees; and
 - (b) at the time the decision was made or action was taken the Member was
 - (i) a Member of the Executive or that committee, sub-committee, joint committee or joint sub-committee and
 - (ii) was present when the decision was made or action taken.
- (3) If the interest is a prejudicial interest, the Code requires the Member concerned:
 - (a) to leave the room or chamber where the meeting takes place while the item in respect of which the declaration is made is under consideration. [There are three exceptions to this rule which are set out at paragraph (4) below].
 - (b) not to exercise executive functions in relation to that business and
 - (c) not to seek improperly to influence a decision about that business.
- (4) The circumstances in which a Member who has declared a prejudicial interest is permitted to remain while the item in respect of which the interest has been declared is under consideration are:
 - (a) for the purpose of making representations, answering questions or giving evidence relating to the item, provided that the public are also allowed to attend the meeting for the same purpose, whether under a statutory right or otherwise, BUT the

Member must leave immediately after he/she has made the representations, answered the questions, or given the evidence;

- (b) if the Member has obtained a dispensation from the Standards Committee; or
- (c) if the Member is the Leader or a Cabinet Member and has been required to attend before an Overview and Scrutiny Committee or Sub-Committee to answer questions.

C. Declaration of Party Whip

To seek declarations of the existence and nature of any party whip in relation to any matter on the Agenda as set out at paragraph 8 of the Overview and Scrutiny Ways of Working.

D. Exclusion of Press and Public

To consider whether, in view of the nature of the business to be transacted, or the nature of the proceedings, the press and public should be excluded from the meeting when any of the following items are under consideration.

NOTE: Any item appearing in Part 2 of the Agenda states in its heading the category under which the information disclosed in the report is confidential and therefore not available to the public.

A list and description of the exempt categories is available for public inspection at Brighton and Hove Town Halls.

Climate Change Ad –hoc Panel minutes - 09.09.09

Present: Gordon MacKerron, Gil Mitchell, Tony Janio, Vicky Wakefield-Jarrett, Chris West, Chris Wick, Barry Luck

Also present: Thurstan Crockett, Karen Amsden

1. Procedural business

No substitutes

No declarations of interest

No party whip

2. Witnesses

Gordon MacKerron introduced the first public meeting of this panel by saying that 12 panels had been conducted by local authorities on climate change. However they had focussed primarily on mitigation, so it felt novel to be focussing on adaptation.

Chris West, Director, UK Climate Impacts Programme: said he understood that the focus on the panel was adaptation, but there were serious interactions between adaptation and mitigation. He believed that climate change should be 'taken as fact', but the size and variation of the change was not known.

He believed that just because there was uncertainty about the issue, there was no reason to put off action. That we faced change and possible uncertainty.

The UK Climate Projections 09 tool was able to project, but not predict, climate changes for this country based on different scenarios.

http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=163&Itemid=287

It was less prescriptive than projections. We should not prepare to adapt to just one future, but a range of futures – as it was not possible at present to tell which one would happen.

He believed that we should not get bogged down in climate change science, but just ask scientists when the information they have discovered can be used.

Local authorities all had the notion of looking after the well-being of the community, but there was a big range in where they thought the lines of responsibility should be drawn and how far into the future they should look to e.g. to protect their residents' great grand children?

There were three aspects to the responsibilities of local authorities, he said:

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- Provider of services
- Big corporate organisation
- Leader of the community

Brighton and Hove (B&H) had an adaptation plan but any such plan needed to be based on an assessment of the risks relating to both the present and the future.

The plan should be informed by what the council wanted to achieve. He believed that the focus must be on how the council addressed current risk. It was important when consulting stakeholders, to consult people with real influence both inside and outside of the council. It was also crucial to look at the interactions between the council and key partners, such as the Environment Agency and Southern Water.

The goal of UKCIP was that the UK be well adapted to climate change. This task would never be finished, so the most realistic outcome would be a UK **adapting well** to climate change. Therefore this meant it was vital to carry out risk assessment and find out current climate vulnerability.

The Local Climate Impact Profile was a tool that was trialled in Oxfordshire. He believed that this had not been done by BHCC and thinks that it should. Here is a link to a guide to using this tool:

http://www.ukcip.org.uk/images/stories/Pub_pdfs/lclip.pdf

Using this tool could involve:

- Looking up the archives of newspaper reports on major weather events
- Going to service providers and asking them what impact each major weather event had on them e.g. what were the costs and impacts of a storm last November?
- Asking the service whether a similar weather event would involve a large % of their deployment of reserves
- Starting to identify vulnerabilities
- Starting to identify thresholds when things are important e.g. if a storm once every 10 years turns into one every 2 years
- Interrogating the UKCP 09 Projections to see the probability of these thresholds being passed in the years ahead
- Plotting these against the impacts in order to assess risk
- Beginning to prioritise actions

Examples of the work done to date are available at this link

http://www.ukcip.org.uk/images/stories/Tools_pdfs/LCLIPsummary.pdf

Has BHCC got a good adaptation plan?

According to Mr West, BHCC appeared to meet some of the criteria, however he did have the following queries:

- Is it a once and for all plan, or is it responsive to future events?
- Has a champion/owner been identified?
- Is there a process for reviewing the plan and looking why it was created?
- What are the measures of success? Outcomes can be different, so there should be some process measures
- Did it offer assurance to either the public, managers and central government that this is a good adaptation plan?
- Was there a link with stakeholders? They were mentioned in the BHCC plan, but there did not seem to be a link with the knock on effects for stakeholders.
- Some sections appeared to be missing. It was weighted to the natural environment and included business, tourism, health and crime – but the built-environment was not well treated.
- It was marked as being a draft plan from '06, but had it been updated?
- It was all about sustainability, but it needed to link with economic and social impacts.

Questions to Chris West

Gordon MacKerron (GMK): Thank you for a very concise and useful presentation. I took the point of needing to have something to measure against. However this was difficult due to ambiguity in areas such as crime and the built environment. Therefore, how do we measure such factors and steer people in the direction of travel?

Chris West: The Impact Profile would be a useful tool as lots of records have not been kept by local authorities. It would form part of the corporate memory process. When challenged, most services would be able to remember. He also believed that the Risk Management or OSC people would be the best people to carry out this exercise rather than sustainability.

GMK: There was a severe flooding a couple of years ago and could see that it would be useful to revisit such an event.

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Vicky Wakefield-Jarrett (VWJ): Was very interested in the impact on adult social care and the care of the elderly. How would climate change impact upon these groups and what had other local authorities done to address this issue?

C West: When the temperature rose in summer, then older people are the most vulnerable - particularly if other factors such as English not being their first language. Fifty years ago care was given to older people by their neighbours, now this care has been professionalised. Help is needed from community groups e.g. church groups, to identify and help people in need. In Oxford they planned an exercise to visit all the older people in their home to see how they were coping with the temperature, however half the social service officers were at home that day looking after children because schools had closed due to the heat. Therefore, a comprehensive model was needed for responding to heat waves.

C Wick: such considerations can be built into the construction of older peoples' homes. For example by adding more insulation/ventilation.

Tony Janio (TJ): Sat on the flood defence committee and heard a very useful UKCIP presentation. This included the 69cm projected figure of rising sea levels, along with the expected hotter summers. He was concerned that the way this information was presented (e.g. Sun headlines) left people feeling there was nothing really to worry about. He believed that it was necessary to link our plans to projects such as Shoreham Harbour, and how should we link our work to that of other local authorities?

C West: There was a need to include the following:

- *Fitting adaptation and mitigation. About 10 years ago he was asked why he was talking about both adaptation and mitigation, even if it is possible to stop future climate change, change has already happened – so need to do both things at the same time. But agree it is not an easy idea to sell.*
- *Area boundaries. Learning from the 2007 Pitt report that authorities must work together to deal with issues such as floods.*
- *Shoreline mitigation. This is a more difficult area to work on as you can be passing on the problem to another area. Like the issue that if you defend Oxford, you can transfer the problems for the river to another area.*

TJ: It is necessary to frame the report to emphasise the point that we need both mitigation and adaptation.

C West: It is also necessary to mitigate for the rest of the world. We can afford to both this and adapt for what is going to happen. There are a lot of countries that cannot afford to do this.

Gill Mitchell (GM): It was necessary to have a good understanding of B&H. It was a densely packed city and needed to learn from the approach it took with the waste reduction policy to address how the population will react to issues. For example, the anger of neighbours to someone who uses a water sprinkler in a time of water

shortage. It would be useful to identify how local people are likely to react. They should promote the role of 'amateur oversight'. The public should ask 'is an action sensible for the future climate?' They should be putting pressure on the councillors.

GMK: It was necessary to sell adaptation as we were not well adapted to current climate and remind people of the effects e.g. the recent heavy snow.

The local authority indicator NI188 is not a quantitative measure, but a process indicator. What are the benefits and drawbacks?

