

CATCH II – review of operational experiences and approaches to the implementation of an ecosystems approach and ecosystem services





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- Spray and Rouillard (2012) *CATCH II Fully integrated catchment management*, final report and research summary
- Waylen *et al* (2012) *Stakeholders perceptions of connections for integrated catchment management*, final report

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Executive Summary

Background to research

In the last decade, catchment management has seen a wealth of new “top-down” legislation and policy initiatives, such as the EU Water Framework Directive, to take forward emerging demands for better integration and delivery of multiple benefits for society and the environment at the catchment scale. In parallel, there has been a growth of “bottom up” initiatives, some of these now representing advanced integrated approaches to Integrated Catchment Management (ICM), for example, Tweed Forum, the West Country Rivers Trust and the Association of Rivers Trusts. The CATCH-II project represents a key opportunity to further learn from existing ICM experience, and contribute to the challenge of making catchment management relevant to practitioners.

Objectives of research

To review the operational experiences and approaches to the implementation of an Ecosystem approach and ecosystem services within Integrated Catchment Management in policy and practice.

Research activities

The main research activity involved collecting information on current projects and pilot projects across the rest of the UK outwith Scotland. Most of this was done by questionnaire and telephone conversations. However, we also visited key actors and organizations, including Natural England, Joint Nature Conservation Committee, Environment Agency (headquarters and regional teams), Department for Environment, Food and Rural Affairs, Association of Rivers Trusts and the West Country Rivers Trust.

Key findings and recommendations

This review reveals that (as in Scotland) there has recently been a major change in the UK environmental policy landscape, resulting in a move towards a wider and deeper adoption of the Ecosystem Approach across many policy areas of government.

A key finding from our investigations is that very few projects actually formally began as an Ecosystem Approach, even fewer as an Ecosystem Services Approach. That said, many have followed the main attributes and principles of the Ecosystem approach, including extensive community involvement and stakeholder engagement, decision-making at the lowest, local scale, multiple benefits, scenario planning and adaptive management. In this way, we were able to look at certain projects in retrospect and note that they could claim with some justification that they adopted at least the majority of the 12 principles of the Ecosystem Approach, as identified in the Convention on Biological Diversity.

One of the reasons for this lack of clarity is undoubtedly the similar lack of clarity as to what the Ecosystem Approach actually is and what adherence to it actually involves. Moving away from the original 12 principles, a number of guidance and policy documents have re-interpreted and re-framed these into a smaller number of different principles, tasks and steps to follow.

Interest in the identification and measurement of ecosystem services is a much more recent aspect of pilot projects, but one that is seen as of increasing importance and relevance at a number of scales. It goes beyond principles towards a more definite identification of services, their valuation and delivery, framing the rules of engagement and management decisions. This has been the subject of increasing academic and research interest, both from a bio-physical and social science approach.

No one single governance model was identified for successful delivery of pilot projects, rather a partnership approach with a variety of agency, NGO, academic and local authority leads were apparent.

In most instances, the main challenge facing those trying to develop projects with a significant element of ecosystem services in them has been, and continues to be, a lack of ready tools and techniques to identify, map, measure and value ecosystem services in practice on the ground. Further development and testing of tools, along with ready access and capacity building among key stakeholders is required.

Integration with river basin management planning at a catchment scale was not seen as a major issue for most projects. Only the Environment Agency had undertaken a detailed assessment, mapping the processes involved in adopting an Ecosystem approach against their own internal processes for river basin management planning and delivery. This is already underway in SEPA, and collaboration between organisations should be further enhanced.

Integration of the Ecosystems approach and the use of ecosystem service mapping and evaluation needs to be spread to other policy areas beyond just the immediate environmental grouping.

The few active delivery projects that have formally adopted an ecosystem services approach from the outset, notably the three Natural England upland catchment pilots and those involving the West Country Rivers Trust were the ones from which most lessons could be learned.

There is a clear need for a series of pilot delivery projects, operating at a number of nested scales to prove delivery in practice, beyond just the stages of co-creation of catchment plans and future scenario planning.

Key words

Ecosystem Approach, Ecosystem Services, Pilot catchments, River basin planning

1. INTRODUCTION

This report is one part of the wider project *CATCH II - Fully integrated catchment management planning (CRW007)*. The other component undertaken by the University of Dundee focused on a review of the challenges associated with delivering national policies at the catchment scale, and with particular respect to three areas: - aligning planning processes with Catchment management Planning; working at multiple scales; and engaging stakeholders.

