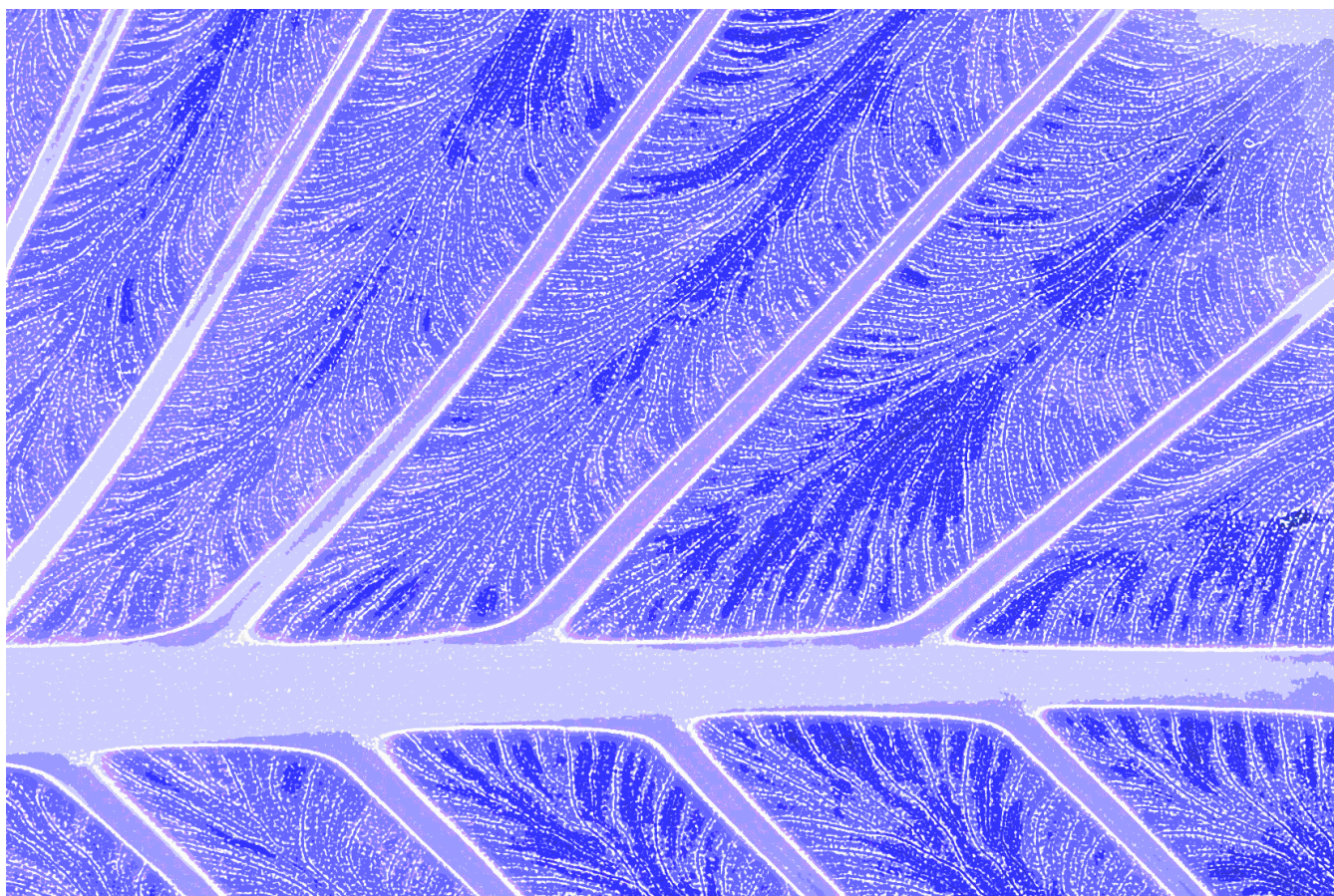# The Parrett Catchment: A case study to develop tools and methodologies to deliver an Ecosystems Approach – Overview Report

(Catchment Futures)

catchment futures

The University of Nottingham

CEM Report | No 5

CEM
Centre for Environmental Management

The Parrett Catchment:

A case study to develop tools and methodologies to deliver an Ecosystems Approach

(Catchment Futures)

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CEM Report | No 5

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Executive summary

Background and Aims

'Thinking globally but acting locally' is often proposed as a way of helping achieve sustainable development. The problem with applying the principle is how to resolve sustainability issues within/between these very different scales. This report considers two important ideas currently being discussed that might help. These are the Ecosystem Approach, promoted under the Convention for Biological Diversity, and the importance that ecosystem services have for the well-being of people. We have considered what contribution these concepts might have to the management of natural resources in the Parrett Catchment.

The Parrett is a highly distinctive and valued cultural landscape located in Somerset, South West England. The area has numerous international, national and local land use designations, which include Areas of Outstanding Natural Beauty (AONB), Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPAs) and Ramsar sites. It also includes portions of Exmoor National Park. Despite its highly valued status, however, there are a number of challenges to people's well-being. These include: issues of environmental security arising from the flood risk and associated development pressures; threats to biodiversity; an economically vulnerable land economy; unstable employment patterns; and, high social deprivation in a number of places. Although the problems in the Parrett are interesting in their own right, the Catchment is also a valuable case to consider because it has a tradition of partnership-working in relation to the problem of flood risk management, in the form initially through the Parrett Catchment Project, and latterly the Water Management Group. In our discussions with stakeholders in the area we have sought to understand how these relate to wider planning initiatives, such as those involving the development of county and district-wide Sustainable Community Strategies and County-level Local Area Agreements. In particular, we have sought to understand in general terms how all these local strategies and actions reflect the principles underpinning Defra's Ecosystems Approach or whether they could be strengthened by including them more explicitly.

The specific aims of this study were therefore to:

▪ Use archive materials and stakeholder experience to review existing planning and land management tools and approaches, and to assess their strengths and limits in terms of reflecting the state and trends of ecosystem goods and services at the catchment scale;

▪ Consider the ways in which current planning approaches might be modified to accommodate the needs of an Ecosystems Approach, and to provide technical advice on its application at a range of spatial scales in the context of current planning frameworks;

▪ Identify what barriers exist for taking an Ecosystems Approach forward in terms of knowledge gaps or data deficiencies, and to make recommendations on how they can be overcome; and,

▪ Make recommendations on how best to provide advice and guidance on the implementation of an Ecosystems Approach.

Decision making in the Parrett Catchment

The Ecosystem Approach as identified by the Convention for Biological Diversity includes a number of ideas. Key amongst them are that policies and management of natural resources should be based on inclusive styles of decision making, and should be framed at appropriate geographical and temporal scales. The approach also asserts that decision making should take proper account of the value of ecosystem services and the environment more generally, and that the implications of decisions should be considered in a cross-sectoral or 'joined-up way'. We have used these ideas to explore

the extent to which current decision or policy making in the catchment conforms to these criteria, what barriers exist that might frustrate the approach, and what might be done to ensure that in the future such principles are followed more closely. We found that:

- Community involvement is considered important to the development of integrated and sustainable approaches to planning in the Catchment, but that a considerable investment of resources may be needed for transforming public understandings and interest of issues related to the environment, particularly in the area of ecosystem services and their relationship to human well-being.

- Although the 'catchment scale' is an appropriate one for developing integrated approaches to natural resource management, it remains unclear as to the extent to which catchments are meaningful to wider stakeholders groups. Systems aiming to provide access to evidence may need to accommodate the different spatial perspectives of different groups.

- Decision makers in the Catchment used a wide range of frameworks for sustainability assessment, but the integrated nature of these is by no means assured.

- Access to information about the environment in forms that were 'meaningful' and 'useful' to stakeholders was problematic.

- Stakeholders agreed that decisions and funding streams geared to administrative areas do not tend to match up very well with how natural resources and land actually function at the level of the catchment. Political imperatives were also seen to be out of step with the long term nature of building more sustainable approaches to catchment planning.

As a result it is difficult to fully embed the principles of an Ecosystems Approach in current decision making, although some progress can be made.

The literature contains a number of variations in terminology designed to emphasise different aspects of the approach: the term 'the Ecosystem Approach' originates from the Convention on Biological Diversity (CBD) and emphasises the higher-level or more strategic issues surrounding decision making. Defra, in a recent publications (e.g. Defra, 2007), refer to 'an Ecosystems Approach', using the plural to emphasise that no prescriptive methodology is implied.

Overcoming the Barriers

Although it may not be easy to introduce an Ecosystems Approach into local decision making, there is evidence from the Parrett Catchment that there is a good basis for taking such thinking forward. In order to overcome the barriers to using an Ecosystems Approach more widely we have recommend that:

- If principles of an Ecosystems Approach are to be made more accessible, locally relevant and user-friendly, and implicit in what people do, then the key concepts should be introduced into new or revised guidance for: Local Strategic Partnerships; Sustainable Community Strategies; Local Area Agreements; Catchment Flood Management Plans; Agri-environment scheme (objectives) and targeting plans; and Local Development Plan Documents, e.g. Core Strategy and Local Development Frameworks.

- Measures to build capacity in communities of interest and communities of place are considered.

- Steps are taken by Defra and CLG to find and promote examples to illustrate the issues and potentials for application of an Ecosystems Approach covering a range of different problems and places.

- Encouragement should be given to developing locally agreed maps of ecosystem service supply and demand as a way of illustrating the geography of issues, potentials and opportunities, and that these maps and related case studies could be made accessible via the CLG planning and community portals as well as Defra's own web site, but more particularly via the Regional Observatories.

- That in addition to providing information on current state and trends of ecosystem services, platforms such as the Regional Observatories also be

encouraged to bring together the results of scenario studies for the area they cover, as a way of informing and supporting the development of community visions and understandings.

- That ways should be found for incorporating questions about ecosystem goods and services into Sustainability Appraisal so that it becomes possible to directly link these to socio-economic prosperity and environmental well-being goals for more integrated, joined-up solutions.

Acknowledgements

Part 1: Introduction

Background

'Thinking globally but acting locally' is often proposed as a way of helping ensure that sustainable forms of development are achieved. The problem with applying the principle is how to resolve these very different scales. This report considers two important ideas currently being discussed in the research and policy literatures that may help people bridge this gap.

The first idea is the 'Ecosystem Approach'. This is an evolving framework of ideas, designed to help decision makers take full account of ecological systems and their associated biodiversity[1]. It has been widely recommended, both internationally and within the UK, as a way in which the overall health or integrity of ecosystems can be assessed and managed sustainably in the context of Society's needs and choices, by emphasising a holistic and adaptive approach to management and policy. The second is the concept of 'ecosystem services'[2]. This is an idea which is being widely discussed at present as a way of emphasising the benefits that ecological systems can provide for the well-being[3] of people. It stresses the importance that systems based on biological diversity have for maintaining human existence and the quality of people's lives. By focussing attention on environmental systems as a source of well-being and the ways decisions and actions impact upon them, the aim of both concepts is to encourage people to see that it is in their own interest to manage natural resources sustainably *at all spatial scales*.