C West: A few years ago when this indicator was optional, the majority said that they would not measure this issue. Now it is statutory and NI188 has to be done. The stages go from identifying to quantifying and prioritising to planning to monitoring. All LAs should be able to do the risk assessment. The first 2 stages do not take a lot of work, 'just doing the day job better'.

In total it should take around 3 years to get a long way through the process. With one year for 2 stages and a year for next 2 stages.

Chris Wick, Environment Agency is based in Pevensey. Chris is operational manager of 5 teams dealing with pollution and enforcement and had a personal passion about climate change. He is also on the city's Local Strategic Partnership and City Sustainability Partnership.

He supported C West's recommendation that BHCC carry out a LCIP. He presented two briefing notes, the first highlighting the areas of climate change that are the greatest significance to the EA, such as flood and coastal erosion.

There was always the temptation to give a median figure in projections e.g. for rainfall, but what has the most impact is the severe events like serious flooding or very high temperatures. He believed that one should anticipate sea level rises of about 15mm a year. But other scenarios could substantially increase such projections e.g. the melting of glaciers.

The effects of severe weather events could be wide ranging. One local example could be the cliff fall next to the A259 near Asda. There could be potential damage to this cliff face from storms and we might not be too many severe storms away from the closure of the A259.

Thurstan Crockett (TC): The economic and financial implications had to be considered at a public enquiry regarding the cliff face a few years back.

GM: Told the meeting that she had been involved in many difficult related issues such as the coastal realignment at Cuckmere.

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C Wick: Is the Environment Agency's lead for Cuckmere, so was in the thick of it. One should expect increased surface water flooding and knows that the system has been overwhelmed. The South East is a water stressed region with above average water use. The average water use in B&H is 169 litres, which was above the 150 litres national average. The Environment Agency is carrying out research on whether climate change will increase the likelihood of severe drought events like the drought of 2005/6. B&H has high quality drinking water, but it is all allocated. It was not believed that there was any more large scale water resource that could be made available. The area was also vulnerable to saline intrusion if the bore hole got very low. The Environment Agency (EA) believed that we must reduce the per capita use of water. Some of the options to increase water supply involve huge energy use e.g. de-salination, which conflicts with climate change mitigation. Therefore one needed to reduce water use, which would also increase drought resilience. The EA was not best placed to comment on wildlife, but the evidence of changes are all around us. The committee might consider inviting Natural England or the Wildlife Trust to discuss this aspect.

In the table in the briefing paper, I may have missed aspects of BHCC progress and so Panel please add to the progress column.

There is a national Climate Change board and supporting teams nationally in the EA. There was a need to link up the good national work with the good local and regional work. They are creating a new regional steering group to make sure that all regional work is being joined up.

A lot of mitigation work was being done by the EA, see Pie Chart in Note 2. By 2012 the EA will regulate almost 50% of green house gas emissions, so have a big part to play. Locally they were investing a lot of resources to look at land fills, as methane is more harmful than CO₂.

It is a massive challenge to reduce emissions by 80% by 2020, when you think that the majority of households in B&H were using fossil fuels for heating. There needs to be fundamental changes in how we live and operate. This can only be achieved if fundamental changes are made e.g. insulating all homes. Therefore adaptation and mitigation needed to be taken together.

He is pressing for an assessment to be made for what a community would look like in 2020 e.g. would we be using electric cars to get to work, would we all heat our homes with solar panels. This would be used as an advocacy tool. There may be many different options on how this future would look.

NB a version from Greenpeace, that Thurstan Crockett has sent Chris, is here:

<http://www.greenpeace.org.uk/files/efficiency/index.html>

He believed there was a big link back to environmental industries and telling this sector that it was certain that there would be a market for their goods.

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TC: explained that the panel on environmental industries had touched on forward procurement - telling organisations what was needed in the future and then looking to buy such projects from them.

C. Wick: This showing people what the future would be like was part of the process of 'turning red to green'.

VWJ. Are you planning for more storms and more intense storms? What will be the impact on drainage as well as surface water? Will we have to use grey water? We will need to make infrastructure changes to meet increased levels of storms

C Wick: It was hard to predict, but it was useful to look at the Pitt report of 2007 regarding the floods. Historically, the EA have concentrated on river flooding and have no statutory duty to consider rainfall in urban areas. But the 2007 floods have led to Local Authorities taking a lead on surface water flooding. DEFRA have given BHCC a grant to look at this. They are one of 77 Las (32 of them are in London).

Barry Luck (BL) was able to confirm that it was for BHCC to create a plan.

GMK: This could influence and help our work on this panel.

GM: There is a tension between drainage and water run off. There was a need to make legislation re: highway law more flexible - to deal with issues such as the increasing loss of front gardens as they are having tarmac put over them or concreted over for car parking.

C. Wick: Sustainable drainage was becoming increasingly important.

B Luck: A front garden has to be permeable if over a certain area, or will need planning permission.

TC: Run off to the sea – the issue arises if designed to run off faster to sea, which can compromise the objective of good bathing water quality. This has led to us losing our blue flag status. This showed the conflicts that can arise between environmental issues.

UKCP Projections- When thinking about our 25kmsq – would the EA's advocacy tool describing the region in 2020 be sufficient for adaptation planning?

C Wick: The tool would not be detailed enough for this. BHCC would need to do their own work. Agreed to supply more information on what the EA was intending to do nationally & locally to help avoid duplication.

C West: One could use a weather generator device, which is available. However you should not do this until you know what the problems are. This is a powerful too, but it is wise to be cautious with it. Therefore, you should use the local profile first and then look at the generator tool.

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C Wick: offered to look at the work of other authorities e.g. East Sussex to make sure there is no overlap – as TC does not have teams of people beavering away at this. The local papers can also be used to identify e.g. disputes over sprinklers.

GM: Should we as a panel decide, due to limited resources, to remove certain areas from the planning process e.g. shoreline?

TC: There was a discussion about this at the scoping meeting and it was decided not to rule out anything until we have found out from the services how well covered they are e.g. in relation to surface water flooding and coastal projections.

VWJ: The Council is a big landowner so we also need to know what we are asking tenant farmers to do.

BL: Farming issues, their practices and management can have a huge impact e.g. on run-off.

TJ: In relation to adaptation and flooding. One of our plans which was submitted to the EA asked for level 5 for more money to carry out flood prevention work. However we were down graded to level 3 which meant no action or money. Should we look at what we can do with our current resources? Or should our recommendations cover money we need e.g. from EA and/or DEFRA etc?

C. Wick: We will take advice and get back to you. There needs to be an understanding of the risks and then this will inform actions e.g. if there was a large risk then need to go on a crusade about.

TJ: It would be foolish to say that as a panel we think what the situation will be and what action we should take. One cannot say a particular climate will be there, but set out a range of climate change options for:

- 2020
- 2030
- 2040

There should be low, middle and top graphs of outcomes and options for each. E.g. new projection methods give this scenario an 80% likelihood.

The best example is the Thames Estuary 2100 projections. BHCC need to do the same thing on a smaller scale. Most adaptation responses were in the unknown and should keep them ready on a piece of paper until they are needed. Robust, but not perfect, projections.

TC: How, and who, should the recommendations be directed to. i.e. not limiting them to BHCC, but also to partners – including the EA.

GMK: There were so many potential changes that for example one could set up an adaptation sub-committee. One should not be afraid of being radical.

Barry Luck: Sewerage Strategy Manager, Southern Water

had spent 35 years in the industry, the majority at Southern Water. The majority of his observations would be confined to sewerage and waste water flooding. He was responsible for dealing with the regulator OFWAT, EA and working with local authorities re: surface water planning, and assisted in Water Industries Research for Water UK. He was also communicating closely with DEFRA re: surface water management.

Southern Water (SW) accepted that climate change was taking place. For the water industry there was no real good news, as all changes would make the matter worse. As a consequence, this could lead to law and order issues. He suggested that the Panel also needed to talk to someone who was an expert on water issues in Southern Water.

He believed that drier summers and wetter winters would lead to issues such as increased garden watering at time when trying to reduce water consumption. SW worked in 5 year funding cycles. Their Final Business Plan was submitted in August 2008 and they are now awaiting Ofwat's Final Determination, due late November. . They would be applying for 100% water meter penetration for domestic use. He believed that there are opportunities to reduce water usage (less waste etc) and that usage around 100-120 litres/h/d is possible just by being more careful about water usage. In relation to drainage and flood there have severe storms over the last 10 years, including:

- Glasgow
- Hull
- Midlands
- Boscastle

There may be greater awareness of the storms, but there are also higher numbers of catastrophic events. According to projections summers were becoming drier, and the consequence is likely to be more flooding. but there was more intense rain. This would lead to problems with run off and ground water flooding. Winters are likely to be wetter, which may also lead to increased flooding.

He recommended reading The Pitt Review (see http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html) which produced 92 recommendations. This has fed into Floods and Water Management Bill which was due to be presented by the Government shortly.