The Ecosystem Approach, as defined in the Convention on Biological Diversity (UN 1992) is a “*strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.*” Along with the more recent focus on ecosystem services, introduced in the Millennium Assessment (2005), this approach offers a new conceptual framework for the potential delivery of multiple benefits in an integrated manner (Maltby and Acreman 2011).

Whilst not solely referring to integrated catchment management, or the wetland environment, this connects human well-being to the sustained functioning of the environment through ecosystem processes and services (Haines-Young and Potschin 2010). Integration of supporting, regulating, provisioning and cultural services is fundamental, but so too is the need to address social and economic issues alongside bio-physical measurements and targets. When considering the wetland environment, the need to think, plan and engage all relevant stakeholder communities at a catchment scale is essential to the delivery of ecosystem services.

In the last decade, catchment management has seen a wealth of new legislation and policy initiatives responding to demands for better delivery of multiple benefits - for society and the environment - at both the local and global scale (Rieu-Clarke and Spray 2012). Much of this has been in the form of “top down” legislation (e.g. the EU Water Framework Directive, the Water Environment & Water Services (Scotland) Act, etc), but both within this legislative approach and the policy initiatives that sprung from it, there has been an increasing focus on the importance of a holistic view of catchment processes and outcomes, and of the need for effective and timely stakeholder participation (Marshall *et al* 2010).

The original CATCH Handbook (CATCH 2009) was one such early contribution to this process to aid implementation of river basin management planning from a “bottom up” perspective. It was grounded in local community action, knowledge and experience, working in partnership with agencies, councils, landowners and other stakeholders to deliver improvements on the ground.

The growth of such local catchment-based organisations, and the potential uptake by such partnerships of a more formal ecosystem approach provides an opportunity to turn concepts in to policy, policy in to practice, and to assess approaches to delivery on the ground (see for instance the Defra Strategic Evidence and Partnership Project’s analysis of the role of Rivers Trusts <http://www.riverstrust.org/projects/sepp/index.html>). In doing so, they seek to bridge the implementation gap that has, until now, been a feature of much debate and frustration around the delivery of integrated water resource management and ecosystem services (Cook and Spray 2012).

In many instances, the tools for taking forward the ecosystem services approach are still in their infancy (as is the competency to use them), especially for such tasks as mapping and valuation of certain ecosystem services (see Acreman, Ed: 2011 special issue of Hydrological Sciences Journal). In other situations, co-construction of scenarios for future catchment management plans and options have been well developed, but delivery on the ground of environmental, economic and societal improvements has not (or not yet) been a part of such projects. And in all cases, there remains the challenge of integration with more formal catchment management processes, and top down requirements acting at a larger scale. Our research therefore aims to learn from on-going catchment management projects and policy experience, in particular with regards to linking an ecosystem approach with other initiatives for integrated catchment management.

Our approach to this element of CATCH II was very much dictated by the discussions at the Start up project meeting in Aberdeen on October 18th. Given the existing work on Ecosystem Approach case studies being undertaken by JHI itself (as part of the wider RESAS Research programme), alongside immediate interest from other bodies (e.g. SEPA), we agreed that our focus would be on UK initiatives outwith Scotland. We would concentrate on examples where an ecosystem services approach had been taken, reflecting progress in both policy and practice. In doing so, we built on our work for the other part of the *CATCH II* project, on *Fully integrated catchment management planning*, to ensure we used knowledge and information gained through interviews and ideas from catchment organisations, as well as liaising closely with people in SNH, SEPA and JHI undertaking similar work.

2. RESEARCH DESIGN

Our approach has been to build upon our work in *CATCH-II* and to focus on initiatives where an ecosystem services approach has clearly been taken. In doing so, we targeted both policy development and practice. We thus centred this around a review of key work to date, and a series of interviews with policy and operational staff in the main organisations actively involved in developing the Ecosystem approach on the ground outwith Scotland. From this, we drew up a list of potential pilot projects to investigate further as key UK case study examples, as well as reviewing the relevant elements of the Millennium Assessment, the UK National Ecosystem Assessment and TEEB.

Our review of case studies included those drawn upon as examples in the UK National Ecosystem Assessment Technical Report chapter on Freshwaters – Open waters, wetlands and floodplains, as well as examples from workshops attended, examples from organisations we interviewed as part of the *CATCH II* project, and case studies to which we were drawn attention in response to questions in our interviews with key practitioners.