The importance of an Ecosystems Approach (EsA), and ideas about ecosystem services, have already been acknowledged by Defra under its Natural Resource Protection Programme who have used them a starting point for their current work to develop a 'new vision' for natural resource management in England (Defra, 2007). In particular this project builds on the outcomes of Phase I of Defra's Natural Resource Protection Research Programme (NRPRP)[4], which suggested that there was a clear need to better understand how ideas about ecosystem values and limits can be applied, and that this could best be done by developing a series of more detailed case studies. This study is therefore one of a number of parallel projects funded

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[1] It should be noted that the literature contains a number of variations in terminology designed to emphasise different aspects of the idea. Reference is often made to an 'ecosystem-based approach', a term used mainly to promote holistic thinking in the design of specific management strategies for natural resource systems. More commonly the term 'Ecosystem Approach' is employed. The latter originates from the Convention on Biological Diversity (CBD) and emphasises the higher-level or more strategic issues surrounding decision making. Defra, in a recent publications (e.g. Defra, 2007), refer to an 'Ecosystem*s* Approach', using the plural to emphasise that no prescriptive methodology is implied. In this report we employ the terminology used by Defra – but see no substantive difference in the way the two ideas are conceptualised. In this report we also avoid abbreviating the term 'Ecosystems Approach' as 'EA' because it can be confused with the abbreviation for the Environment Agency; the IUCN CEM suggests using EsA as an alternative (written communication, 2007).

[2] Ecosystem services are defined by the MA (2005) as "The benefits people obtain from ecosystems. These include *provisioning services* such as food and water; *regulating services* such as flood and disease control; *cultural services* such as spiritual, recreational, and cultural benefits; and *supporting services* such as nutrient cycling that maintain the conditions for life on Earth." Note that for convenience the term 'ecosystem services' is often used in this report to denote the longer 'ecosystem goods and services'. Ecosystem services are conceptually considered to include the output of goods.

[3] Human well-being is defined by the MA (2005) as "A context- and situation-dependent state, comprising basic material for a good life, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience."

[4] http://www.defra.gov.uk/wildlife-countryside/natres/index.htm

under Phase II of NRPRP designed to assist Defra in identifying some of the evidence needed to carry thinking forward about this approach into enhanced policy-making and delivery. The outcomes of this work will be used to evaluate opportunities and obstacles associated with introducing the EsA for England's terrestrial ecosystems, given the current policy and regulatory framework and therefore help to shape Defra's future research programme on Natural Resource Protection, which aims to explore more fully how an Ecosystems Approach can add a new dimension to decision making – not just within Defra but across Government as a whole and other sectors of society.

Project aims and objectives

The aim of this study is to make a critical examination of how an Ecosystems Approach can be applied at local and regional scales and what new insights and opportunities it provides for linking priorities for natural resource protection into wider sustainability assessments.

In order to realise the aims of the study, the following more specific objectives were agreed. These map on to the specification set out in the Invitation to Tender (ITT) as follows:

1. to use archive materials and stakeholder experience to review existing planning and land management tools and approaches, and to assess their strengths and limits in terms of reflecting the state and trends of ecosystem goods and services at the catchment scale (ITT, §14a);

2. to consider the ways in which current planning approaches might be modified to accommodate the needs of an EsA, and to provide technical advice on its application at a range of spatial scales in the context of current planning frameworks (ITT, §14b & d);

3. to identify what barriers exist for taking an EsA forward in terms of knowledge gaps or data deficiencies, and to make recommendations on how they can be overcome (ITT, §14c i); and

4. to make recommendations on how best to provide advice and guidance on the implementation of an EsA (ITT, §14c ii, iii and iv).

Project context: the Parrett Catchment as a case study

The focus for this work is the Parrett Catchment in Somerset, south west England. This is a large, well-defined natural resource unit, encompassing a number of local authority, government agency and local area partnerships. It is a highly valued and diverse cultural landscape of which large tracts are nationally designated in terms of their biodiversity, amenity and historic value. In policy terms, the area has been widely praised for its pro-active engagement with natural resource planning. Stakeholders in the catchment have, for instance, recently developed a collective 'vision' for sustainability, one underpinned by a 50 year integrated sustainable management strategy and series of ten year action plans "to benefit the social, economic and cultural life of the catchment whilst conserving and enhancing the environment". Thus, one of the reasons underpinning our choice of case study was that **existing decision making processes in the Parrett Catchment may offer us insight into current best practice with regards to embedding elements of an Ecosystems Approach at the local scale**. At the same time, the opportunity to conduct this research took place a number of new, but as yet undeveloped, partnerships for action were emerging. As a result, **the project team also considered the study area a potentially receptive policy culture in which to explore further the development and application of principles at the heart of an Ecosystems Approach**. Finally, the Parrett Catchment is inherently interesting in the context of natural resource management for this is an area where there remains widespread local acknowledgement that a range of interrelated issues affecting land use and quality of life need resolving, not least those relating to land economy, flood risk and development. In consequence, the development of strategies for the

management of the Parrett Catchment suggests that a range of multifunctional values and cumulative impacts ultimately need to be reflected in decision making and that **core ideas of an Ecosystems Approach could, *in principle*, foster more sustainable outcome for the area.** Thus, the Parrett Catchment was not only a generic object of study in which to test general approaches and develop guidelines for best practice, but also a natural resource unit that may benefit readily from the application of an EsA.

General theoretical framework employed

The overall concern of this study is to understand how the general principles of an Ecosystems Approach can be fostered at more local scales. It is therefore necessary from the outset to explain how the approach is being interpreted and deployed in the context of the Parrett, and in particular, how the study's specific concern with evaluating tools and methodologies fits into the overall framework of an EsA.

For Defra, a general 'Ecosystems Approach'[5] is represented by a series of core principles around which processes of decision making should ideally be structured; It is suggested that these principles should guide, rather than prescribe, the future character of natural resource management. In particular Defra's understanding of the approach involves:

- taking an holistic approach to policy-making and delivery, with the focus on maintaining healthy ecosystems and ecosystem services;
- ensuring that the value of ecosystem services is fully reflected in decision-making;
- ensuring environmental limits are respected in the context of sustainable development, taking into account ecosystem functioning;
- taking decisions at the appropriate spatial scale while recognising the cumulative impacts of decisions; and,
- promoting adaptive management of the natural environment to respond to changing pressures, including climate change.

This project began before the publication of Defra's vision, though the parameters of the approach adopted by this study are consistent with each of these principles. In particular, just as Defra's most recent statement of core principles are effectively a summation and distillation of the 12 principles embodied in the Ecosystem Approach of the Convention on Biological Diversity (CBD), this study follows earlier NRPRP work (Haines-Young and Potschin, 2008) which seeks to restate them around four key themes namely: inclusive decision making; proper accounting for the environment; appropriate geographical and temporal perspectives, and joined-up policies.

Based on these four themes the study argues that an EsA represents "inclusive, cross-sectoral decision making at appropriate spatial and temporal scales so that a proper account is taken of the value of environmental systems for the well-being of people". This logic forms the overall framework against which this project inspects tools and methodologies for embedding the EsA at the catchment scale. Thus:

Inclusive decision making emphasises the need to develop participatory tools and methodologies in the design of environmental policy and management strategies. *In this study we examine the Parrett Catchment as a potential model of best practice, and a context in which participatory techniques can be developed further.*

Proper accounting for the environment emphasises the need to evaluate existing tools and methodologies for monitoring and valuing the environment in a holistic and integrated way (such as 'Environmental Impact Assessment'(EIA), or Strategic Environmental Assessment, SEA), and to enhance these in the context of new approaches (such as identifying and monitoring 'ecosystem services'). *In this study we describe the assessment practices Parrett Catchment decision makers currently*

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[5] See note 1

employ, and solicit the views of catchment stakeholders regarding the value of these approaches for fostering integrated catchment management.

Furthermore, we examine the conditions under which new approaches to monitoring and assessment – ones based specifically on the idea of ecosystems services – can be employed in the Parrett Catchment, as the basis for understanding potential applications of this methodologies in similar natural resource contexts. Again, we solicit the views of catchment stakeholders regarding the potential of embedding this fresh way of looking at natural resources into existing structures of decision making.

Appropriate geographical and temporal perspectives emphasises the need to match processes of decision making to the scale of the problem or resource being managed. Here, an important area for the development of tools and methodologies is one that seeks to decouple decision-making from political time-frames such as the use of scenario building. *In this study we explore the value of 'scenario building' as a tool by which decision makers in the Parrett Catchment might make more informed choices about the future. It comes to a judgment about the potential of scenario techniques for embedding ecosystems thinking into decision making processes at the local level, and again, subjects this work to a process of evaluation among catchment stakeholders.*

Joined-up policies emphasises the cross-cutting nature of decision making and impacts. We suggest that if tools and methodologies are developed for the above three EsA items it may be possible to manage the natural resources in an integrated way, enhancing the integrity of ecological systems, and expanding the output of services and benefits associated with them. *In this study we therefore come to an overall conclusion regarding the capacity of new and existing tools and methodologies to embed ecosystem thinking into catchment level decision making and what must be done to take this work forward.*

General methodological framework employed

The project team employed a **mixed methodological** approach to pursue its research aim and objectives. In particular, alongside the review and evaluation of policy materials and data, the team has undertaken a **significant programme of direct stakeholder engagement** in the catchment. In this study we interpret the idea of stakeholder broadly: as any person or institution who may have an interest in, influence upon or right over the management of natural resources. Engaging with stakeholders was fundamental to the success of the project for it is through such discussions that we can:

- gain insight into the key challenges perceived to face the catchment both now and in the future;
- understand current approaches to management as the basis for identifying examples of good practice for embedding the EsA into catchment level decision making processes; and,
- elicit feedback on the potential uptake of new techniques and methods fostering further EsA at the catchment scale.

In the programme of stakeholder engagement we have made a distinction between three ideal groups who it considered to be central to eliciting reactions to, and assessment of, themes at the heart of an EsA and who could provide insight into aspects of the approach that were already embodied in catchment level decision making. These were:

- *Strategic decision makers* – defined as those who lead on the development and establishment of local visions and make fundamental decisions about, or affecting, natural resource use, e.g. senior local authority officers and local elected members.
- *Frontline deliverers* – defined as those responsible for translating policy and strategy into action. These stakeholders are often involved in an advisory capacity on groups helping to shape local visions but do not actually take

decisions about natural resource use, e.g. local authority, statutory agency and NGO officers.

- *Residents and community groups* – defined as those people living in the catchment, often involved in local voluntary groups and initiatives, bringing them into contact with frontline deliverers and strategic decision-makers, e.g. Women's Institute, other local voluntary interest group representatives and residents

It is worth noting that **this framework evolved through initial discussions with senior decision makers in Somerset County Council, and in this sense, may offer Defra a useful framework and terminology around which to articulate the nature of "inclusive" decision making.** Indeed, these three groups were chosen because they are generic ones, i.e. they are not only locally relevant but widely applicable across England and are thus directly relevant to Defra's Natural Environment Strategy and application of the Action Plan. We found this framework to be a sound one in terms of capturing a diversity of views within the study area. Table 1 summarises how the groups were constituted in the particular context of the Parrett study.

Overall the process of stakeholder engagement in this study has involved:

- An **on-line questionnaire** sent to 208 individuals in the start-up phase of the research and covering the three main stakeholder groups. This survey elicited general aspirations for the catchment and types of challenges it was perceived to face, alongside an assessment of current approaches to decision making. In total, 55 responses were returned giving an overall response rate of 26%. Respondents comprised a cross-section of public sector workers (38%) plus local authority officers, members, NGOs, small businesses and large corporations with just over 7% retired or unemployed. However, it is worth noting that only around 35% of respondents felt that their professional role has an impact on the future well-being of the catchment and its communities (See Full Technical Report for detailed results).