<http://www.defra.gov.uk/environment/water/flooding/flow/index.htm>

He asked if BHCC had commented on this Bill.

TJ: There was a rumour that this Bill would die.

BL: That would be a disaster. However there were sections, such as reservoir safety, that could be pulled out to ease its passage. He believed the Bill represented a better clarification of responsibilities and greater local authority (LA) responsibilities. The EA would be responsible for reservoir and river flooding, the LA responsible for ground water flooding and water courses, with all responsible for surface water and pluvial flooding. Therefore this would increase the responsibilities of BHCC.

SW's responsibilities started as public health responsibilities e.g. draining water away from roofs and foul water. They had no responsibility for agricultural drainage.

The minor drainage system was the underground pipe system and could deal with the 1 in 30 or 40 years event. There was also the major drainage system, for when the underground drainage system was overwhelmed. The drainage system for B&H was very old and new sewerage systems should be able to deal with the 1 in 30 year event.

In the event of potentially catastrophic flooding, e.g. in 2007, the local authority would now have to take responsibility. Water customers could not build systems to deal with catastrophic event. Therefore there was the need to change the above ground systems to increase resistance to flooding (e.g. boards against doors) and increase resilience (e.g. no carpets downstairs and placing electrical sockets higher up) – these measures were also appropriate for areas near rivers.

He believed that the new Bill was a good tool. He also believed that the All Party Parliamentary Group (APPG) which deals with flooding would press any change of government to go ahead with the proposals.

There had been integrated urban drainage studies. All partners needed to get together and understand floods, who was responsible for them and who dealt with them. They have considered whether you can make water authorities work with LAs. One of the pilots was carried out in Lewes - for details of the pilots see:

<http://www.defra.gov.uk/environ/fcd/policy/strategy/ha2.htm>

The intention had been to use this work to create a good practice manual. But there was now Surface Water Management Guidance on the DEFRA website.

<http://www.defra.gov.uk/environ/fcd/policy/surfacewaterdrainage.htm>

Defra have provided £16M for surface water management, all going direct to local authorities. Of this, £10M is for preparing plans, £5M for 'easy wins' (physical work to alleviate flooding) and a further £1M for training and resource building. Southern Water will be funded (through Ofwat's Final Determination of our Business Plan) to support the production of the plans. When planning you needed to address the following considerations:

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- *How can you reduce risk? E.g. are there malconnections with the highway?*
- *Can you introduce relatively small wins? E.g. Dropped kerbs can often direct flooding into properties or gardens, so the issue is about how very small changes to above-ground drainage systems can unintentionally affect, or cause, flooding*
- *How can you divert water? E.g. from Preston Park into a temporary pond if needed.*
- *How can partners work together?*
- *What are the contingency plans? Because it will flood.*
- *How do you look after the vulnerable?*

The funding that has been awarded for Brighton is to enable them to go from spatial planning to contingency planning and identifying partners.

He believed that the increasing risks to B&H were as follows:

- *Tidal flooding (this was not SW's responsibility) but what would a rise in the sea level of 6m do to Brighton?*
- *Ground water flooding (e.g. the autumn 2000 flooding in Patcham). There were for example some agricultural practices that could assist*
- *The sewerage system in B&H is quite resilient but cannot absorb much above the 1 in 50 year event*
- *In 2000 the big storm water tunnel between King Alfred and Black Rock was pretty full throughout the area. A big single event could have led to very substantial flooding.*
- *Urban creep e.g. the Carden Avenue area. There were malconnections on chalk. Where was the surface water coming from? This could have been caused by building up over front gardens.*
- *Protecting natural flood routes. Water would flow in odd places, so do not build there.*

SW was keen to engage in the Surface Water Planning Process.

TC: In relation to water resources, what sort of % reduction will universal water metering produce?

BL: In the Isle of Wight test the reduction was between 10-12%

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TC: There had been criticism in the press about the inequalities impact of metering. What plans did SW have in place to deal with the impact of metering on large, low income families?

BL: thought that it was the government's responsibility to deal with the social impacts of metering. He also suggested inviting Meryck Gough from SW to talk about this issue in greater detail.

VWJ: If 16,000 new homes were to be built in the area, would water consumption not become a concern?

BL told the Panel that this issue was covered in SW's plans but again suggested that questions relating to this issue should be addressed to Meryck Gough.

GM: There was a huge sewer and mains replacement programme for B&H. Were you replacing like with like?

BL: It was all water supply work, but any sewerage works would be like for like. SW had identified where there were old/leaking pipes and were replacing them with plastic pipes.

TC: 35 miles were being replaced.

BL: One could measure the impact of this replacement programme. We have split the Brighton water distribution system into small 'District Metered Areas each of which has one or two meters measuring flow into the area, so flows can be accurately measured in each of these areas, and hence leakage can be quickly identified and located. We endeavour to locate and repairs leaks as soon as possible, with 2-3 days as a target. Therefore SW had a good picture of leakage.

TJ: The Panel now seemed to be well informed about flooding, but do we need to know more about other areas such as heat?

C West: believed that it was not enough to just look at flooding and draught, but needed to consider the human end, infrastructure and health issues. This was an area that needed more work. He believed that one should start by looking at the council functions and identify which areas are under greater stress and look at those. Do not begin by looking at climate change areas e.g. flooding.

C Wick: felt that the implications of climate change were everywhere e.g. tourism and commerce (for example if the heat forced workers to have siestas).

GM: asked the witnesses whether we need to talk to people about the infrastructure, sustainable planning and the built environment?

GMK: believed that if the issue was not already covered, then needed to look at infrastructure.

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TC: said that because so many things came under Environment e.g. emergency planning, shoreline management, spatial planning, public safety, the Head of Scrutiny felt it best to ask the Director of Environment for information about adaptation planning, with supporting information and staff present e.g. the Head of Public Safety.

C West: suggested that the panel subscribed to the monthly newsletter from UKCIP (see link below for how to subscribe

http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=373&Itemid=9

He also suggested looking at their tool known as Brain (Base for Research, Adaptation, Impacts and News) see link here

http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=226&Itemid=324

He also recommended that Panel members explore the UKCIP website

<http://www.ukcip.org.uk/index.php>

And look at LCLIP

http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=278&Itemid=377

GMK: drew the discussion to a close with the following summary:

- Adaptation is not just for the Environment directorate - it has to become part of corporate and routine thinking and planning
- The need for engagement with partners
- The need to be aware of extreme events. The 1 in 30 year event could become the 1 in 10. The greatest political issue is reluctance to invest in things that may not happen.
- Planning and adaptation run in parallel and need some reconciliation

He expressed his gratitude to all witnesses.

Barry Luck and Chris West then offered to provide future support and information to the Panel.

3. Dates of next meeting

Next Meeting – at 6.30pm a briefing session for the panel. Then public panel meeting to commence at **7pm on 20th October**, at Hove Town Hall, Committee Room 1.

Agenda Item 8

Meeting 3- in November to be confirmed.

Biographies of the Witnesses

Graham Tubb MBE

Graham is Head of Energy Policy with SEEDA, the Regional Development Agency for South East England. He has a background in sustainable development, environmental policy & strategic planning at regional, metropolitan and county level; while his career has been mainly in the public sector, it has included private sector and academic appointments (incl. University of Sussex).

Graham is a member of the Executive Committee of Climate South East, and was its Chair from 2002 until October 2008; Climate South East, originally the SE Climate Change Partnership, was set up in 2001 principally to raise the profile of the need to address, and plan for, adaptation to climate change. Graham also chairs the national Sustainable Consumption and Production Network (SCPnet), is a member of the Sussex Energy Group Steering Board at SPRU, University of Sussex, and is a member of the Aldersgate Group. He managed the national RDA policy lead on Energy on behalf of England's nine Regional Development Agencies for five years (until Jan 2009) and in this role represented the RDAs on a number of Government bodies, mainly concerning energy and climate change. Graham was made an MBE in 2000 for services to regional governance and he is a Fellow of the Royal Society of Arts.

Jörn Peters

Jörn holds a degree in Spatial Planning from the University of Dortmund in Germany. He worked as a planner at Southampton City Council and Adur District Council. His responsibilities included strategic planning, policy development and sustainability appraisals. Jörn has also experience with the development and assessment of European projects from positions at the Environment Agency and the North Sea Interreg Secretariat. He joined the Regional Planning Body (formerly Regional Assembly – now South East England Partnership Board) as full-time Regional Planner in September 2006. Jörn's areas of work include flood risk, climate change, water resources, water quality and the coast. He is leading the sustainability appraisal work and is the lead officer for the South Hampshire sub-region.

Jörn gave evidence at the Examination in Public of the draft South East Plan and produced evidence such as the Regional Flood Risk Appraisal. He recently worked on the preparation of a guide for local planners on climate change. He is currently undertaking a Regional Climate Change Vulnerability Assessment. Jörn is participating in

Agenda Item 10

various regional partnerships such as the Climate South East Planning Sector Group, a national advisory group on the preparation of guidance about 'Planning for Water' as well as European cooperation projects on climate change adaptation.