We held structured interviews in person on the Ecosystem services approach with multiple representatives from the following organisations:

- Joint Nature Conservation Committee (JNCC)
- Natural England (NE)
- Environment Agency - HQ, Evidence Directorate, and Environment & Business directorate (EA)
- Department for Environment, Food and Rural Affairs (Defra)



- Association of Rivers Trust (ART)
- West Country Rivers Trust (WCRT)

In addition, we used our attendance and contributions to a series of workshops and seminars on Ecosystem services and approaches to gather further information in discussion with key players, including the:

- SNH Ecosystem Approach in Action Workshop - Edinburgh December 19th
- SEPA/CREW Water-related Ecosystem Services Indicator Workshop - Perth, March 22nd
- West Country Rivers Trust Ecosystem Services seminar - Scottish government April 16th

As well as building up an overall picture of UK experiences, challenges and solutions, our investigations focused on four main areas:

- Which organisations have utilised an Ecosystems services approach in catchment management in the UK – in policy and practice?
- Do they have any common aims and methodologies used?
- How are organisations attempting to integrate their approaches with other operational and planning systems already in place at a catchment level? and
- How are organisations engaging with key stakeholders and local communities on the ground?

The research phase spanned the period between November 2011 and April 2012. Interviews were held face to face in all cases bar one, and a written note produced immediately after and, where possible, checked for accuracy with those involved. The same four themes above were covered in each case, as well as general information on the case studies themselves. Themes were then examined to identify commonalities and differences between projects, and preliminary results were presented at a stakeholder workshop in March 2012. The workshop encouraged input and debate with national and local Scottish policy-makers and stakeholders working on ICM. The workshop, and a follow-up questionnaire, provided an opportunity to refine information needs and adjust the last stages of data analysis.

3. OVERVIEW OF THE ECOSYSTEM APPROACH AND ECOSYSTEM SERVICES

The Ecosystems Approach owes its origin largely to the output of the Convention on Biological Diversity in 1992, or more accurately to the plan articulated by the Convention of the Parties at Jakarta in 1995. This latter provided 12 principles that can and should be applied to any decision-making process or plan:

1. The objectives of management of land, water and living resources are a matter of societal choice
2. Management should be decentralized to the lowest appropriate level
3. Ecosystem managers should consider the effects (actual and potential) of their activities on adjacent and other ecosystems

4. Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: (a) reduce those market distortions that adversely affect biological diversity; (b) align incentives to promote biodiversity conservation and sustainable use; and (c) internalize costs and benefits in the given ecosystem to the extent feasible
5. Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach
6. Ecosystems must be managed within the limits of their functioning
7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scale
8. Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should beset for the long term
9. Management must recognise that change is inevitable
10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity
11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices
12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

As stated in the UN Convention on Biological Diversity (2000), the Ecosystem Approach is: *“a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.”* The 12 principles clearly recognise that any adoption of this approach will mean dealing with the complexities of both bio-physical and human systems, and indeed the principles can be grouped to reflect these different aspects as relating to: management the involvement of stakeholders; societal choices and the use of evidence-based science.

At the outset though, we make a distinction between the **Ecosystem Approach**, and the subsequent and more focused attention on ecosystem services (what might be called an **Ecosystem Services Approach**) - although the two concepts are intrinsically linked. The Ecosystem Approach does recognise that new forms of valuation and assessment are needed, and that different sectors of society and different cultures will see ecosystems very much within the context of their own particular environmental, economic and societal needs. However, only Principle 5 specifically refers to ecosystem services and on its own very little further direct development of this particular concept occurred until the Millennium Assessment in 2005.

Whilst **the Millennium Assessment** <http://maweb.org/en/Index.aspx> is not the first such interpretation of this concept of ecosystem services (its early origins can be traced back to at least the 1970's), it has become to be seen as the dominant interpretation of what is sometimes now claimed as a new paradigm. Certainly, the period since the publication of the Millennium Assessment has seen a major increase in research and management initiatives directed towards an ecosystem services approach. What the Ecosystem Approach does not do itself, and what the Millennium Assessment and latterly also TEEB starts to do, is to develop clear ideas and a potential new conceptual framework for the detailed assessment and management of ecosystems in terms of the values and services that flow from ecosystems to humans. In doing so, it goes beyond the management and scientific principles of the

Ecosystem Approach, and focuses firmly on the connectivity between functioning ecosystems, the services they produce and human well-being.