- **Presentations** to strategic and frontline decision makers in which the principle of an EsA was outlined and then discussed. These presentations were held in Spring 2007 and allowed the project team to begin the process of relating existing catchment decision making process to the 12 principles of the Ecosystem Approach as detailed in CBD, since these represent the framework upon which Defra's more general re-statement was built.

- **Focus groups** with residents to test understandings and valuations of the catchment, and challenges it faces; 30 individuals were contacted with the aim of generating two groups of 8-10 participants, one group for Wellington (5 recruited) and one for Langport (7 participants recruited). The events were held in the summer of 2007.

- **Semi-structured interviews** to obtain in-depth information, perceptions and views from a representative sample of members of the Water Management Partnership (WMP) and the Environmental Leaders Group (ELG), but also widened to gather views from planning officers (strategic and district level). These key informant interviews were designed to probe strategic and frontline stakeholders further on how adopting an EsA could help to resolve catchment challenges and achieve policy aspirations. Elected members interviewed for this study were each responsible for some aspect of environmental thinking as part of their formal role. As such they should be regarded as being alive to environmental issues and potentials for the study area, so readers should be aware that they are not necessarily representative of the majority of elected members in the catchment (See Appendix 4 of the Full Technical Report).

Table 1: Stakeholder groups in the Parrett Catchment

Strategic decision makers - *The Environment Leaders Sub-group*

The Somerset Strategic Partnership (SSP) recently established an Environment Leaders Sub-group (ELG), formed under the auspices of the County Council for supporting the SSP's efforts to embed the environment in the next iteration of the Somerset Local Area Agreement (LAA). Partnership working is therefore an important aspect of its work and it includes representatives from each of the statutory agencies, the voluntary sector, the Environment Portfolio Holder from Somerset County Council, representation from the District Councils, an Exmoor National Park elected representative, and a representative for the Government Office for the South West (GOSW) and the Regional Assembly. A small team of officer advisers from the County Council and District Councils, Exmoor National Park, GOSW and the South West regional Development Agency and Regional Assembly support the ELG in its work.

Frontline deliverers - *The Water Management Partnership*

The Water Management Partnership (WMP) replaced the former Parrett Catchment Partnership (PCC) with the goal to consider water matters of significance affecting, or with the potential to affect the communities, landscape, economy and ecology in the catchment areas of the Parrett, Brue and Axe and their tributaries. It began operating in late May 2007. The role and function of the WMP is to act as a cross-sectoral "community of interest" on water management issues within the designed catchment areas.

Resident and community groups – *Wellington and Langport 'citizens'*

Whist working directly with the WMP and ELG is a useful way of engaging with a diversity of policy visions and approaches, a rounded understanding of catchment issues and aspirations is not dependent on these groups alone. As a result the project used local community networks in two, quite different, areas of the catchment, with the aspiration of soliciting the views of a wider constituency of people. The first locality was Wellington, a small settlement in the upper catchment in a farmed area that contributes both sediment load and diffuse pollution. The second locality was Langport in the lower catchment where a considerable number of flooding events had occurred in recent decades, linked to intensive farming practices further up the catchment. Clearly membership of the Environment Leaders Sub-group or the Water Management Partnership does not preclude community membership and vice versa, and in fact, three of the participants who aligned themselves within this third grouping were also parish and district councillors. Again this is an issue that Defra may wish to consider participating individuals can clearly belong to more than one. In many respects **stakeholders with multiple interests may be key champions of the approach, but care must be taken to go reach beyond the most willing and vocal'.**

- An **on-line web-based consultation** in which strategic and frontline decision makers, as well as the wider policy and academic research community, interacted with the principle of ecosystem services as the basis for evaluating scenario-building methodologies at the catchment scale. Invitations were circulated to 74 stakeholders of whom 27 responded over four weeks in early 2008

Part 2: Decision making in the Parrett Catchment: insights for an Ecosystems Approach

Introduction

Set against the backdrop of the key well-being challenges in the study area, this chapter seeks to introduce the reader to current structures and approaches to decision making in the Parrett Catchment, and in particular, to make an assessment regarding how these structures and approaches relate to the core principles of an Ecosystems Approach. It draws upon policy materials and stakeholder views to come to a judgment regarding how these themes are reflected in current decision making. In doing so the analysis we present seeks to identify evidence of good practice in employing elements of an Ecosystems Approach at the catchment scale, and within this, to make an assessment of some of the practices that would need to be adopted to embed this approach into catchment level decision making. This work therefore provides a number of key conclusions for this project and provides the context to a more general commentary at the end of the report in which we examine how catchment decision makers viewed the key parameters of the approach itself.

There are numerous public sector authorities and agencies operating in the catchment, working closely with commercial and voluntary partners to implement national, regional and local policies for managing the area as sustainably as possible (Figure 1). The current policy framework and its related processes for delivering more sustainable outcomes within the study area are all in place, but key decision-making processes like the newly revised planning system and evolving Local Area Agreement (LAA) are still 'bedding down'. The creation of the new Environment Leaders Group (ELG) to begin working with the Somerset Strategic Partnership should start to make a very necessary contribution towards building the environment into the LAA. The ideal structures and ways of working set out by the Department of Communities and Local Government (CLG) and Improvement and Development Agency (I&DeA) are being put in place across Somerset but this is taking time. **Whilst in principle these structures and processes are easily capable of delivering local integrated solutions and more sustainable outcomes, because the environment and natural resources do not yet feature there is still some way to go.** These top-down 'prescribed' processes are complemented by local, bottom-up initiatives such as the Parrett catchment's forward looking 50yr strategy for integrated catchment management. However, the dissolution of the former Parrett Catchment Partnership and its replacement by the new Water Management Partnership has caused a hiatus in stakeholder engagement, possibly making it harder to ensure a 'meeting of minds' between the top-down statutory and bottom-up non-statutory goals for the catchment. However, this current disconnect could be resolved given time and effort.

Inclusive decision making

Local authorities, government agencies and voluntary bodies have a well regarded tradition of using a variety of stakeholder engagement tools and processes to progress their corporate aims and initiatives in ways that will be locally acceptable and meaningful. Defra may wish to look to the Parrett Catchment Partnership as a recent model of good practice in the context of inclusiveness. The PCP approach was successful because sponsoring organizations shared the project between them. This suggests that cultivating a sense of common ownership between stakeholders groups will be key to embedding an Ecosystems Approach into decision making.

Figure 1: Statutory and voluntary partnerships in the Parrett Catchment
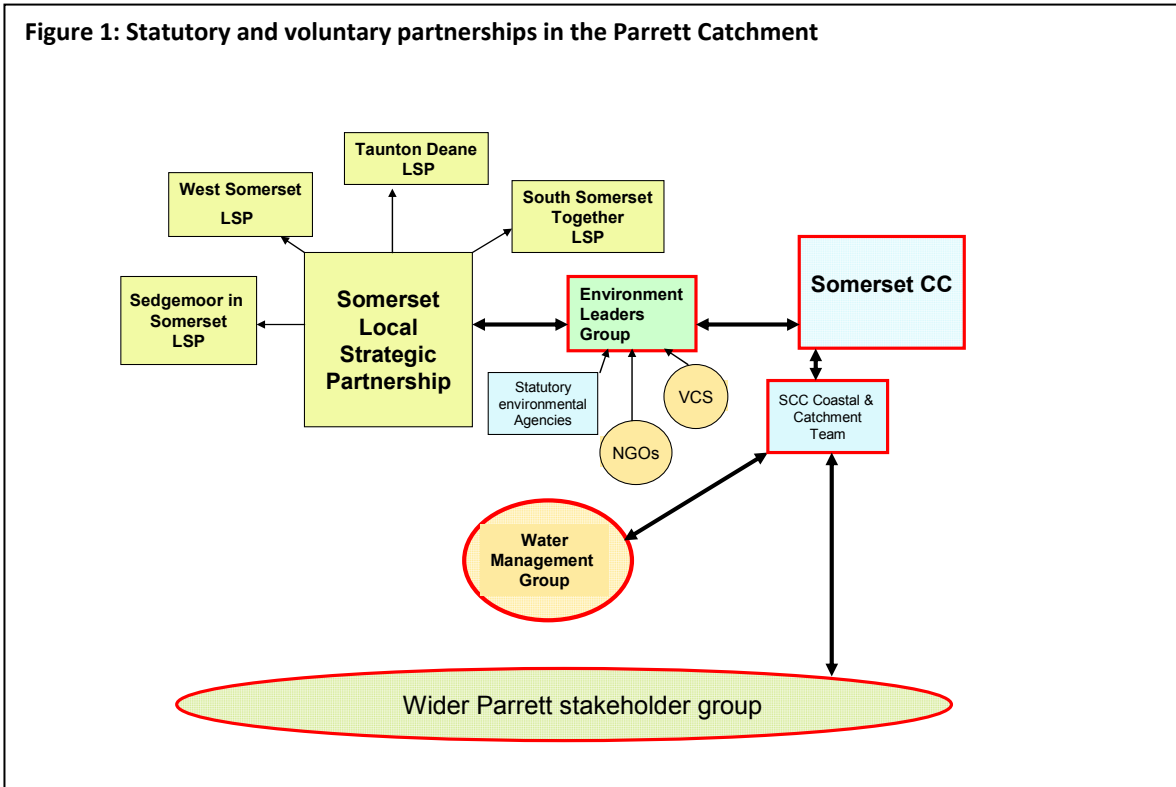
Among stakeholders community involvement is, in different ways, regarded as central to the development of integrated and sustainable approaches to planning in the Catchment. **However, our study suggests that those promoting an Ecosystems Approach may need to demonstrate the nature of the contribution that the wider community can make to decision making.** Advocates of an Ecosystems Approach should be clear to emphasise that community engagement is a principle, not a requirement of good practice in local decision making. Gaining a representative input can be fraught with difficulties at the local level. According to many of the decision makers consulted "apathy" often tends to pervade. For engagement to be cultivated and fostered, it was suggested that investment of resources needs to focus on transforming public understandings of issues. At the same time the idea of strong leadership was seen as an important determinant of interest and participation.

Appropriate geographical and temporal perspectives

The catchment scale may be considered an appropriate one for developing integrated approaches to natural resource management, but it remains unclear as to the extent to which this unit of decision making is meaningful to wider stakeholders. Members of the non specialist general public we consulted readily identified with the terms 'Catchment' and 'Parrett Catchment' but we recognise that the term will need to be given practical definition and expression for many; this may be especially so in other areas, where the catchment identity is less strong.

Proper accounting for the environment

The principle of 'living within environmental limits' was felt to be little understood and not yet developed in any practical sense by the decision makers we consulted. Some stressed the need to cost choices and options using full lifetime costs and break out of short-term plan and political cycle costings, but were unclear as to how this could be achieved. Decision makers in the catchment use a wide range of sustainability assessment tools (e.g. EIA, SEA). However, the current Local Area Agreement does not incorporate the environment in any way at all, and the Somerset Strategic Partnership is largely economic in its focus and vision. Local Development

Frameworks are also probably not as focused on sustainability issues as they need to be. There is very little easily accessed information about how the agreements and frameworks were assessed; this information is not shared across sectoral groups and organisations outside of the planning system. Outside of these statutory processes we suggest that sustainability appraisal may be a valuable way of articulating some of the key principles of an Ecosystems Approach as the basis for incorporation into decision making at the local level.