AGENDA ITEM 10

From Jorn Peters - South East England Partnership Board

BRIGHTON AND HOVE CITY COUNCIL SCRUTINY PANEL ON CLIMATE CHANGE ADAPTATION

Date: 20 October 2009

Subject: **Regional Planning addressing Climate Change Adaptation**

Report of: Regional Planner, South East England Partnership Board

1. New Governance Arrangement for Regional Planning

- 1.1 The Partnership Board comprises four members of the board of SEEDA and eight members of South East England Leaders' Board (councillors from the region's local authorities). The staff of the South East England Partnership Board is made up of the former Regional Assembly secretariat and some South East England Development Agency (SEEDA) staff.
- 1.2 Together they provide support to the Partnership Board in order to deliver a new Regional Strategy which brings together the Regional Economic Strategy and the Regional Spatial Strategy, the South East Plan.
- 1.3 Further details are available on our website www.se-partnershipboard.org.uk and a brochure will be available at the Scrutiny Panel meeting.

3. Climate Change Policy in the South East Plan

- 3.1 The South East Plan was published in May 2009. It provides a regional framework for planning and development over the next 20 years. Local Development Frameworks (LDFs) have to conform to the South East Plan.
- 3.2 Policy CC2 of the South East Plan addresses climate change mitigation and adaptation. It sets out that climate change adaptation should be achieved through:
 - Guiding strategic development to locations offering greater protection from impacts such as flooding, erosion, storms, water shortages and subsidence.
 - Ensuring the new and existing building stock is more resilient to climate change impacts.
 - Incorporating sustainable drainage measures and high standards of water efficiency in new and existing building stock.
 - Increasing flood storage capacity and developing sustainable new water resources.
 - Ensuring that opportunities and options for sustainable flood management and migration of habitats and species are actively promoted.
- 3.3 Adaptation is also integrated into a wide range of sectoral policies such as water management and housing design.

4. Implementing the South East Plan Policy

- 4.1 In March 2007 the former Regional Assembly held a Climate Change Summit in Brighton and launched a user-friendly guide on how to implement the then draft Climate Change policy. This Climate Change Implementation Plan sets out a suit of actions for key partners to help deliver the policy aspects set out in the policy. The document also suggests sectors/organisations that should be responsible for individual actions.
- 4.2 Concerning the resilience of buildings for example actions include the use of planning conditions to ensure raised floor levels and save access as well as improving building design to allow cooling/shading. Sources of detailed information such as the British Research Establishment (BRE), the Environment Agency and CIRIA¹ are provided.
- 4.3 The Climate Change Implementation Plan can be downloaded from the Regional Assembly website www.southeast-ra.gov.uk² and a CD will be available at the Scrutiny Panel meeting.
- 4.4 In addition, the Three Regions (London, East and South East of England) Climate Change Group has jointly produced a Checklist for Development and a practical guide on retrofitting existing housing for changing climatic conditions. The documents can be downloaded from the following website www.london.gov.uk/trccg/publications.

5. Overcoming Barriers to the Delivery of Climate Change Adaptation

- 5.1 Despite the above there are many barriers including knowledge gaps, lack of coordination and funding, conflicting priorities and resistance to change. Therefore, we commissioned further research and identified the following key actions to overcome these barriers.
- 5.2 Organisational actions
- Improve knowledge and awareness - making existing information and advice more widely and easily accessible to decision makers and delivery agencies in different sectors.
 - Improve leadership - making the challenge of adaptation relevant to leaders from a range of sectors and organisations by increasing their understanding of the benefits of adaptation so that they are keen to test innovative approaches.
 - Ensure consistency of the policy framework - ensuring that all policies are climate proofed using common definitions/goals/indicators.
 - Improve partnership working - using existing networks and partnership initiatives to promote the delivery of adaptation measures.
- 5.3 Technical actions
- Integrate adaptation considerations into existing policy assessments such as sustainability appraisals and flood risk assessments.

¹ Construction Industry Research and Information Association

² http://www.southeast-ra.gov.uk/documents/regional_planning/START.pdf

- Identify good practice and promote common standards on resilience across the area/authority.
 - Establish water metering in all properties and improve water efficiency for new development.
 - Encourage policies and management agreements for sustainable drainage and agree strategies for surface water management.
 - Develop a robust evidence for the vulnerability of habitats/species.
- 5.4 The full research report can be downloaded from the ESPACE website www.espace-project.org.³ ESPACE is a European-funded project, which has informed our work on adaptation over the last few years.

6. Specific Planning Guide on Adaptation

- 6.1 The Partnership Board has recently produced a specific online guide to help local authority planners ensure that their LDFs reflect the climate change policies of the South East Plan. The guide is structured around the various stages of plan preparation so that it can be used as a 'dip-in-and-out' resource.
- 6.2 The adaptation sections of the guide focus primarily on water management and resilience of the built environment and infrastructure. Some key recommendations include:
- Identify at an early stage with relevant departments in the authority (environmental policy, health, emergency planning, building control, colleagues dealing with National Indicator 188 on adaptation) and external stakeholders such as the Environment Agency and the local water company if likely climate change impacts could threaten proposed growth.
 - Identify available research that investigates the impacts of climate change on the area.
 - If further research is required ensure it is tailored to the specific problems/threats related to future development and consider joint working with other relevant council departments and neighbouring authorities.
 - Reflect the evidence on current and future vulnerabilities when allocating growth and identify the ambition of adaptation measures and infrastructure needs.
 - Be clear about the level of risk the authority is taking with its level and location of development.
 - Use the Sustainability Appraisal to ensure that long-term climate change considerations appropriately inform policy development.
- 6.3 The guide is available on the new Partnership Board website <http://www.se-partnershipboard.org.uk>.⁴

³ http://www.espace-project.org/publications/Extension%20Outputs/SEERA/Annex%201%20-%20adaptation_revisedsummaryreport_13May.doc

⁴ <http://www.se-partnershipboard.org.uk/page/5/view/97/sub/73/subc/26/ldf-guides>

7. Assessing Climate Change Vulnerabilities within the Region

- 7.1 The Partnership Board has started to undertake a regional climate change vulnerability assessment to reflect requirements of the Planning Policy Statement on Planning and Climate Change. The assessment will help to identify vulnerability 'hotspots.' This will inform the options for future growth and enable us to prioritise the type and location of adaptation measures.
- 7.2 The initial assessment covers a wide range of sectors including public health, natural resources, the built environment, infrastructure and economic development. For these sectors we are exploring the following questions and identify indicators, for which sub-regionally specific data are available.
- What affects current vulnerabilities to severe weather?
 - What are consequences currently experienced?
 - Do these vulnerabilities/consequences significantly accelerate through climatic change?
- 7.3 We are working with local authorities on this assessment as they are also required to assess climate change vulnerability. We aim to use and compare in particular their Local Climate Impact Profile (LCLIP) findings.
- 7.4 Looking into the future, the following two major questions are of particular importance from a strategic planning perspective:
- Is a fundamental change in spatial development and investment required or can we make relatively minor adjustments to improve resilience to change?
 - How can we inform and improve decision-making to ensure adaptation and resilience in the future?

For more information about our climate change adaptation work please contact:

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Regional Planner

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Weathering the Changes

A living landscape in a changing climate

By Dr Tony Whitbread, Chief Executive Officer, Sussex Wildlife Trust



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Taking Care of Sussex



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Introduction



Dr Tony Whitbread
Chief Executive
Sussex Wildlife Trust

Predictions regarding future climate change vary considerably. The great scientific consensus is that, whilst no one weather event can be attributed to climate change, the climate is changing and the most likely cause is human activity.

The broad pattern of change for this part of the planet is for warmer and drier summers, with milder, wetter winters. Increased storminess is also more likely with more extreme rainfall events, more windstorms and continuing sea level rise.

Climate change models, however, can only go so far. They may only apply at a large scale; effects at county level will be far less certain. We may not know the nature, extent or even direction of the likely changes at a Sussex scale. For example, while the rest of the world gets warmer it is possible, although unlikely, that changes in sea currents may make Sussex colder. We should have less rain in summer, but increased storminess may cause summer floods and, whilst we may hope for a benign

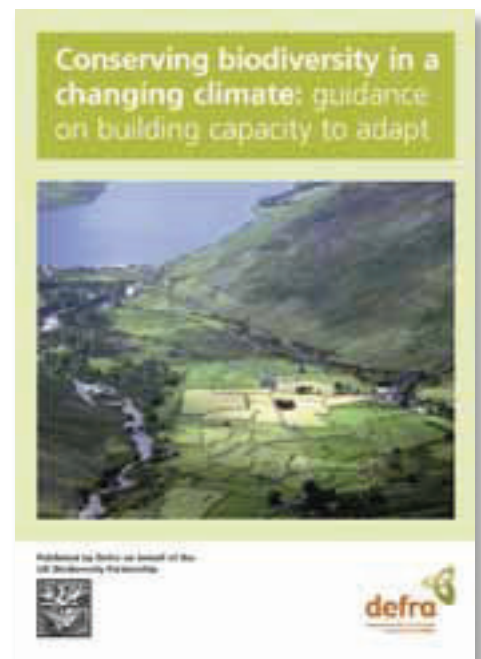


spotted flycatcher Kim Taylor/naturepl.com

change to warm, dry summers, we may in fact experience severe droughts and windstorms.