Perhaps most significantly, the Millennium Assessment introduced a conceptual framework that identifies the various types of services that healthy functioning ecosystems provide – supporting; regulating; provisioning; and cultural - and the need to recognise, value and protect these. However, this simple definition hides an increasing debate on typologies and terminologies, and increasing confusion as to linkages between services. This framing has led to a focus on attempts to identify these services, to map them, to map those suppliers and beneficiaries (and losers), to value them (especially in non-market terms), and to consider how they might be “traded” when it comes to decisions as to how and which to favour ahead of other competing services. In particular, it has led to the development and consideration not so much of the absolute value that such services provide, as to marginal values and the potential to develop scenarios that allow stakeholders to choose between different futures.

The UK National Ecosystem Assessment (2011) <http://uknea.unep-wcmc.org/> takes the process further than the MA, with a detailed account of levels of ecosystem services, trends and drivers in each country, as delivered by broad habitat groupings. It concludes with a range of potential future scenarios, and the policy options that might lead to their respective development or avoidance. The chapter on freshwaters (Maltby *et al* 2011) highlights that throughout history, the integrity and effective functioning of freshwater ecosystems have been compromised and their multiple service provision “traded off” against delivery of provisioning services, such as food production, with little appreciation of the true cost or the losers from this changed environment.

The UKNEA identifies a wide range of ecosystem services provided by the main freshwater habitats in the UK (rivers, lakes, ponds, grazing marsh, reedbed, fen and lowland raised bog), and the significant contribution that these habitats make to provisioning, regulating, cultural and supporting services. However, as noted in the UKNEA, while many of the final ecosystem services provided by freshwaters are well known, there are very few studies in the UK that quantify the value of these services; that have investigated interactions between delivery of services and ecological function; or have addressed the issue of the area or condition of habitats required to deliver such services. This is despite freshwaters being amongst the most studied and monitored of all habitats, with a wide range of potential indicators of change being available across the whole of the UK. Not all freshwater habitats, however, perform all ecological processes and functions to the same extent, and indeed the degree of service delivery varies over time and space within a catchment.

Nevertheless, increasing attention has been paid to wetland evaluation and to promoting the appreciation of the value of wetlands to users and authorities (Turner *et al* 2008). A limited number of key studies (see below) have formed the core of academic research covering a range of services with particular emphasis on flood risk management, biodiversity conservation and carbon management in peatlands. Whilst good for identifying the inherent conflicts between services - in particular provisioning services and most other services provided by wetlands - and in highlighting the nature and impact of synergies and trade-offs, many of these studies have largely been academic and scenario-based studies, rather than delivery programmes on the ground.

Ultimately, this focus on ecosystem *services*, as with the Ecosystem Approach looks to provide the framework for better decision making. This includes ensuring that: firstly, the ecosystem *services* framework seeks to capture and take into account the *full* range of services that ecosystems provide; and secondly, where tradeoffs between different services are inevitably made, that this is done in a way that identifies and engages with all relevant stakeholders. However, while conceptually sound, implementation of the totality of such an approach has been rare. The challenges inherent in identification and valuation of a full range of ecosystem services; in making decisions on tradeoffs between services; and in engaging all relevant stakeholders within these processes are beset with practical difficulties.

The Economics of Ecosystems and Biodiversity (TEEB) series of reports has been another key driver of policy thinking, though largely focused at international initiatives within the context of highlighting local, national and global economic benefits of biodiversity. The first report (TEEB 2010) highlighted that by failing to take proper account of wildlife and the natural environment, politicians and others are effectively ignoring the value of ecosystems to economies and society, and risk making the wrong decisions in responding to challenges of resource allocation, both locally and globally. The most recent publication, *The Economics of Ecosystems and Biodiversity in Local and Regional Policy and Management (April 2012)* brings much of the earlier thinking together and offers examples of successful implementation of a local approach in management and planning, as well as drawing attention to potential tools and practical guidance - see:

<http://www.teebweb.org/ForLocalandRegionalPolicy/tabid/1020/Default.aspx>

This report does not address issues such as integration with catchment management, nor does it include many UK or indeed European examples, focusing instead largely on international examples where elements of an ecosystem approach have been included within different projects. Tools such as the *InVEST* model are shown to be effective in helping scenario planning for land-use decisions, but less so for actual management.

4. ECOSYSTEM APPROACHES IN POLICY

The policy background for current work on an ecosystems approach within the UK lies with the key reports mentioned above – the CBD Ecosystem Approach, the Millennium Assessment and TEEB. More recently, the European Environment Agency (EEA) has published an Experimental Framework for ecosystem capital accounting in Europe (2011). These are being developed to provide information on the environment and natural capital, in order to broaden the scope of variables taken in to account in policy-making and hence improve understanding of the interdependence and interactions between the economy and the environment. It is unclear as yet how this will be factored in to policy development within the UK at this stage.