Joined-up policies

The perception at the Catchment level was that decisions and funding streams geared to administrative areas do not tend to match up very well with how natural resources and land actually function at the level of the catchment. Political imperatives were also often perceived to be out of step with the long term nature of building more sustainable approaches to catchment planning. Funding is still too short term for many initiatives so not as effective as it could be.

There was felt to be little correlation between decision making time frames for different sectors (water, health, education, environment) so "nothing matches" leading to intractable problems for effective planning and decision making. Equally there was also considerable frustration locally that national [planning] policies were "forcing change" that local levels thought inappropriate in the long term. Nevertheless, many of the key partnerships, (e.g. the Somerset Strategic Partnership (SSP), the various Local Strategic Partnerships (LSP) and the WMP) have visions and agenda's are cross-cutting, strongly indicating that they are committed to holistic methods of working.

Conclusion

In this Chapter we examined the extent to which key elements of an Ecosystems Approach are currently reflected in structures and approaches to decision making in the Parrett Catchment. We found that there was acceptance that a holistic approach to decision making is important and a good tradition of joint working, as was illustrated by the Parrett Catchment Partnership. Moreover, there was a sense in which decision making was 'adaptive in character', in that processes are in place to revise, for example, Local Area Agreements to include environmental issues. However, our consultations also suggested that other key elements of an Ecosystems Approach, such as those dealing with ecosystem services, environmental limits, geographical scales and environmental valuation were less well understood or used. As a result we now turn to the problem of how access to these kinds of evidence might be provided at the local scale.

Part 3: Supporting an Ecosystems Approach - Data, Models and Analytical Tools

Introduction

The feedback we gained from interviews with key informants suggested that there were two major sorts of barrier to embedding the kind of thinking represented by an Ecosystems Approach in decision making. The first related to institutions and governance. These issues have been described in Part 2. The second concerned access to information about natural resources and their importance for well-being. It is towards this second issue that we turn now. In Part 3 we examine questions of data availability and the extent to which it is possible to implement an Ecosystems Approach given the state of the current evidence base.

In our investigation we have attempted to go beyond simply reviewing the data sources, and have explored the extent to which existing bodies of information can be used to map and value ecosystem services within the catchment. Although we recognise that an Ecosystems Approach is about much more than assessing ecosystem services, the latter are nevertheless a valuable focus because they emphasis the close connection between natural resources and the well-being of people. Moreover, they are also a topic around which there has been much recent debate about the importance of valuation of service flows for decision making and the limits to service output. What kinds of information handling tools are needed to support an Ecosystems Approach? In what *ways* can existing data be used and presented so that people better understand the issues surround the management of natural resources?

Evidence, information and data islands

In the UK we are fortunate in that we have access to a rich body of data about the social, economic and biophysical environments (Osborn et al., 2005; ADAS, 2007). The South West of England and the Parrett Catchment are no exception, as a review of the findings of these studies and the resources available through the SW Observatory will reveal[6]. Thus it seems paradoxical that people still found data availability an issue. A local Planning Officer argued, for example, felt that there was still a need for "improved access to more detailed information about different localities". He added that it was essential that evidence was available in formats that were "meaningful" and "useful".

The SW Observatory, like others in the UK, has been established as a result of partnerships between the Regional Development Agencies, Government Offices, Regional Assemblies, and other bodies with the aim of 'supporting evidence-based policy and improved decision making'[7]. It brings together a range of aggregated local and national sources of information and evidence, and provides access to reports, guidance and wider public information networks. Users can quickly gain access to a wide range of local information and in many cases use the site links to place that local and regional information in its wider national context. It is essentially the kind of system that people consulted felt they needed to support an Ecosystems Approach.

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[6] http://www.swo.org.uk/observatory/home-1/introduction.shtm
[7] http://www.regionalobservatories.org.uk/

We have used the resource of the Regional Observatory as the starting point of our analysis of the ways people gain access to evidence, because it is typical of what is available across all the English regions. Moreover, since the construction of these Observatories is the result of partnerships between all the key public bodies in the regions, they offer a good barometer of the kinds of evidence and support are available and the extent to which it might support an Ecosystems Approach.

A review of the extent to which the SW Observatory website could support 'ecosystems thinking' suggests that while it gives access to a wider range of evidence, information on ecosystem services lacked integration. For example, although users can gain rapid access to biodiversity information contained in the SW Nature Map there is currently no possibility of looking at this alongside, say, the Environment Agency Catchment Plan for the Parrett. The latter proposes a zonation of the area for different degrees of flood protection. As a result, users interested, say, in the supply and demand for ecosystem services in the catchment, would need to find ways of linking up these separate 'islands of data' if they were interested in the contribution that different habitats made to flood regulation. This could hinder anyone attempting to gain a strategic overview of the ways in which natural resource systems interact with each other and other sectors of society.

The use of the resources provided by the SW Observatory is also frustrated by the fact that this and other such sites make little or no explicit reference to ecosystem services or an Ecosystems Approach. Although those consulted may not be users of the Observatory site itself, it could be argued that the lack of the kinds of strategic information needed to support an Ecosystems Approach on such sites is symptomatic of the general paucity of information that is available in the wider, public arena.

This situation illustrated by the SW Observatory is perhaps inevitable and not a fault of the Observatory system *per se*. To a large extent the Observatories are dependent on the sorts of data provided by other organisations. As noted elsewhere (Haines-Young and Potschin, 2008; Osborn et al., 2005; ADAS, 2007) the fragmented nature of evidence about ecosystem services to a large extent reflects current institutional responsibilities and perspectives. As organisations like Natural England or the Environment Agency begin to focus on ecosystem services and deliver information about them, the form and content of the resources available through the Observatories are likely to evolve. Nevertheless, if people and local groups are also encouraged to think about ecosystems and ecosystem services by, for example, including reference to them in guidelines for sustainability appraisals, strategic environmental assessments or other planning procedures, then demand for such information would grow and the key data providers are also likely to respond accordingly. The Observatories should ideally also enable local knowledge to be combined with organisational data so that greater insights about any given locality can be developed.

Mapping Ecosystem Services

There is at present growing research and policy interest in the problem of mapping ecosystem services and ultimately of constructing atlases to help people understand and take account of the relationships between ecosystems and wider social and economic processes. In the context of identifying the links between sustainable resource management and poverty alleviation, for example, the World Resources Institute have recently published an atlas of ecosystems and human well-being for Kenya (WRI, 2007). In the US, the Environmental Protection Agency are now considering how an atlas of ecosystem services might be constructed at national scales (Neil and Wickham, 2008; EPA, 2008) and in the UK Natural England, the Environment Agency and others are investigating what kinds of mapping might be attempted given the types of evidence currently available for England (Haines-Young et al., 2008a). Mayr et al. (2006), for example, have examined the possible mapping of soil functions.

Mapping ecosystem services is, however, not an easy task. Any comprehensive treatment of the issue requires both an understanding of the capacity of ecosystems

to supply a service and where the beneficiaries of that service are to be found. Successful mapping thus requires both the supply and demand side of the service chain to be identified. Moreover, since the areas where a service is generated may not be the same as those where any benefit is enjoyed, the task of mapping can potentially become a complex undertaking.

Our review of recent work suggests that there is, however, much that can be achieved technically. For example, Troy and Wilson (2007a&b) have considered some of the issues associated with mapping ecosystem services, and particularly the challenges and opportunities for linking GIS and methods of value transfer. They argue that the development of spatially explicit valuation methodologies essential if we are to better understand the relationship between the ecologically important elements of the landscape and the other relevant pressures associated with the use and transformation of land. Although such methodologies are still in their infancy, progress is now being made. **In terms of identifying one way forward, we recommend that the relevant public agencies in England should be encouraged to contribute maps of ecosystem services so that facilities such as the Regional Observatories could host a comprehensive atlas that could be interrogated by users at a range of spatial scales.** The Observatories could then also provide links to valuation studies and valuation tools, so that users can better characterise the importance of natural resource systems in their area.

Nevertheless, our discussions with stakeholders in the Parrett suggest that technical opportunities that now exist for mapping ecosystem services must not obscure what is also required in promoting and supporting new forms of *governance*. If an Ecosystems Approach is to be embedded in decision making, then ways have to be found to highlight the importance of natural resource systems *and* the way they are coupled to wider social and economic processes. To achieve this it has also to be recognised that the process of embedding is essentially a process of *social learning*, or part of what others have described as 'transition management' (Wiek et al., 2006). Thus the design of facilities such as the Regional Observatories has to go beyond the technical challenges of data provision and modelling. **The aim should be to promote and support the kinds of public discussion needed to ensure that new approaches to governance, such as Local Area Agreements, are effective and take account of the benefits that natural resource systems provide.**

In order to examine what this approach might mean for the Parrett, we have explored ways of building 'science-based stakeholder dialogues' that highlight the role of ecosystem services in discussions about well-being. Following the recommendations of a number of workers involved in transition studies, it was decided to user scenario construction as the focus of this work, because it offered the opportunity of presenting the various tools and concepts that surround ecosystem services, values and limits in a kind of narrative that might make the principles underpinning an Ecosystems Approach more meaningful and useful to stakeholders.

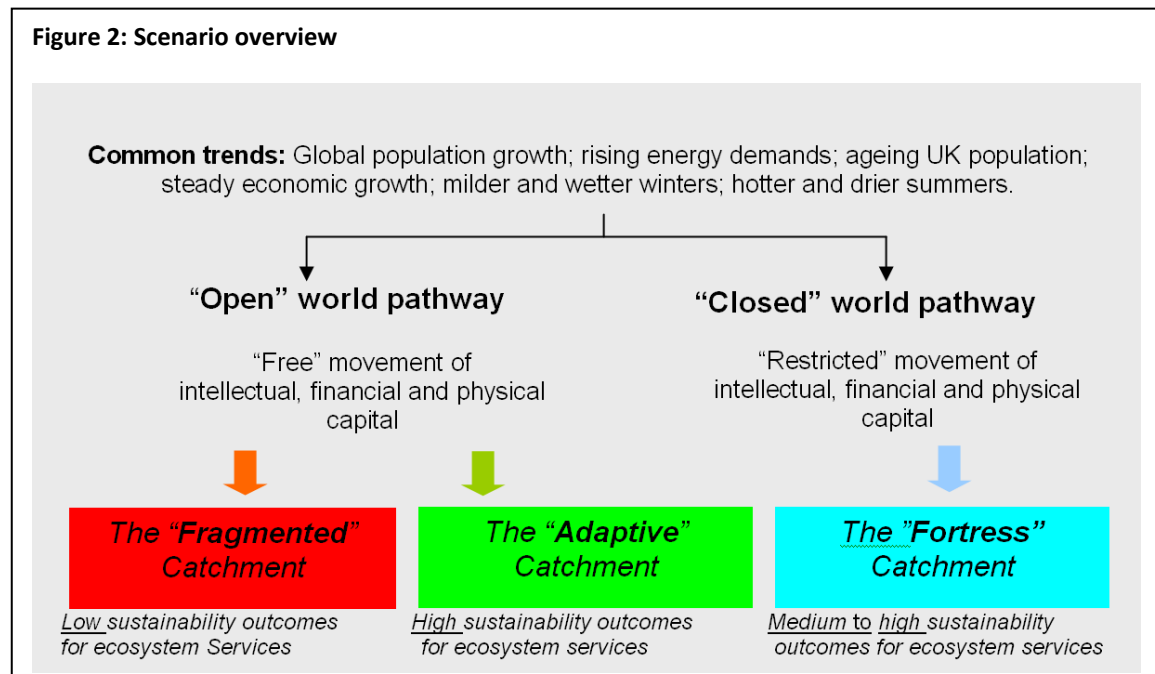# Part 4: Developing and evaluating scenarios for the Parrett

Introduction

In order to explore how '**science-based stakeholder dialogues**' could be initiated as a way of promoting 'ecosystems thinking', a set of scenarios were constructed with the aim of helping people to discuss some of the issues linking natural resources and well-being issues within the catchment.