Furthermore it is likely that there will be an increase in unpredictability and variation from one year to another. There could also be the possibility of tipping points, flipping the climate into a new and unpredictable state.

However, the purpose of this document is not to examine the science of climate change or to investigate the likelihood of the different scenarios (for this visit the Intergovernmental Panel on Climate Change website: www.ipcc.ch). Its purpose is to present a strategy for the conservation of biodiversity in Sussex against the background of a changing climate.



Wildlife could respond to climate change in a variety of ways:

- Changes in the timings of seasonal events, leading to loss of synchrony between species and the availability of food, and other resources upon which they depend.
- Shifts in suitable climate conditions for individual species leading to change in abundance and range.
- Changes in the habitats that species occupy.
- Loss of habitats as conditions change (for example the drying up of wetlands), with the loss of the species in them.
- Changes to the composition of plant and animal communities.

It is likely, however, that the greater frequency of extreme weather events will have a greater impact on biodiversity than general changes in average conditions. It is also likely that the human response to climate change will have a far greater effect on biodiversity than the climate change itself.

Furthermore, whilst climatic zones may move several hundred kilometres north, many changes will occur at an extremely small scale. Similarly, changes in land management at a small scale could have a far greater effect on wildlife than major shifts in climate zones. (For example, heavy grazing of grassland allowing sunlight to penetrate the grass sward will increase the temperature of the soil surface far more than the predicted changes from climate change alone).

A strategy for climate change must therefore present the best course of action to conserve nature against an unknown and unpredictable future.

We therefore need a strategy that is based on improving adaptation, which means increasing the ability of natural systems to absorb and respond to change, whatever that change might be. In essence, a successful strategy must allow for uncertainty. Effective adaptation action should be beneficial whatever the extent, rate or direction of climate change.

However, even the most effective biodiversity strategy aimed at improving the adaptability of the environment will be overwhelmed if we do not take other action to address the underlying causes of climate change.



This strategy is aimed at improving adaptability. There must also be other strategies aimed at significantly reducing the cause of climate change: our continually growing emissions of greenhouse gases.

The Department for Environment, Food and Rural Affairs (Defra) has recently produced the document *Conserving Biodiversity in a Changing Climate: guidance on building capacity to adapt* (Hopkins et al, 2007).

www.ukbap.org.uk/Library/BRIG/CBCCGuidance.pdf

This is an extremely helpful, well referenced document that can legitimately be used to form the basis of a local approach. This strategy draws heavily on this document.

Defra's guidance note details the following principles for a biodiversity strategy to address climate change and each of the six principles are expanded in the following pages:

- 1 Conserve existing biodiversity
- 2 Reduce sources of harm not linked to climate change
- 3 Develop ecologically robust and varied landscapes
- 4 Establish ecological networks through habitat protection, restoration and creation
- 5 Make sound decisions based on analysis
- 6 Integrate adaptation and mitigation measures into conservation management, planning and practice



1 Conserve existing biodiversity



bluebell wood Simon Colmer/naturepl.com

Future biodiversity can only adapt and evolve from the biodiversity that survives today so the importance of conserving current high quality sites cannot be overemphasised. These, however, cannot be preserved in aspic; change, including climate change will mean that habitats will change in their composition and structure with time.

a) Conserve protected areas and other high quality habitats

In Sussex, protected areas Sites of Special Scientific Interest (SSSIs) Sites of Nature Conservation Interest (SNCIs) and Nature Reserves (NRs) cover about 11% of the county. High quality habitats also occur outside protected areas and these may be managed for purposes other than wildlife conservation. Examples in Sussex include a very high cover of ancient semi-natural woodland, hedgerows, grazing marshes, gills and rivers.

These areas have two important functions acting as core areas for biodiversity and as connecting habitats within ecological networks. The success of an ecological network will depend upon the existence of large populations in core areas, hence acting as centres for colonisation of surrounding areas.

b) Conserve range and ecological variability of habitats and species

The risk of species and habitat loss will be less if a varied set of sites are conserved. With varied habitats, at a variety of scales, species may be able to move short distances, and habitats re-configure, with changing conditions. Therefore a varied set of sites should be conserved encompassing the full range of ecological conditions in which habitats and their constituent species occur.

Future ecosystems will only be able to develop from what survives from the present. Healthy populations of a diversity of species forming centres from which the surrounding environment can be colonised is the vital first step in the maintenance of an adaptable environment.

Sussex Wildlife Trust Role

- Develop a strategic approach to site protection through the Sussex Biodiversity Action Plan. Ensure that plans encompass the range of ecological situations, seeking good representation of different habitats in Sussex, including atypical or unusual sites.
- Explain and interpret the value of high quality wildlife sites to create a demand for special places from people.
- Acquire, maintain, enhance and expand Sussex Wildlife Trust (SWT) nature reserves so they act as core areas for colonisation into the wider environment.
- Work in unison with other conservation organisations for the acquisition, conservation and unified management of existing high quality areas.
- Lobby for effective protection and management of key sites throughout the county.
- Work for effective conservation and management of key wildlife sites through influence of agri-environment schemes, methods of 'planning gain' and community action.
- Seek opportunities to create buffers of semi-natural habitat around high quality wildlife habitats.

2 Reduce sources of harm not linked to climate change

Wildlife may be less able to adapt to climate change if other sources of harm are present. Many of these may be out of our control but we should be aware of them.

- Abandonment of traditional management, such as neglect of woodland management or lack of grazing in grassland and heathland.
- Nutrient enrichment.
- Spread of non-native species.
- Agricultural intensification.
- Over abstraction of water.
- Aerial pollution.
- Habitat loss and fragmentation.

Sussex Wildlife Trust Role

- Ensure in future reviews of the Sussex Biodiversity Action Plan that plans and projects identify and address non-climate causes of adverse change.
- Work to ensure that agri-environment schemes, forestry methods and other land management approaches reduce the above potential sources of harm.
- Promote robust protection of wildlife in strategic planning and in the strategies of government and non-government bodies.
- Implement effective management on our own nature reserves.
- Negotiate with landowners and land managers surrounding key sites to reduce causes of harm to key sites from surrounding land use.



Dried river bed [Adrian Davies/naturepl.com](https://www.naturepl.com)

3 Develop ecologically robust and varied landscapes

It is likely that landscapes will change in complex ways as a result of climate change. This may result in some habitats increasing or decreasing in size, changing in structure, appearing or disappearing. Maintaining a diversity of semi-natural habitats, increasing the area of semi-natural habitats, addressing the impacts of unsympathetic land uses and allowing natural processes to shape the ecology and structure of whole landscapes will create the best chance for biodiversity. Reducing the intensity of land use in intervening parts of the landscape will also increase the chance for species to move between high quality wildlife patches. Sussex is already a varied landscape, especially when compared to some other counties. However, variation is limited when compared to a possible natural situation.

Conserve and enhance local variation within sites and habitats

The environment is a mosaic of habitat patches, the patches being surrounded



silver washed fritillary David Plummer

by both sub-optimal areas (that may allow dispersal but not long term survival) and by hostile areas. Each species requires its own range of habitat patches, the size of a required patch varying enormously from species to species.

Example of within-site variation:

Woodlands are one of our most diverse habitats, made up of species that like shady conditions. Grasslands, on the other hand consist of species liking more open, sunny conditions. A matrix of woodland and grassland, with all the stages of regenerating scrub in between, provides a moving small scale network of different micro-habitats so that individuals that like open or shady conditions can simply move to a nearby area as climate changes. Thus diverse pasture woodland may offer an example of a wide range of possible conditions so species can move small distances within a site in response to changing climate.

Climate, for example, can vary enormously over very short distances, from inside a wood in deep shade to the open, sunny patches of grassland. Even two sides of a rock can have very different conditions. Where there is a wide diversity of habitat patches, species are more able to respond to climate change by relocating within the landscape they already occupy. Management approaches that give a more varied vegetation structure with a diversity of habitat patches are more likely to deliver a landscape that is ecologically robust to climate change.

Landscapes that are currently richest in wildlife are also more likely to be the more varied in terms of habitat diversity and so more likely to allow species to adapt by dispersing to nearby habitat patches. The following characteristics will be worth maintaining and enhancing:

- Diverse and structurally varied vegetation.
- Uninterrupted semi-natural habitat on a range of slope or aspect.
- Uninterrupted semi-natural habitat over a range of altitudes is not as relevant in Sussex as in upland areas although transitions on the Downland scarp, for example, could be important.
- Uninterrupted semi-natural vegetation across coastal zones.
- Diverse water regimes and a diversity of wetland conditions. These could be most valuable where open waters and wetlands are fed by combinations of surface drainage, ground water and aquifers.