4.1 Department for Environment, Food and Rural Affairs (Defra)

Defra's evolving approach to integrated water management and an ecosystems approach was perhaps first formally articulated in the 2005 report **Making Space for Water**. This heralded a new way of thinking that put sustainable management of catchments, multiple benefits and stakeholder engagement much more to the fore. The 2007 cross-government natural environment Public Service



Agreement (PSA) then set out a vision to secure a healthy natural environment for today and the future, and committed Defra to developing the strategic approach.

In 2007 Defra published ***Securing a healthy natural environment: An action plan for embedding an ecosystem approach***, and also in 2007 ***An introductory guide to valuing ecosystem services***. To embed an ecosystems approach in policy-making and delivery, the guide sets out 5 Core Principles:

- Taking a more 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 recognizing the cumulative impacts of decisions
- Promoting adaptive management of the natural environment to respond to changing pressures, including climate change.

Within this programme, Defra identified a number of priority areas for action:

1. promoting joined-up working within Defra and the Defra network to deliver environmental outcomes more effectively
2. identifying opportunities for mainstreaming an ecosystems approach
3. using case studies that demonstrate the benefits of taking an ecosystem approach
4. developing ways of valuing ecosystem services
5. developing a robust evidence base.

The current policy framework for an ecosystems approach is provided by **Defra's Natural Value Programme**. This recognises that a more strategic and systematic approach is needed, one that encourages a better understanding of the value of the natural environment to society, and which brings together a wide assembly of stakeholders interested in the multiple benefits to be gained by an ecosystems approach.

Much of the work of the Natural Value Programme was central to the 2011 Natural Environment White paper (*The Natural Choice*). It is based around improving decision making, such that:

- The value of ecosystems (natural capital) and the services and resources they provide is properly reflected in decision making, economy and markets – in terms of costs, benefits and welfare / wellbeing
- The correct incentives for action are in place and work appropriately for both the service providers and beneficiaries
- Integrated management of assets and services at the right spatial scale is practicable and encouraged.
- Critical gaps in knowledge base are prioritised and filled through the most appropriate mechanisms.

More specifically, the Natural Value Programme has 5 objectives:

1. Enable and influence senior and practitioner level decision makers / policy makers in a range of key audiences, so that they mainstream the good practice
2. Identify and address key gaps in the current knowledge base about ecosystem services and their social and economic value, which allow for improvements in the application of this knowledge to decision-making
3. Scope, prioritise and support the establishment of new ground-breaking, innovative interventions which have a wider transformational benefit in the economy / society, acting as catalysts for change
4. Develop and deploy a coherent and compelling narrative which articulates and advocates the value of our natural environment (its capital, resources and services), corporately, within Whitehall and in our priorities for the EU and Internationally
5. Work to achieve this more efficiently and effectively as a Programme.

In looking to demonstrate the value of taking an ecosystem approach to policy and decision making, Defra are evaluating four demonstrator projects to better understand the costs and benefits of making the links between ecosystem services and human well-being in decision making at different spatial and temporal scales. These are the:

Natural Economy Northwest Green Infrastructure Demonstration project

The East of England Gaywood River Valley Living Landscape Project (how the approach is being applied to flood risk management)

The Southwest Finding Sanctuary Project (how the approach is being applied to a marine coastal zone)

The Southwest Wetland Example of Payment for Ecosystem Services Project: River Fal

By the end of the overall programme (2014), the aim is that decision and policy makers across Government (and outside) will be persuaded that they need to think in new ways about working with the environment, that they will be equipped to do this routinely, and that they will have the evidence they need to make better decisions.

In our meetings with Defra officials in London, there was a clear emphasis on the valuation side of the ecosystems approach, with particular interest in developing better understanding of the potential of payments for ecosystem services (PES) models. This follows the recognition in the Lawton Review (Lawton *et al* 2010) of the urgent need to “develop market mechanisms through which landowners can realise the value of the ecosystem services that their land provides to society”. Work on developing models for the set up and operation of PES schemes was seen as key, and a Best Practice Guide for PES is in production. Existing examples from which lessons can be learned include several catchment approaches, including the West Country Rivers Trust/South West Water’s *Upstream thinking* and United Utilities *Sustainable Catchment Management Programme (SCaMP)*. There is particular interest in learning to understand different stakeholder perspectives and how to encourage additional “buyers” on the back of further promotion of schemes such as water payments for catchment land and water improvements.