The scenarios we devised reflected the global concerns of the Millennium Ecosystem Assessment (MA), but were built in such a way that they also captured some of the local cross-cutting issues that may impact on the natural resources in the Parrett. The scenarios were then operationalised using a range of mapping approaches, and used to test stakeholder reactions to the method, and their ideas about an Ecosystems Approach that they convey and the types of future they suggest.

Scenario Construction

Scenario building is a process of describing a contrasting set of narratives about the long term future, based on hypothetical propositions about the character and interaction of drivers of change. While scenario building techniques do not yet represent standard practice in approaching issues of natural resource management, allocation and valuation, an understanding of these techniques is central to the EsA and Defra's Action Plan.

Figure 2: Scenario overview

Common trends: Global population growth; rising energy demands; ageing UK population; steady economic growth; milder and wetter winters; hotter and drier summers.

"Open" world pathway

"Free" movement of intellectual, financial and physical capital

The "*Fragmented*" Catchment

Low sustainability outcomes for ecosystem Services

The "**Adaptive**" Catchment

High sustainability outcomes for ecosystem services

"Closed" world pathway

"Restricted" movement of intellectual, financial and physical capital

The "*Fortress*" Catchment

Medium to high sustainability outcomes for ecosystem services

While there are many scenario building exercises at the global level, there is a need to develop and evaluate these techniques at more localised scales. Three MA (MA, 2005) inspired scenarios were therefore created for the Catchment based on how underlying trends and themes in the Catchment may unfold. The scenarios were used as the basis of a further round of stakeholder consultations. Each of the scenarios we devised shared a number of key assumptions. In terms of *indirect*

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drivers: global populations will rise; that the demographic profile of the UK will age; and further that there will substantial global increases in the demand for energy. They also work on the assumption that in the UK there will be reasonably strong, but steadily declining, economic growth. In terms of *direct drivers* all of the scenarios work on the general assumption that winters in the UK will be milder and wetter and summers hotter and drier. What initially distinguishes the scenarios is the extent to which their pathways of development are governed by an 'open' or 'closed' world (Figure 2). This distinction reflects two, fundamentally different, views about the future.

Under the **'open' world** pathway the Parrett Catchment develops in a world of global inter-connectness, one premised on expanding open world markets and the generally free movement of intellectual, financial and physical capital. Here the role of the nation state as an agent of change has been progressively diminished. It has been replaced with a litany of supra-national organizations attempting to regulate this increasingly globalised world to good and ill effect. In the open pathway, environmental problems, such as climate change, continue to be met with co-ordinated programmes of action at the supranational level, but these efforts are less responsive to local circumstances. Indeed, while the focus of many of these organisations is on improving human quality of life, they tend to be cumbersome from the point of view of managing local systems. In an important sense, then, this results in a world that involves a reactive approach to natural resource management at the global scale, despite good intentions. By 2050 systems of global governance seem to be disconnected from the lives and livelihoods of ordinary people on the ground.

In contrast under the **'closed' world** pathway the Catchment operates in a world of where globalization has been progressively resisted and rejected. The expanding open world markets of the early 21st century have been replaced by a culture of protectionism and introspection among 'liberal' western democracies. This is a development pathway in which the rich protect their borders, and attempt to confine poverty, conflict, environmental degradation, and deterioration of national resources to areas outside of those borders. This process has been driven by a series of real and perceived crises in globalization: the widely felt economic 'downside' of exposing industry to the disciplines of free trade; the perceived 'burden' of hosting economic and environmental migrants; instability in world financial markets; the spread of international 'terrorism'; as well as periodic fuel and food shortages resulting from widespread dependency on imports. Under this pathway, the role of the nation state as an agent of change has been progressively re-asserted and established. There are new drives towards national "self-sufficiency" and "self-determination" across the whole ambit of the sustainability. This is the old-world order re-visited. Localised action is governed by the imperatives of national strategic planning.

Under each of these general pathways the more specific scenarios for the catchment begin to emerge (Table 2). Two of these scenarios - the 'fragmented' catchment and the 'adaptive' catchment depict responses to the 'open' pathway, while the 'fortress' catchment represents a possible response to the 'closed' pathway:

- *The 'Adaptive' Catchment* describes a catchment where highly localized, low impact and generally 'low tech' responses to wider trends prevail. This is a scenario where communities have become increasingly resilient as processes of globalisation become stronger, and nation states weaker. By today's standards this scenario is what many would describe as 'sustainable'.

- *The 'Fragmented' Catchment* describes how an increasingly open and deregulated world dictates the fortunes of the Catchment. Here the free market that shapes environmental, economic and social well being. Local communities are disempowered and disorganized, while the nation state lacks influence and power over global trends. The outcomes for sustainability are mixed.

Table 2: Parrett Catchment Scenarios 2050 - key themes

| Driver Issues	Fragmented Catchment	Adaptive Catchment	Fortress Catchment
Population	Significantly growing population due to high immigration, steady birth rate and advances in healthcare. Polarisation between residents who enjoy protected tranquillity/leisure versus workers	Moderately growing and ageing population due to steady in-migration, low birth rate and advances in healthcare. Diverse (mixed use) and novel types of communities	Low to moderate growth in population/ significantly ageing due to low birth rate, low in-migration and advances in healthcare. Concentration in existing centres.
Mobility	Commuting to work still necessary for some of the population, despite expense. Lack of integration/investment in public transport. Restricted or regulated access to protected areas	Reduced commuting reflects more local orientation of employment and leisure patterns Access to open space a high priority – but emphasis on local provision rather than high-status 'honey-pots'. Good public transport	An expensive necessity – also commuting aided by good public transport. Access to the leisured countryside - parkland expansion to accommodate wider use
Energy	National sources	Emphasis on local sources	National and local sources,
Climate	Warmer summers, milder wetter winters, increase unpredictability of weather patterns.	Warmer summers, milder wetter winters, increase unpredictability of weather patterns.	Warmer summers, milder wetter winters, increase unpredictability of weather patterns.
Housing	Conversion of redundant farm buildings, ribbon development. Some expansion of population in rural areas, but also urban concentration of development – ribbon developments and development on flood plains reflect weaker controls	Dispersed/low intensity/mixed. Expansion of population in rural areas but development is 'sustainable'	Renewal and protection of status quo. Concentration of existing patterns of housing and employment
Land Use and environmental Management	Polarised with intensification in some areas and abandonment in others, lack or low commitment to stewardship – except in areas with high conservation or cultural value. Increased diffuse pollution risks from intensified agriculture. Land abandonment in marginal areas and intensification on best land. Ad hoc approaches to environmental management and regulation. Targeted conservation measures	Local markets, with market led approaches to stewardship to assure food quality. Some intensification in best areas and diversification into energy crops. Expansion of local recreational opportunities. Reduced diffuse pollution risks from lower-input agriculture and better farm practices. Expansion, restoration and buffering of areas of high conservation value. Soft engineering solutions flood mitigation rather than control. Market-based approaches to environmental management and regulation	Some intensification in best areas to meet national needs, but also focus on local markets, stewardship schemes mainly target priority areas in farmed landscape. Hard engineering solutions, flood control rather than mitigation. Additional river and flood control measures to protect existing assets. Levels of diffuse pollution risk hardly change from today. Protect, ring-fence key conservation areas rather than expand and buffer
Employment	Polarisation of employment patterns – patterns dependent on location and context	Diversification of employment patterns with focus on local markets and home working.	Employment patterns follow national trends rather than local needs, opportunities depend on mobile workforce.
MA (2005) parallel	This scenario approximates most closely with the 'Global Orchestration' scenario	This scenario approximates most closely with the 'Adapting Mosaic' scenario	This scenario approximates most closely with the 'Order from Strength' and 'Technogarden' scenarios

Figure 3: Ecosystem Services in the Parrett Catchment - Somerset Levels (2050)

(A) *Somerset Levels and Moors under the 'Adaptive' scenario*
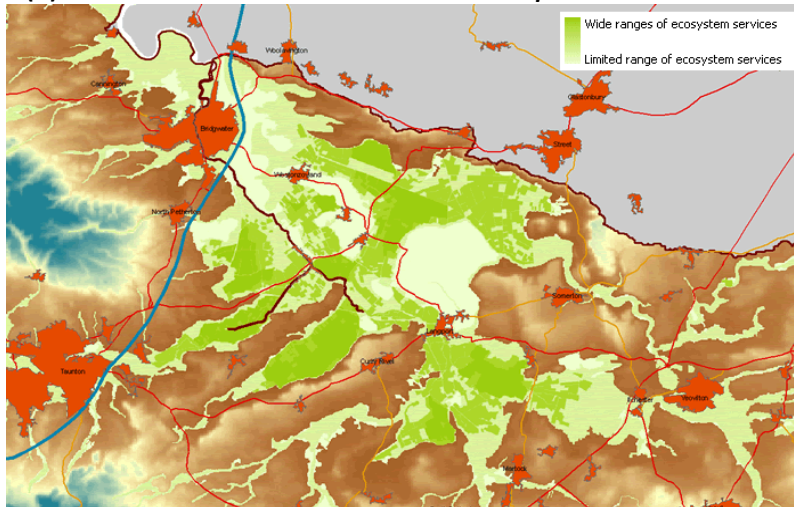
(B) *Somerset Levels and Moors under the 'Fortress' scenario*
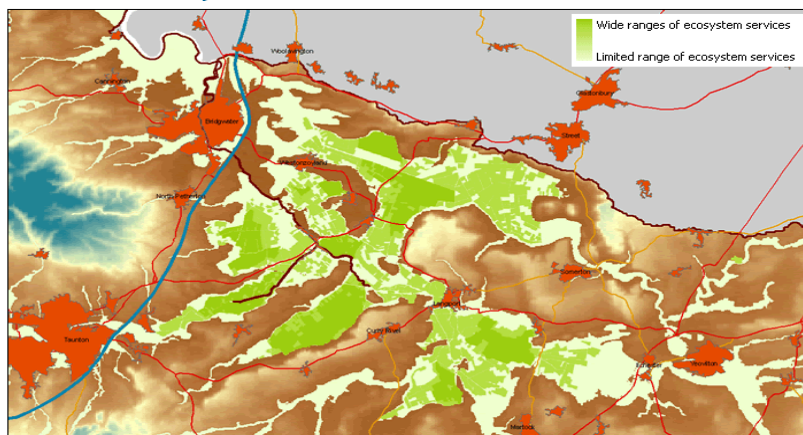
(C) *Somerset Levels and Moors under the 'Fragmented' scenario*
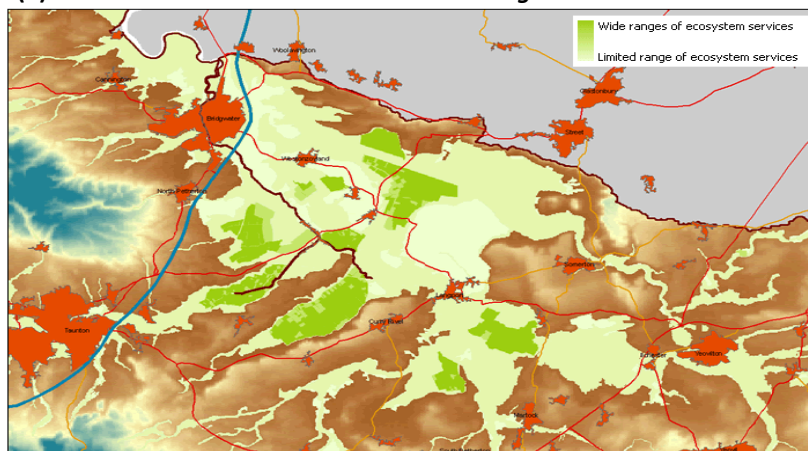
We have mapped the ability of the Levels to provide ecosystem services (such as water regulation, conservation and recreation) under each of these scenarios the darker the green on the map the more services the different parts of the Levels provide. Terrain is shown in shades of brown to blue

In the *'Adaptive'* catchment flood risk is managed in an intelligent way through an integrated strategy covering the whole catchment. Image A depicts an expanding area of the Levels to deliver flood alleviation benefits since ecosystems are functioning, healthy systems.