Sussex Wildlife Trust Role

Carry out vegetation management to give more varied vegetation structure. This can be done in a variety of ways but will include:

- Low intensity or naturalistic grazing and browsing regimes.
- Rotational vegetation cutting, with a variety of patch sizes and a variety of time intervals.

Carry out management to create a diversity of water regimes. This could include:

- Careful regulation of extraction and water flow, possibly with increasing water storage in and between sites, to create a diversity of conditions.
- Re-naturalisation of river catchments to encourage natural processes to create the diversity of conditions.
- Restore and create transitional habitats (such as scrub between grassland and woodland or fen/marshland between water and dry land) to increase variability of habitats and micro-climates.
- Seek opportunities to achieve the above in conjunction with other land managers to increase variation in the landscape.
- Seek opportunities to explain and interpret the value of varied vegetation structures to the wider public.



Amberly Wildbrooks Gerry Gavgan

Make space for the natural development of rivers and coasts

Rivers, streams, gills and seas in Sussex have an important influence on wildlife through the processes of erosion and deposition. Halting erosion and deposition, stabilising rivers and coasts, canalising rivers and other artificial modifications of river courses reduces biodiversity and makes rivers and coast more vulnerable to sea level rise and flooding, both of which are more likely with climate change. The vast majority of the river courses and coastal zones in Sussex have been heavily modified making habitats and human settlement more vulnerable to change.

Making space for natural processes (flooding in the flood plain, natural meandering of rivers, erosion and deposition on coasts and along rivers etc) to take their course will be difficult as it will impact on other land uses. Nevertheless, opportunities should be sought. The role of re-naturalised coastal zones and flood plains in flood alleviation should help drive these changes.

Sussex Wildlife Trust Role

- Seek opportunities to influence plans and strategies to encourage the natural development of coasts and rivers, such as River Basin Management Plans, the Sussex Biodiversity Action Plan, shoreline and coastal zone management plans, flood risk management plans and protected area management plans (for Areas of Outstanding Natural Beauty and National Parks).
- Encourage plans that retain or restore natural river profiles and floodplains, including the variety of their associated habitats, allowing erosion, deposition and natural flooding thereby increasing the potential for maintaining biodiversity while alleviating the risk of flooding. This could be achieved through the Trusts landscape projects, especially the Sussex Otters and Rivers Partnership project.
- Encourage the realignment or natural change of coastal defences to restore coastal habitats and transition zones between coastal and terrestrial habitats, so enhancing biodiversity while delivering more sustainable long term coastal defence.
- Campaign against plans for built development in or near flood plains and coastal areas that could compromise options for natural management of river systems, including wetland restoration on the floodplain.

4 Establish ecological networks through habitat protection, restoration and creation



barbastelle bat Frank Greenaway

Creating ecological networks to improve connectivity between habitat patches and allow species dispersal will enhance the resilience of the landscape and increase the probability of species surviving.

Sussex is fortunate in that it is not as fragmented as many lowland landscapes; there is more of a network to build on than in some places. Nevertheless, habitat isolation remains a problem for long term species survival; many habitat patches remain isolated through intensive intervening land use, development and infrastructure such as roads. Ecological networks should be established and strengthened by programmes of habitat restoration and creation to provide opportunities for dispersal across landscapes and between regions in response to climate change.

Effective links between habitat patches will enable a landscape to act more as one large unit from a wildlife perspective. Large units have a greater chance of containing more habitat variety within them, a greater ability to support viable populations of species and allow a greater ability for wildlife to spread throughout the landscape. The effective linking of core areas will be through activities such as habitat restoration and re-creation targeted to where there are concentrations of existing habitats. A network may therefore be created through a mixture of expansions and buffering around existing habitat patches, through the creation of stepping stones and broad corridors between sites and by a general improvement to the environmental quality of the wider landscape.

Critical to the development and value of ecological networks is, however, the conservation of existing areas of high quality wildlife habitat (principle 1). These will form core areas that will populate the rest of the network once connections are improved. Other types of activity are also required. Firstly to restore existing habitats that have become degraded through inappropriate management or neglect, and secondly to create new habitat, targeting it where there are greatest concentrations of existing semi-natural habitats.

An ecological network, however, is not a network of hard lines on maps, but broad areas where biodiversity objectives might best be achieved. It is a map of opportunity, not constraint, of concentrations of wildlife sites connected by linkages and buffer strips set in a broad Sussex landscape that is all more amenable to wildlife, nature and natural processes. Whilst a map is a useful guide, an ecological network is better considered as a broad principle that can be applied at any scale.

Habitat restoration and the creation of new habitats are both more resource intensive than conserving existing areas. Furthermore the opportunities for restoration and recreation (in terms of land use, land ownership and environmental characteristics) may be fairly limited. Nevertheless, Sussex, being less fragmented than some places, has more 'sub-optimal' habitat that could be enhanced. We also know



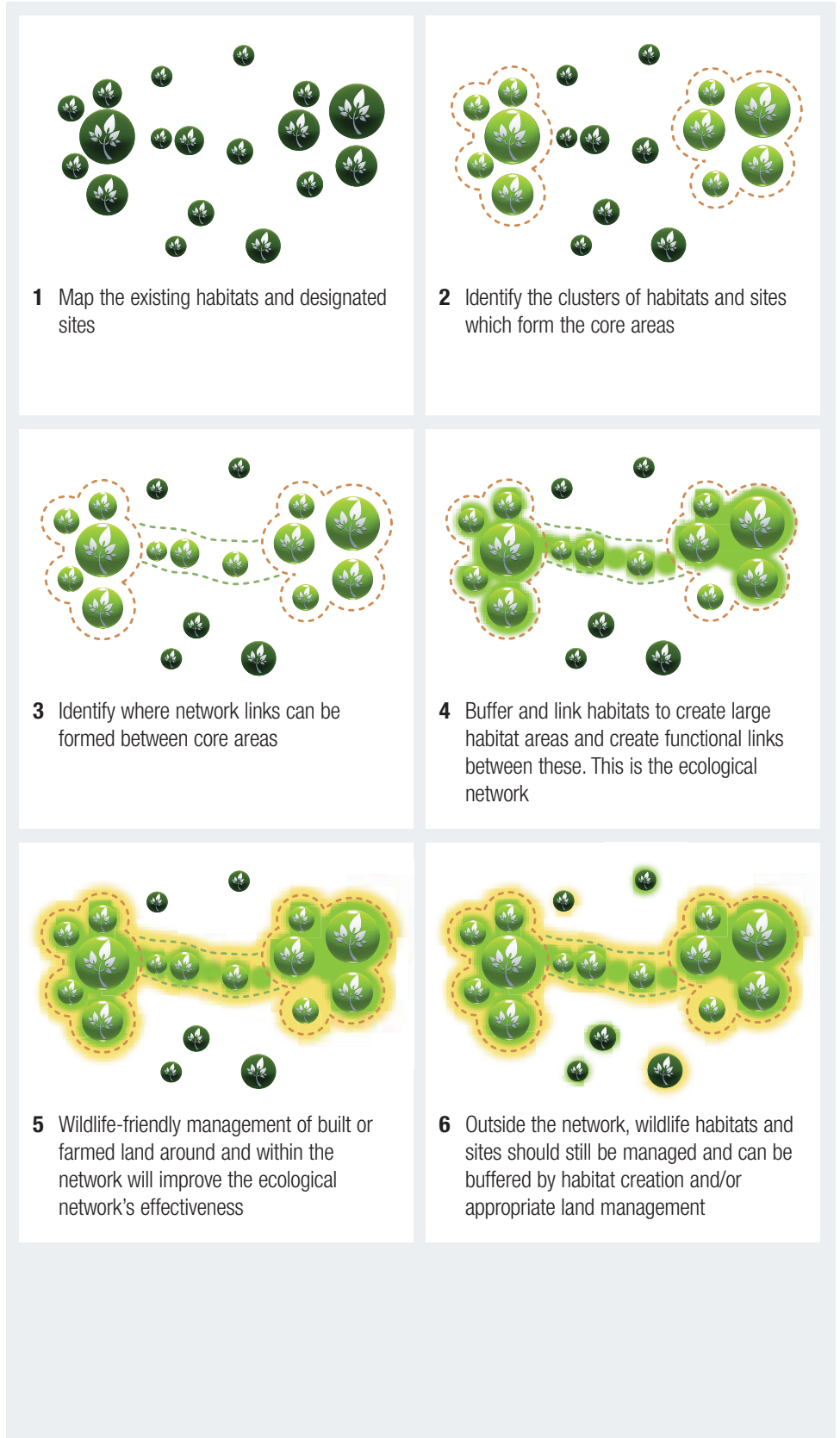
fly agaric Mark Monk-Terry

of landowners who may wish to contribute to an ecological network approach. Whilst opportunities may still be limited, a long term strategy for an ecological network is an important part of a climate change strategy and part of the reason behind current initiatives by the South East Wildlife Trusts who published *A Living Landscape for the South East* and the Sussex Wildlife Trust document to be published later this year *A Living Landscape for Sussex*.