In the *'Fortress'* catchment flood risk managed through engineering to minimise inundation. Total area of wetlands reduces but the condition of the remaining patches is improved through strong national policies for environmental protection. Wetlands systems are healthy but the total benefits they deliver are diminished by loss of area compared to the adaptive strategy.

In the *'Fragmented'* catchment flood risk has not been managed in an integrated way - different strategies have been tried in different places. Image C depicts that the ability of the Levels to deliver benefits such water quality and wildlife is impaired - the core area reduces and patches fragment.

The 'Fortress' Catchment describes a catchment where planning for the future becomes increasingly centralized. This is a world where seemingly unstoppable trends toward globalization have been resisted. The nation state is increasingly closed and inward looking and leads the way in planning for national self-sufficiency. High impact, high tech and over engineered approaches to sustainability prevail.

The scenarios were translated into web-based text and map materials as the basis for an online consultation (see Full Technical Report for details). The maps were produced using the ArcMap GIS and all drew on present data as the base-line, which was modified according to the different assumed trends. The aim of the mapping exercise was to give people a visual understanding of what the implications of the different scenarios were, rather than to make precise predictions of the future. Thus no deterministic or stochastic modelling techniques were used, although clearly if the approach was refined then this could be attempted. No differentiation was made about the speed with which the different scenario outcomes would be achieved.

Figure 3 illustrates some of the maps produced for the different scenarios. These maps focus on the ability of the Levels to provide ecosystem services (such as water regulation, conservation and recreation) under each of these scenarios the darker the green on the map the more services the different parts of the Levels provide.

Responses to the consultation

Invitations to participate in the online consultation were disseminated among strategic and frontline stakeholders who occupied roles either on, or working in conjunction with, the Environmental Leaders Group and the Water Management Partnership and who interacted with the project at earlier stages of the research. While the technique may be potentially used directly in conjunction with the wider Parrett Catchment community, this consultation did not include to citizen reactions to the scenarios. Invitations were circulated to 74 stakeholders although the primary purpose of the consultation was not to conduct an extensive survey. The survey was designed to be purposive in its sampling: eliciting detailed views on the technique from contrasting stakeholder organisations and networks across the catchment. The consultation opened for four weeks in early 2008 and in terms of the *range* of organisations and groups operating in the catchment, the project team secured responses from:

- RSPB
- The Environment Agency
- Somerset County Council
- Taunton Deane Borough Council
- Sedgemoor District Council
- National Farmers' Union
- Natural England
- NGOs (such as Forum 21: West Somerset).

In addition, the project team also evaluated the value of the scenarios with wider groups who may potentially use this technique in the course of their work. To this end the scenarios were presented and evaluated at the "Going underground" scientific network [8] in January 2008. This network comprises a multidisciplinary community of researchers working specifically in the area of land management and pollution, often in a catchment specific context. The consultation also elicited the views of engineers working on drainage management in the catchment and independent research consultants working in the field of ecosystem management and valuation. In total 27 people shared their views about the scenarios with the project team. Most respondents preferred to offer verbatim views on the materials rather than completing the structured on-line questionnaire. This partly reflects the nature of the technique in that it tends to generate reactions that are not necessarily

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[8] http://www.shef.ac.uk/going-underground

amenable to a structured and closed questionnaire. Thus many wished to elaborate upon their views directly. The key findings were as follows:

- ***With some important caveats, most consultees were positive about the value of scenario building as a potential tool for catchment level decision making.*** As one put it, echoing the concerns of Defra's action plan, "this country is so short term in terms of the planning horizons, often only thinking 5 and 10 years ahead...[scenarios]... are a way of "trying to deliver the bigger picture. We need to know where we might be going". All of our respondents were aware of the technique though the majority had not used scenarios personally. In total, over ninety per cent of respondents suggested that they thought scenarios could potentially be either a "useful" tool for decision makers, or assist them "greatly" in their work. However, a significant number of respondents were less convinced that as to the extent to which scenarios might help them understand 'environmental 'limits and thresholds'.

- Scenarios are designed to elicit reasoned responses and arguments about the future. They are designed to initiate debate and raise controversy. Indeed, the scenario building process has not worked if they do not generate a reaction. ***It was therefore not surprising that respondents were quite vocal as to the plausibility and completeness of the scenarios.*** Some respondents suggested that the exercise ignored important dimensions of change in the catchment, and offered alternative views as a result. Others highlighted concerns about what these pathways of development implied. The process of scenario building clearly has a potential to open up fundamental debates about the nature of long term regardless of whether the 'world views' of particular stakeholders are exemplified within them. Scenario building probably has to be iterative in character. There is a need to refine scenarios in light of stakeholder reactions to them and, to think very broadly about the potential scope of change.

- **There was a strong feeling that scenarios should be backed-up by quantifiable data sets**, and that they should in some sense be 'ground truthed' wherever possible. However, it was also recognised that the idea that scenarios could ever be constructed "objectively" was a problematical premise. Indeed the interpretive and subjective nature of the process of scenario building has its own benefits, in that it is able to reveal stakeholder value systems and goals. Where there are uncertainties in developing future narratives, it nevertheless is important to be clear and explicit about underlying assumptions.

- The consultation generated wide ranging views regarding the specific techniques employed to characterise and convey the three scenarios. For some respondents, the use of 2050 as a end-marker in time was potentially problematical. According to one "40 years doesn't sound unreasonable but it's very distant for many", while for another, "25 years [from now] is the sort of cut off point". **In terms of the quantity of information provided to explain the scenarios, most of those consulted suggested that the level of detail was "about right".**

Part 5: Discussion and recommendations for using an Ecosystems Approach

Introduction

The aim of this study was to examine how the principles of an Ecosystems Approach (EsA) can be fostered at the local scale. Throughout this research we have therefore attempted to focus on general issues exposed or illustrated by the experience of stakeholders working at the Catchment level, rather than the particulars of the Parrett Catchment itself. In essence the insights we have developed are designed to advise on its wider application in a range of current planning and decision making contexts. In order to do this we have attempted to identify what barriers exist for taking an Ecosystems Approach forward, in terms of knowledge gaps or data deficiencies. In this final Chapter we take stock of what we have found and use this experience to develop recommendations on how best to embed an Ecosystems Approach in decision making at local scales.

Barriers of Language and Understanding

In the dialogues that we have had with strategic, frontline, and community stakeholders in the catchment, we found that introducing the EsA to them was a difficult undertaking. With a few notable exceptions, **it was a concept that stakeholders found very hard to 'get to grips' with in a tangible way. Its terminology and language appeared to be alien to how most stakeholders think about the environment.** Many considered it "jargon", and some of the elected members found it unintelligible. Individuals across every category of stakeholder consulted strongly advised that, if the ideas behind the EsA are to be promoted and *used*, then more accessible 'everyday' language would be essential to make it meaningful and relevant.

Clearly many new ideas and concepts probably start off by generating such reactions. As has been illustrated by the recent transformations in the ways ordinary people think about such things as 'climate change' and 'carbon footprints', barriers to understanding and reluctance to use new ideas can be overcome. However, this does not mean that things should be left to themselves.

The study commissioned by Defra on *Public understanding of the concepts and language around ecosystem services and the natural environment* (Define, 2007) concluded that people found the language and terminology of environmental debates complex. They suggested that the public connect most strongly to the natural environment through aspects that enhance the quality of their lives. They place real value on those aspects of the natural environment that they relate to and use day-to-day, such as 'green space'. This seems to help them engage in the concept in the first instance. The study also found that people seem to be far more interested in the concept when the cost implications of environmental damage are made clear. Experience gained in this case study bears out these findings. People were far more comfortable talking about 'quality of life or 'well-being' issues' and how they related to particular localities or places. We found that such issues could be used as 'hooks' for exploring links to ecosystem goods and services, as in the case of security from flood risk and the link to 'natural' flood management services provided by woodland and similar features within the catchment.

Despite the difficulty that people expressed with the *language* of an Ecosystems Approach, and ecosystem services, it is important to note that they did not have the same reaction to the intrinsic *principles* or *key ideas* upon which the concept was based. Indeed, our experience with decision makers in the catchment was that in many respects an Ecosystems Approach is tacitly understood *and* employed by decision makers in the Parrett. Local authority stakeholders were readily interested in discussing the benefits that local communities get from the catchment's environmental resources, and how these impact on disparities in local quality of life, or could help considerably improve quality of life. Perhaps this is not surprising, given the nature of the case study itself. The catchment was selected *because* there was a track record of joint working and partnerships in area, and the catchment is a distinct biophysical unit with a clear set of local issues associated with it. Nevertheless, the study is of interest because it helps us identify how far the principles of the EsA can be taken and what barriers might frustrate the application of these ideas.

We found that while no one argued against core principles of an Ecosystems Approach, such as 'inclusive decision making', the need to make decisions at 'appropriate geographical and temporal scales', 'taking proper account of the environment' and the goal of 'joined-up policies', a number of obstacles to the effective application of these ideas existed. For example, while some could see the connection between people's well-being and the environment, the majority of those interviewed felt very strongly that there was no real discussion at all about the supply of ecosystem services in the catchment, or across Somerset as a whole. Ecosystem services and the benefits they bring were poorly understood and given very little thought by the majority of local politicians and communities. This was possibly because the majority of decision-makers were not sufficiently prioritising the environment into their thinking, let alone in terms of ecosystem goods and services. The environment is not yet a central component in how all local decision-makers are obliged to think about meeting local needs and resources. **The goal of improving understandings of the links between ecosystem services and benefits to local community well-being was felt to be a big issue by many respondents.**
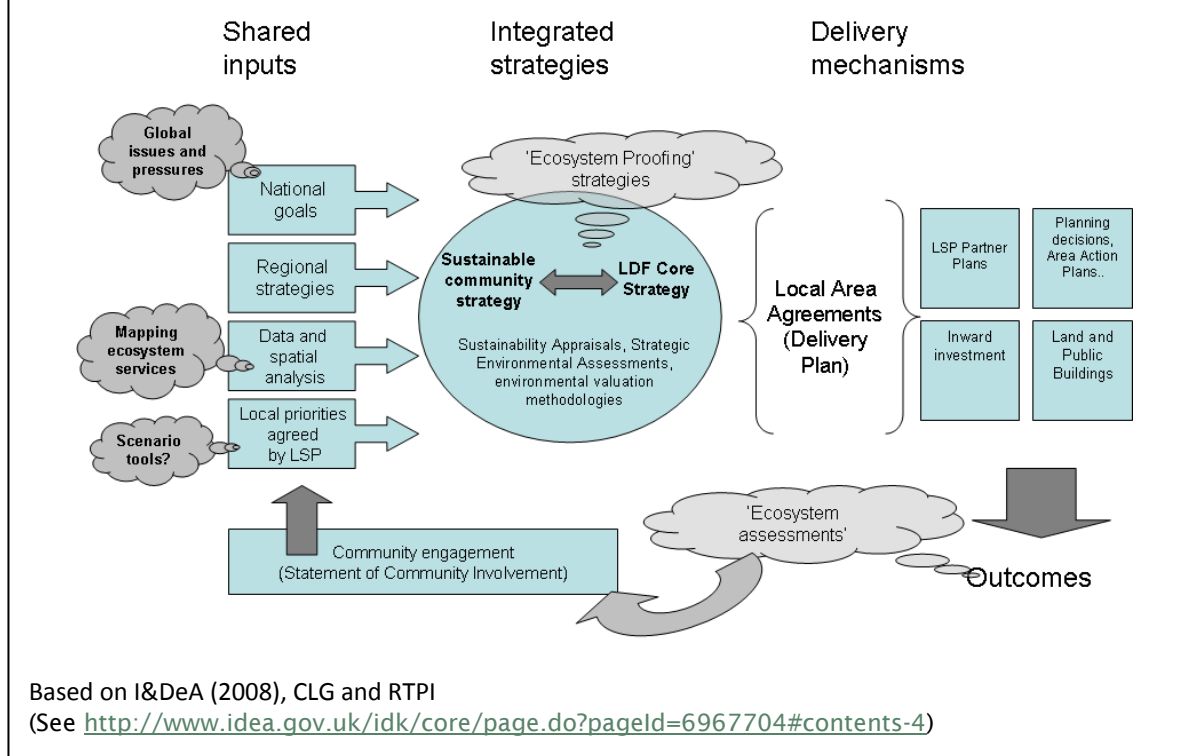
The experience we gained in the Parrett Catchment suggests that the problem of embedding an Ecosystems Approach in local decision making is not simply one of language, or of persuading people that the principles of the EsA are 'right' or a more reliable or robust way of solving problems. Rather, it is about empowering people to work through the issues highlighted by the EsA. This involves giving them access to appropriate information, and by better defining the frameworks in which debates occur. We therefore now focus on what kinds of mechanisms might be used to promote the approach.

Mechanisms for embedding an Ecosystems Approach

The Planning and Compulsory Purchase Act 2004 reformed the plan-making system in England. The statutory development plan now consists of the Regional Spatial Strategy (RSS), prepared by the regional planning body and the development plan documents assembled into the Local Development Framework (LDF). The latter is prepared by the local planning authority. The reforms were put in place to ensure that Local Authorities became more effective in 'shaping places' by helping to develop and take forward more ambitious and more widely supported collective visions for their area than had been the case in the past. With the new planning system, there is a strong emphasis on partnership working, sustainable change and community involvement. Overall the goal is to promote sustainable development through the integration of social, environmental and economic factors.

Figure 4 provides an overview of the key elements of the new planning system that are relevant to the local concerns exposed by the Parrett study. The schema is based on the account by I&DeA (2008) but has been modified to highlight where connections to the elements of an Ecosystems Approach are particularly relevant.

Figure 4: Potential connections between the core strategy of the Local Development Framework, the Sustainable Community Strategy and an Ecosystems Approach

Based on I&DeA (2008), CLG and RTPI
(See http://www.idea.gov.uk/idk/core/page.do?pageId=6967704#contents-4)

According to the model, the Sustainable Community Strategy (CSC) is the mechanism that sets out the vision for a place and the ways in which the long-term challenges facing an area might be addressed. The LDF documents how key spatial strategies for the area should reinforce it. Collectively they provide the basis for the Local Area Agreement (LAA) which is essentially the delivery plan for the CSC.

Most of the decision-makers we interviewed were adamant that if an Ecosystems Approach and the principles that underpin it are to be used *explicitly*, then they the must be a mandatory part of the planning system, and specifically the Local Area Agreement process. Most people were very clear that unless use of 'EsA thinking' is made mandatory and "irrefutable" it would not be used. Stakeholders felt there could be no real choice in the matter.

Leadership and joined-up thinking at the highest political levels - particularly between Defra and CLG, but also within Defra - was therefore seen a crucial for encouraging confidence and 'buy-in' at more local levels in the idea of an EsA. The new Public Service Agreement (PSA) framework announced as part of the Comprehensive Spending Review (CSR) 2007 would seem to be an important step in this respect, but it was clear through our engagement with stakeholders that more guidance about how this would play out on the ground is needed. However, it was also noted by some of those consulted that while putting the concept into mainstream planning and land use decision-making through guidance, regulation or even legislation is one thing, to succeed on the ground it would have to be seen as "*a real vote winner*" by local politicians. It might be that this could be achieved through a social marketing approach that makes clear links between people's health and well-being and the appearance and 'well-being' of the local environment and landscape.

The Local Strategic Partnerships and Sustainable Community Strategies were seen by the majority of decision-makers as highly relevant for successfully introducing an EsA into local decision-making processes. These were seen as some key inputs into the integrated strategies represented by the CSC and LDF (Figure 4). **There was consensus that these local partnerships and strategies appear to be beginning to engage local communities across Somerset. They were achieving the sort of**

'buy-in' that has the potential to shape future development of local areas and how they might function. The view was that they should be vehicles for introducing and embedding the EsA concept and ideals for making environment core to people's thinking. Embedding the ideas through a bottom-up-process directed at resolving local issues was felt to be far more satisfactory strategy than imposing top-down targets decided at strategic levels. However, it is unlikely that this would be a spontaneous process, but one that would need to be encouraged over the long term.

While guidance and examples of best practice were seen as important mechanisms that might influence the Local Strategic Partnerships, more effective use of Sustainability Appraisal and Strategic Environmental Assessment was also suggested by those consulted as a possible mechanism for more deeply embedding the thinking that lies behind the EsA. At present, Sustainability Appraisal is required for all development plans (such as the LDF), and aims to evaluate the social, economic and environmental effects of a plan or programme. Strategic Environmental Assessment (SEA), on the other hand, is a process for identifying and assessing the likely effects on the environment of a policy, or plan. It is required under the EU SEA Directive, and like the Sustainability Appraisal it has to be prepared by the local public authorities. Clearly there is overlap between them, and it is increasingly accepted that there is potential to satisfy both requirements through a single assessment process, and that in the context of the development of the LAA, Sustainability Appraisal should be applied to the whole Sustainable Community Strategy and not just the LDF.

In terms of helping to embed an Ecosystems Approach, another interviewee who discussed the role of appraisal and assessment argued that much better guidance on how to undertake Sustainability Appraisal was probably needed. Current advice was felt to be too "broad brush" and "bland" to be really useful. For example, a local authority stakeholder suggested that it would be worth considering how a list of key ecosystem services and benefits, tailored to the catchment, or Somerset as a whole, could be introduced into the current planning process, so that an EsA became an explicit part of it. A further advantage of using Sustainability Appraisal for implementing an EsA was that this decision-tool encourages longer, more realistic timeframes for making decisions about natural resource use and issues like climate change. This could help overcome the constraints of local political and local plan timeframes considered by many interviewees to be hampering better environmental decision-making. As well as Sustainability Appraisal, one consultee suggested that integrated accounting methods for the environment were necessary to replace conventional cost-benefit analysis. **The development of more detailed guidance for Sustainability Appraisal, Strategic Environmental Assessment and potentially environmental valuation at local scales could be an opportunity for CLG and Defra to work together to jointly meet each Department's aims for land use planning and natural resource management.**

If an Ecosystems Approach is to make a difference to the ways things are done then it has also be effective in changing things on the ground. Outcomes are important. In looking to the future many stakeholders in the Parrett felt that a less complex ownership and management structure for the Catchment would be desirable, because it would be easier to make decisions about the area's long-term management. Compulsory purchase and amalgamation of Environment Agency and Internal Drainage Board objectives, for example, was felt to be something else that would help towards implementing an EsA. Using spatial plans of the catchment was also seen to be important, together with efforts to stimulate informed debate about ecosystem goods and services. It was suggested that this could encourage agreement about shared objectives and long term targets and the development of a single, integrated management plan for the catchment that could be seen as "*really getting to grips with implementing the spirit of the Water Framework Directive*".

The suggestions about land ownership concerned particular measures that *some* stakeholders thought might resolve issues in the Parrett and the Somerset Levels. In

terms of looking at more general ways of embedding 'ecosystem thinking' in local processes people seemed to welcome the freedom to implement a systems approach but suggested that it could mean a very radical re-think of current priorities and funding streams. Having the time and space to think through what this would mean was felt to be impossible, given the current pace of activity, especially with implementation of the new planning system. More than one interviewee advised that good, practical examples of how to implement an EsA together with spatial data for the supply of services and 'sensitive ecosystems' would need to be readily available from Defra and its agencies, or we might suggest following the discussion of Part 3, the Regional Observatories.

The potential for decision-making using different spatial structures (sub-catchment, landscape types and soils) was mentioned by several consultees as being worth considering if an EsA were to really make a difference. This was because decisions and funding streams geared to administrative areas often do not match up with how natural resources and land actually function. This was true for both agri-environment scheme delivery and planning in the flood-plain. Thus mechanisms for linking strategies at different scales and in different administrative areas would also be beneficial. Since over 84% of respondents to the on-line survey felt that a river catchment was a useful geographic unit for exploring the connections between social, economic and environmental issues this aspect could be given far more serious consideration in future scheme and Local Area Agreement development. **Given that the Local Area Agreements will be linked to new Comprehensive Area Assessments from 2009 onwards, and that Multi-Area Agreements of a more strategic nature are planned, it would make considerable sense for Defra to explore ways of introducing the EsA into these processes with CLG as a matter of priority.**

Conclusions and Recommendations

Although it may not be easy to introduce an Ecosystems Approach (EsA) into local decision making, there is evidence from the Parrett Catchment that there is a good basis for taking such thinking forward. There are clear similarities between some basic elements of the approach and the objectives of the new planning system which sees community partnership, local choice and integrated strategies as fundamental to delivering a sustainable future. Local Area Agreement and the new Multi-Area Agreement processes appear to be the right kind of 'vehicles' for incorporating an EsA (CLG, 2007). EsA principles readily fit with LAA criteria and it should be possible to develop indicators that more readily reflect EsA goals. **Most importantly, when local decision makers become aware of the thinking behind an Ecosystems Approach, despite its unfamiliarity and technicalities, they can see the synergies between the different frameworks too.**

We found that the local authorities and other statutory organisations engaged in the decision-making processes in the area understand and accept the benefits of incorporating an Ecosystems Approach into decisions about how resources are funded and delivered. Examination of the various area-wide visions and strategies that are relevant to the catchment shows that there is much potential for incorporating the approach into the way the objectives are formulated, but this potential is yet to be realised. Indeed, its introduction would make these far more comprehensive, integrated and capable of delivering "better outcomes". However, because many of these decision-making processes are still relatively new, and new groups are being set-up to deliver them, an EsA could be seen as an unwelcome extra burden at this stage. There are obviously difficulties in getting local sectoral 'join-up' to meet *current* statutory goals for the LAA, the new planning process and Defra's objectives for the Water Framework Directive and the UK Biodiversity Action Plan. Nevertheless, the evolution of the Parrett Catchment Partnership into the new Water Management Partnership in April 2007 is an opportunity for exploring how an EsA could be made integral to the decision-making tools and processes that the Partnership will be using.