It is, however, important to note that ecological networks can only enhance dispersal of some species; their development might reduce but not prevent biodiversity loss due to climate change.

Sussex Wildlife Trust Role

- Produce a strategic document *A Living Landscape for Sussex* to promote an ecological network for Sussex.
- Promote the concept of ecological networks in the Sussex Biodiversity Action Plan.
- Lobby for the development and implementation of an ecological network approach in regional plans (such as the South East Plan), county and district strategies, local development frameworks, protected area management plans (for Areas of Outstanding Natural Beauty and National Parks), regional and sub-regional investment frameworks etc.
- Utilise the ecological network approach to assist with targeting of incentive schemes such as Environmental Stewardship and the Forestry Grant schemes.



5 Make sound decisions based on analysis

There is always more that can be learned about biodiversity and the way it might change with changing conditions. However, Britain probably has information systems that are as good as any in the world and Sussex has one of the best Biodiversity Record Centres in the country. Lack of information should not be an excuse for inaction. However, it is vital that research, survey and monitoring continues and that the results inform biodiversity conservation.

Thoroughly analyse causes of change

Identifying and responding appropriately to declines of species caused by climate change is an important challenge to nature conservation. However, it is important that biodiversity loss is not seen as an unavoidable consequence of climate change. In many cases other factors, alone or in combination, will be more important causes of habitat degradation and species decline.

Sussex Wildlife Trust Role

- Ensure reasons for change or decline in species and habitats are understood before assuming all change is due to climate change.
- Accept inevitable change in the distribution of species (even if this means loss from Sussex) when considering our management of nature reserves, the advice we give to others and the interpretation we provide to the wider public. For instance accept local decreases in a species if there is clear evidence of increases elsewhere in its range.
- Utilise existing, and establish new, long term monitoring schemes for species and habitats to follow the effects of climate change and provide information for management.
- Consider interventions to address declines in species. This may be appropriate and practicable only in certain situations. Translocations of keystone species may be one approach, though UK Joint Nature Conservation Committee (UK JNCC) guidance should be followed.



water vole monitoring

Respond to changing conservation priorities

Nature conservation has traditionally prioritised the conservation of rare and threatened species and habitats. This has served nature conservation well and we now have a good system of site and species protection. Under a changing climate however, the range and abundance of many species will change.

For some species and habitats our current conservation measures may become redundant if climate change means they become more abundant. A warming climate may mean that species of a southern distribution could move northwards. Conversely, some currently common species may decline because of climate change so difficult decisions will have to be made about how much conservation effort should be put into species whose eventual loss from Sussex may be inevitable. As a result of these changes there will need to be reviews of conservation priorities in, for example, biodiversity action plans.

It is also possible that European species will colonise Britain whilst they could decline in mainland Europe. Britain may then become of international importance for these species and this again might affect UK conservation target setting.

Nevertheless climate change, especially on a small scale, could be highly unpredictable and the effects of climate change on any one area might be very variable. This variety and unpredictability may have a greater effect on biodiversity than a general trend of warming.



red-veined darter Premaphotos/naturedpl.com

Sussex Wildlife Trust Role

Work with the Sussex Biodiversity partnership to adapt biodiversity targets in species and habitat action plans. This will include:

- Reduction of conservation effort on species becoming more common with climate change.
- A review of conservation effort for previously common species that become on the edge of their ranges as a result of climate change.
- Increase in conservation effort for species which, though possibly common in Britain, have become rare elsewhere as a result of climate change.
- Greater conservation priority given to reducing habitat fragmentation.

6 Integrate adaptation and mitigation measures into conservation management, planning and practice



coppiced hazel wood Adrian Davies/naturepl.com

Conservation management on individual sites has generally involved the identification of targets for habitats and species, then the application of protection and management approaches to effect their achievement. In the light of changing conditions, however, there is now a need to move from management largely focused on selected species and habitats towards an emphasis on the underlying physical and ecological processes that are essential to the maintenance of biodiversity on a site. These include:

- Water regimes, as droughts and unpredictable extreme events (such as flooding) may become more common.
- Fire control and management as habitats, some of which may not have been vulnerable in the past, become more prone to fire.
- Livestock management and cutting regimes as changes in growing seasons may change the availability

of fodder, may alter the type of grazing animal likely to be successful and may alter the timing of cutting regimes in order to deliver a biodiversity affect.

- Erosion and deposition of sediments from increased flooding in rivers and sea level rise on the coast.
- Increased control of alien species that may become invasive at an early stage in their establishment or spread.

In some cases these factors might be under the control of one land owner or manager – such as grazing and cutting regimes. Others, such as water management and control of alien species will need an integrated approach across several ownerships or applied at landscape or regional scale.

Carbon dioxide mitigation measures may become more of a feature of land use practices in the future. This is more likely to be applied in preventing carbon loss than to carbon sequestration. Most

of the terrestrial carbon in the UK is in the soil and measures to reduce modification of soils should be incorporated into management approaches. This may be more appropriate to the peat soils of the uplands than to Sussex; however, carbon storage in less disturbed soils in ancient woodland, long established grassland and wet heathland are still likely to be important considerations to land management.

Carbon dioxide mitigation in woodland management is more likely to be achieved through resource substitution rather than sequestration *A Strategy for England's Trees, Woods and Forests*. (Defra, 2007). This means that instead of growing trees for carbon storage, woodlands are grown and managed to provide resources, such as wood fuel, that substitute for more carbon intensive energy sources such as fossil fuel.

Sussex Wildlife Trust Role

- Re-focus management of important wildlife sites (including our own nature reserves and other sites via the advice we give to others) to give higher consideration of underlying physical and ecological processes, with less emphasis on species and habitat targets.
- Emphasise habitat size, quality and inter-connectivity alongside the conservation of existing habitat patches (without de-valuing the importance of remaining high quality sites) in the advice to and influence of other organisations and people.
- Support and promote environmentally beneficial resource substitution approaches, for instance the use of wood fuel as an alternative to fossil fuels. This should only be done if there are appropriate checks and balances in place so that wood fuel is provided as a result of management approaches in appropriate woodlands sites that deliver biodiversity gain.

Conclusions

There is a high degree of certainty in the scientific community that climate change is happening and that its cause is human activity. The nature, scale and direction of climate change is however, unpredictable at a Sussex scale. It is also likely that there will be increasing variability in local and seasonal weather patterns with possible large swings in conditions. Nevertheless, uncertainty about how climate change will unfold or how habitats and species will change must not prevent us from taking action.

A strategy for biodiversity conservation in the light of climate change is therefore needed that presents the best course of action to conserve nature against an unknown and unpredictable future. This means that we need to develop an environment that is robust to change, whatever change that might be.

Future biodiversity can only adapt and evolve from the biodiversity that survives today so the importance of conserving current high quality sites cannot be overemphasised.

Maintaining a diversity of semi-natural habitats, increasing the area and connectedness of semi-natural habitats, addressing the impacts of unsympathetic land uses and allowing natural processes to shape the ecology and structure of whole landscapes will create the best chance for biodiversity.

Furthermore this is an effective conservation strategy even if there was no climate change or if it was not caused by human activity. This strategy aims to deliver an adaptable, robust environment, an important approach independently of climate change.

Providing the best chance for biodiversity, as well as being a worthwhile objective in its own right, will also provide the best chance of maintaining a high quality environment that continues to provide the ecosystem services (such as



dormouse Colin Varrdell

flood amelioration, climate regulation, nutrient cycling and water purification) on which we all depend.

The Sussex Wildlife Trust will promote this strategy in all that it does, including guiding management and acquisition of nature reserves, informing our campaign work, the way we influence people and the way we communicate the importance of a healthy wildlife rich environment through education and to the wider public.

An important element of this strategy is the development of an ecological network for Sussex. This concept will be presented in the document *A Living Landscape for Sussex*, due to be published in 2008.

However, even the most effective biodiversity strategy will be overwhelmed if we do not take other action to address the causes of climate change: our continually growing emissions of greenhouse gases.

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Ecosystem assessment, climate change and the value of biodiversity

Tony Whitbread, November 2009

The value of biodiversity stems at least in part from the point that biodiversity is the main component of ecosystems and hence fundamental to the provision of ecosystem services. An ecosystem is defined as a system formed by the interaction of a community of organisms (biodiversity) with their physical environment, i.e. the interaction of biodiversity and its non-living environment. So, assess the value of ecosystems and this helps understand the value of biodiversity.

The UN Millennium Ecosystem Assessment,

This was published in 2005 and has been helpful in providing a structure for describing and valuing ecosystem services, and so in valuing biodiversity. It was a large and ambitious international project supported by over 1000 scientists' world wide.

Ecosystem services are defined as: The benefits that a healthy natural environment provides for people, either directly or indirectly. These range from the essentials for life, including clean air and water, food and fuel, to things that improve quality of life and wellbeing, such as recreation and beautiful landscapes. They also include natural processes, such as climate and flood regulation. Ecosystem services are divided into four categories:

- **provisioning services** – the products obtained from ecosystems, including fresh water, food, fibre (e.g. timber, cotton, wood fuel), genetic resources, biochemical products, natural medicines and pharmaceuticals
- **regulating services** – the benefits obtained from the regulation of natural processes, including air quality regulation, climate regulation, water/flood regulation, erosion regulation, water purification, disease and pest control, pollination, buffering pollution
- **cultural services** – the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic enjoyment
- **supporting services** – the services that are necessary for the production of all other ecosystem services, including soil formation, photosynthesis, primary production, nutrient cycling and water cycling.

It follows, therefore, that biodiversity provides the building blocks of ecosystems and ecosystems are fundamental in delivering the services on which we all depend.

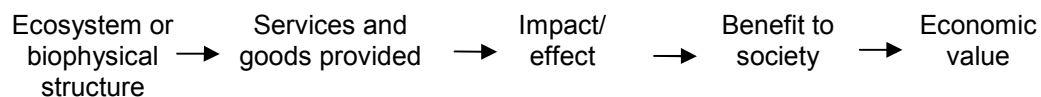
DEFRA's Ecosystem Approach.

DEFRA are in the forefront in developing a practical approach for ecosystem assessment which should help guide policy development. Their ecosystem approach is described as "integrating and managing the range of demands placed on the natural environment in such a way that it can indefinitely support essential services and provide benefits for all". More broadly, this seems to be a pretty good definition of environmental sustainability.

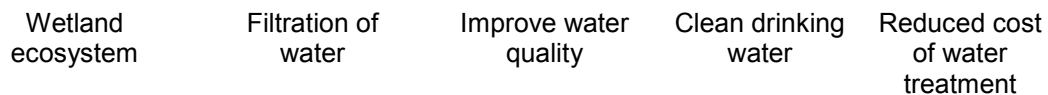
DEFRA has linked ecosystem services to human well-being in the following diagram:

Ecosystem services		Constituents of well-being	
<p>supporting services: soil formation, photosynthesis, primary production, nutrient cycling and water cycling</p>	<p>provisioning services: - fresh water, - food, fibre (e.g. timber, cotton, wood fuel), - genetic resources, biochemicals, - natural medicines pharmaceuticals</p> <p>regulating services: - Air quality regulation, climate regulation, water/flood regulation, - erosion regulation, - water purification, disease and pest control, - pollination, - buffering pollution</p> <p>cultural services: - spiritual enrichment, - cognitive development, - reflection, recreation - aesthetic enjoyment</p>	<p>Security: - personal safety - secure resource access - security from disasters</p> <p>Basic material for good life - adequate livelihoods - sufficient nutritious food - shelter - access to goods</p> <p>Health - strength - feeling well - access to clean air and water</p> <p>Good social relations - social cohesion - mutual respect - ability to help others</p>	<p>Freedom of choice and action: opportunity to be able to achieve what an individual values doing and being</p>

DEFRA’s pathway for valuing ecosystem services is along the flowing lines (summarised from various DEFRA sources):



An example might be:



Biodiversity and ecosystem functioning.

There is an assumption linking the richness of biodiversity to ecosystems, and this is that a healthy, well-functioning ecosystem is formed of and indicated by a rich biodiversity. In other words biodiverse ecosystems “work” better than poor ones. This is probably a reasonable assumption for various reasons. As Darwin noted, an ecosystem made up of a large number of characteristic, specialist organisms will utilise that ecosystem more efficiently than a poor mixture. As a result the presence of uncommon or special species will indicate that an ecosystem is functioning well. (For example if a wetland is good enough to have otters in it then it is probably

providing drinking water, flood amelioration and pollution buffering in the most effective way).

Ecosystem services and Living Landscape

In order to be of practical value in valuing ecosystem services, it will be necessary for ecosystem services to be analysed at various scales of organisation. Some ecosystem function might be delivered at the scale of a micro-habitat (for example a small river tributary), others may be at habitat level (such as a reedbed or fen), or delivered at an ecosystem level (a wetland system), some may be delivered at a landscape scale (such as a whole river catchment) and still others may provide a function at the level of a matrix or ecological network. However, whilst all scales should be considered, it is likely that practical assessment of ecosystem services will be most helpful at the scale of ecosystem or landscape units.

In The Wildlife Trusts we have now developed our own landscape scale approach to nature conservation, entitled Living Landscape. This is a major initiative supported by Wildlife Trusts throughout the country and with over 100 separate active projects. Each project is at the scale of a landscape unit and they provide valuable case studies where particular landscape units can be examined in order to assess the services that the constituent ecosystems provide. This is a strategic approach in which we wish to achieve the following:

- Protection, enhancement and enlargement of places that are already rich in biodiversity. These high-quality locations will include SACs, SSSIs and Wildlife Sites.
- Build connectivity between these high quality sites to allow species to move and natural processes to function at a landscape scale.
- The more general improvement of low quality areas (such as the urban environment and areas of intensive agriculture) so that species are able to move more generally throughout the environment.

Pitfalls with an economic valuing approach.

Ascribing an economic value to biodiversity does, however, have problems.

Placing a financial value on an ecosystem service may imply a “market” – the ability to trade or pay for the loss, or gain, of a service. In fact these services are essential, generally held in common and non-tradable. In some ways this will make them incompatible with normal approaches to economic valuation. Nevertheless, such services could be said to have a value in that if we had to deliver them artificially it would cost something. This clearly also has limits as it would be inconceivable to work out the cost of pollinating every plant or producing every oxygen molecule.

Valuation of services is also vulnerable to the idea of tipping points and lag times. A service may be assigned a low value, or even missed altogether, because it is considered ubiquitous. As that service becomes increasingly constrained its value may increase. By then, however, the service may have passed a tipping point and the cost (or even the possibility) of regaining that value could be disproportionately greater than the cost of retaining it in the first place. A good analogy for this is climate change and greenhouse gasses. Greenhouse gasses cause climate regulation to go beyond a tipping point. Originally climate regulation was considered an externality and not valued, as we reach a tipping point the cost of retaining it

hugely increases and as we go past it the cost of losing that function will be beyond value.

An understanding of the significance, and perhaps even the existence of a service, may be vulnerable to a non-linear reduction of the service as ecosystems become degraded. This may mean that a potential ecosystem service is not assessed because the degradation of an ecosystem has pushed it past the point where a service might be considered significant (for example a drained wetland system may have resulted in a river being so disconnected from its flood plain that any recharging of the aquifer has become insignificant). The logic works the other way around as ecosystems are restored. As the functioning of an ecosystem improves then unpredictable services might emerge – often called emergent properties by ecologists. Such services would almost inevitably be missed as most of the ecosystems today are already degraded.

Ecosystem services in relation to climate change.

Adaptation of biodiversity to climate change is often considered from the perspective of maintaining species and habitats in a changing environment. This is important in its own right but environmental adaptability should also be considered against the back-cloth of maintaining a healthy, functioning environment in order to continue to deliver vital ecosystem services. Thus ensuring adaptability for wildlife is central to ensuring environmental adaptability to underpin ecosystem services.

Summary:

- Ecosystems are the system of interaction between communities of plants and animals (biodiversity) and the non-living world. Ecosystems provide services on which we all depend.
- Ecosystem services have been well defined by the Millennium Ecosystem Assessment, an approach that is being taken forward in the UK by DEFRA.
- Biodiverse ecosystems probably function better and so provide ecosystem services better, than poor ones.
- The Wildlife Trusts Living Landscape projects could provide helpful case studies where ecosystem services can be examined at a practical level.
- Using the Millennium Ecosystem Assessment approach, it may be possible to assign an economic value to ecosystem services. This may involve approximations and assumptions, and will probably be a severe underestimate of their true economic value. It could, however, be good enough to guide policy.
- Encouraging adaptation of biodiversity to climate change is central to delivering continued ecosystem function and so the provision of future ecosystem services.

Useful web links:

<http://www.ecosystemservices.org.uk/index.htm>

<http://www.biodiversityeconomics.org/index.html> - This gives useful references on valuing biodiversity and ecosystem services listed under a section labelled “basics”

<http://ec.europa.eu/environment/nature/biodiversity/economics/> - This has a section on a major international project called “The Economics of Ecosystems and Biodiversity (TEEB)

<http://www.defra.gov.uk/wildlife-countryside/natural-environ/eco-actionplan.htm> - This is where DEFRA’s ecosystem documents can be found.

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