The first aim of this study was to review existing planning and land management tools and approaches within the Parrett and to look at their strengths and limitations in relation to embedding an Ecosystems Approach and the management of ecosystem services. **Our key conclusion here is therefore that, while the underpinning philosophy of the current planning frameworks is often consistent and compatible with an Ecosystems Approach, the complexity of the language surrounding it makes it difficult to use, and the novelty of the ecosystem services concept means that consideration of their state and trends is not taken into account at present.**

On the basis of this finding, then, we may move on to consider the issues surrounding the other three aims of this study, which concern how current planning frameworks might be modified to accommodate the needs of an Ecosystems Approach, what kinds of barriers current evidence gaps present to using the framework, and what kinds of guidance on embedding the approach might be needed.

Giving guidance and leadership

We found that an Ecosystems Approach is a totally new concept to the majority of stakeholders in the catchment, and it would need to be comprehensively explained and justified within the existing suite of planning guidance being rolled out by the CLG and I&DeA if it were to be used. The concept and language of the EsA does not currently feature in the planning process, and so any enhancements to ecosystem services by current decision making is more by accident than design.

Making the EsA an integral part of the planning process – at least as a core strand of the Sustainability Appraisal for plans and policies – would mean that stakeholders of every kind would have to get to grips with it. This would almost certainly present some issues over data availability and indicators but the iterative nature of the EsA should allow for this to be developed in response to local data needs and priorities.

We recommend that to make the principles of an Ecosystems Approach more accessible, locally relevant and user-friendly, and implicit in what people do, then the key concepts should be introduced into new or revised guidance for:
- **Local Strategic Partnerships;**
- **Sustainable Community Strategies;**
- **Local Area Agreements;**
- **Catchment Flood Management Plans;**
- **Agri-environment scheme (objectives) and targeting plans; and**
- **Local Development Plan Documents, e.g. Core Strategy and Local Development Frameworks**.

The preparation of this guidance could be done unilaterally by Defra with agreement from the CLG, though it would be far better if both Departments worked together to produce this jointly and present examples of good practice (see below) for each of the above and for a professional audience of planners and local decision-makers. Any such guidance should also show how the EsA fits into Strategic Environmental Assessment and Sustainability Appraisals, as an explicit component of the process. In the context of SEA, this could be done within the existing terms of the Directive, i.e. there would be no requirement for seeking approval at EU level.

Empowering local people

The Parrett study suggests that the framework of Sustainable Community Strategies are probably key to getting local residents and businesses engaged in the thinking that lies behind the an Ecosystems Approach, as part of a local 'place-shaping' agenda. Given the variation in environmental and socio-economic issues and

opportunities for change across the catchment, this could work very well for introducing the notion of ecosystem or perhaps "environmental" goods and services and how these can be made more or less accessible, depending on how resources are managed. However, from our experience we conclude that the development of local partnerships working will need to be supported by inter-departmental working at the national level. The lack of strong representation of environmental issues in the current LAA is symptomatic not only of the need to promote awareness of these issues more widely, but also of the need to provide people with the tools to deal with them. **Therefore we recommend that measures to build capacity in communities of interest and communities of place are considered.** These measures would cover such stakeholders as local elected members, voluntary groups, planning officers and would be essential alongside the introduction of new guidance for using an EsA in existing plan development and decision-making processes. Resources would be needed for training local elected members in understanding and using the EsA principles. This would need to be a part of any induction training for new members regardless of whether they are to hold an environmental post.

Steps should be taken by Defra and CLG to find and promote examples to illustrate the issues and potentials for application of an Ecosystems Approach covering a range of different problems and places. Examples of best practice would show people what "joining-up agendas" means in practical terms. It is important note, however, that the presentation of these case studies would need to be carefully thought through, given the reactions we found to the language in which an Ecosystems Approach is currently framed. We have suggested how the key ideas can be collapsed into four key themes, namely those covering issues of 'inclusive decision making', the need to make decisions at 'appropriate geographical and temporal scales', 'taking proper account of the environment' and the goal of 'joined-up policies', but these would still need to be presented in terms that have resonance at local scales. So for example, we found that the term "sustainably managed" currently means different things to different stakeholder groups, but that climate change is a common thread running through local decision-making and stakeholder processes. This latter topic might be a useful 'way-in' to the issue of the benefits that ecosystem services provided in particular localities. An analysis of these services in terms of threats and opportunities could be a means by which communities could be encouraged to think about the general problem of living with environmental change.

Improving the evidence base

Our study suggests that easier access to better, more user-friendly and integrated data and information, across all policy sectors remains an issue. This conclusion is not specific to the Parrett. It echoes the finding of the 2005 review of Community Strategies (ODPM, 2005, ii) which found that very few Community Strategies "included sufficient material to suggest whether evidence had been used appropriately to derive the strategy and a series of actions". Such a situation clearly poses difficulties for Defra in terms of its need to ensure that environmental policy at all levels is based on robust evidence and understanding.

We recommend that encouragement should be given to developing locally agreed maps of ecosystem service supply and demand as a way of illustrating the geography of issues, potentials and opportunities requiring action. These maps could be tested and developed for wider use by a set of action research projects involving the key Statuary Agencies. The maps would also act as good practice examples for a wide range of stakeholders elsewhere to draw on. **These maps and case studies could be made accessible via the CLG planning and community portals as well as Defra's own web site, but more particularly via the Regional Observatories**. Links could be set up with the Local Government Association and similar stakeholder organisations with the aim of spreading understanding and good practice thinking, building capacity and 'normalising' the EsA concept and language.

As Part 3 highlighted, it is important to note that there is a spatial mis-match between administrative and governance areas, i.e. counties and districts, and how natural resources operate or function. There are a number of 'natural resource units' such as river catchments, landscape types, e.g. uplands and landscape character areas (and their sub-units) that can be used to describe and quantify ecosystem goods and services. The challenge is bringing these two types of unit together. The most logical way would be for local authorities to make more use of these natural resource units and their ecosystem data via the planning system and the Local Area Agreement process. Alternatively Local Authorities should be able to extract information about ecosystem services that makes sense in terms of the geographical environments in which their work is set. For example, the Somerset Strategic Partnership's county vision provides the context for the District LSPs at the next level of governance down. Thus information needs to be nested in such a way that people can see how the plans and strategies at more local levels flow from this, so that they could be 'EsA-proofed'. This should mean that it will be easier to cascade ecosystem thinking –- and the experiences gained in working the ideas through – so that a consistent approach for each of the sub-county LSPs is achieved. **These kinds of data warehousing tasks are ones that Regional Observatories could quite easily provide.**

Although maps of the present situation for ecosystem services are essential as a base-line for decision making, as Part 4 of this report demonstrated, scenarios describing future possible change can also be important in shaping peoples ideas. They help people evaluate current evidence and identify what more needs to be known if effective future strategies are to be built. The consultation suggested that scenario building could be a potentially fruitful and imaginative way in which stakeholder think about the long term. **We recommend that in addition to providing information on current state and trends of ecosystem services, platforms such as the Regional Observatories also be encouraged to bring together the results of scenario studies for the area they cover.** The construction of region specific scenarios would, however, require a broad partnership to be formed, that would include the Statutory Agencies, Local and Regional Authorities, NGOs and other people's groups. Local champions for taking such scenario work forward are needed. In the Parrett, the Water Management Partnership is an ideal platform. In other areas means would have to be found to lead such work. **The possibility of a Defra-led England-wide assessment of ecosystem services, along the lines of the Millennium Ecosystem Assessment may be a framework that could be used to stimulate local thinking (Haines-Young et al., 2008b).**

Ecosystem Proofing Strategies and Plans

In theory, Strategic Environmental Assessment (SEA) takes a holistic approach to considering possible projected environmental impacts over time of multiple actions within a region or ecosystem. According to WWF, SEA's wider frame "*enables policy-makers to anticipate effects on species, habitats and ecological processes that site-specific studies do not capture. SEA also facilitates an Ecosystems Approach, which emphasises the importance of holistic analyses*". Thus, in principle, SEA already focuses decision making on many of the issues highlighted by an Ecosystems Approach in an implicit way. Similarly, Appropriate Assessment (AA), through its sequential methodology, inherently delivers an EsA by filtering and sieving out areas unsuitable for specific activities and land use or development. Thus by making an Ecosystems Approach far more explicit in SEA and AA it would be possible to support more holistic, integrated local planning documents, Local Area Agreements and site specific EIAs.

We conclude that given that many SEAs are now undertaken in tandem with Strategic Sustainability Appraisal (SSA) the potential for integrated assessment incorporating an Ecosystems Approach is already possible in the current

planning system. Ensuring that this potential is met, however, will require considerable institutional and cultural change.

A fairly strong message coming out of the work with Parrett Catchment stakeholders is that Sustainability Appraisal holds considerable potential for applying the EsA in very practical ways. Doing so would enable an objective and transparent assessment of the state and trends in ecosystem goods and services for any given area. Sustainability Appraisal can be carried out at any scale and on any type of plan or 'product'. It is a mandatory part of the planning process so it is already in widespread use throughout the country. **We recommend that ways should be found to incorporate questions about ecosystem goods and services into Sustainability Appraisal so that it becomes possible to directly link these to issues of socio-economic prosperity and environmental well-being goals.**

Our findings suggest that the LAA would be a very useful focus for seeing how an Ecosystems Approach could be used to 'ecosystem-proof' a local decision-making procedures. The development of new tools is particularly timely given the fact that ways for delivering the LAA are still being developed. Steps to build **Comprehensive Area Assessments and Multi-Area Agreements provide further opportunities to embed ecosystem thinking at a range of spatial scales.**

Embedding an Ecosystems Approach

If we are to encourage people to think globally and act locally, then a raft of measures will be needed. We need to help them make the transition from current approaches which often neglect the wider impacts of decisions on the environment and undervalue the benefits that natural resource systems can provide. The promotion of an Ecosystems Approach is one such measure. It is, along with the notion of ecosystem services, an idea that has stimulated attention at national scales. However, the task of translating it down to the local scales at which people live is potentially challenging, given the technical language in which it is often set and the way environment has to compete with other issues, and data limitations. Nevertheless, the experience in the Parrett suggests that the general principles behind an Ecosystems Approach have strong synergies with current approaches, and there is great potential for embedding the thinking behind it, if it is promoted sensitively and strategically.

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