4.2 The Joint Nature Conservation Committee (JNCC)

JNCC describes the Ecosystem Approach as a fundamental delivery mechanism for progress towards sustainable development in their 2007 publication: *The Ecosystem Approach: Experiences from the UK*. Whilst not seen as a formula, the Ecosystems Approach is described as a framework, which can be adapted to suit all issues and situations. They provide five points of operational guidance:

1. Focus on the functional relationships and processes within ecosystems
2. Enhance benefit sharing
3. Use adaptive management practices
4. Carry out management actions at the scale appropriate for the issues being addressed, with decentralization to the lowest level, as appropriate
5. Ensure intersectoral co-operation.

They then provide a 9 point task list for addressing the problems identified for resolution through the Ecosystems approach, before adding a further 4 cross-cutting issues (capacity building & participation; information, research & development; monitoring & review; governance) that also need to be considered when applying the approach. The case studies provided in this publication do not cover catchment issues, but reference is made to the CBD Ecosystem Approach Sourcebook www.biodiv.org/programmes/cross-cutting/ecosystem/sourcebook/home.shtml in which the case of the West Country Rivers Trust is included. This practical application of the Ecosystem Approach in river catchments is a rare example where the approach was deliberately adopted from the outset, and is proving very successful (see below).

In our further discussions with JNCC, they noted that all UK administrations were moving towards an ecosystem services way of thinking. This included not only the Natural Environment White paper and the Lawton Review, but a refreshed England Biodiversity Strategy (see below) and would also be influenced by the proposed EU Directive on Environmental Accounting which will introduce requirements for member states to develop metrics for environmental accounting.

JNCC were increasingly looking at a number of cross-cutting initiatives, particularly around improving the evidence base. These include:

- ***Spatial frameworks for assessing biodiversity and ecosystem services*** – looking to develop ecosystem service mapping utilising available spatial data sources, with rules and reference values that allow services to be quantified (and then valued)
- ***Improving mapping/monitoring of habitats using remote sensing (the Crick Framework)*** – relevance to integrated catchment management seen as enabling cost effective habitat mapping and rapid assessment. Phase 1 results: <http://jncc.defra.gov.uk/page-5663>
- ***Biodiversity Action Reporting System (BARS)*** - being redeveloped to provide a spatial tool that integrates local and national actions.

4.3 Natural England

Natural England's work on ecosystem services and catchments seeks to identify the range of ways the natural environment provides benefits to society and to engage the beneficiaries in reaching decisions



about the objectives and priorities for their environment. Their evidence programme focuses on identifying and mapping ecosystem services, understanding how they provide benefits, and how they can be valued and considered in decisions about projects for, or affecting, the environment.

Currently, relevant work is dominated by their **three Upland Ecosystem Pilots** - through which they look to test the Ecosystem approach in practice, by engaging with stakeholders to undertake land and water management through the lens of ecosystem services (see below). In earlier work, they have been deeply involved with partners in the East of England Region & Government Office pilots. This is set within a context of the Natural Environment White paper and the Lawton Review (Lawton *et al* 2010)

The England Biodiversity Strategy was re-launched in July 2011 (Defra 2111), and it includes two specific Outcomes that promote integration of ecosystem services and biodiversity:

1c - By 2020 at least 17% of land and inland waters, especially areas of particular importance for biodiversity and ecosystem services, covered through effective integrated and joined up approaches to safeguard biodiversity and ecosystem services, including through management of our existing systems of protected areas and the establishment of Nature Improvement Areas; and

1d – Restoration of 15% of degraded ecosystems as a contribution to climate change mitigation and adaptation

4.4 Countryside Council for Wales (CCW)

In the time available, we did not consult with CCW, though we identified key leads and policy initiatives in their Strategic Planning Group, Freshwater Science, Natural Environment Framework and Environmental Economy teams.

In 2010 CCW started work to map ecosystem services, as identified in the UKNEA, at a national and regional level. Their work seeks to inform decision-making on land use options, and the potential trade offs and choices between delivery of different ecosystem services. It uses available information such as high resolution land cover maps and phase 2 field surveys, along with multiple images and data sources to differentiate habitats. From these, rule-based image processing is used to develop maps showing ecosystem service outputs at a national and regional scale. Over time, CCW plans to develop tools that will allow ecosystem services to be taken into account for planning and policy decisions on a local, regional and national scale.

<http://www.ccw.gov.uk/landscape--wildlife/managing-land-and-sea/sustaining-ecosystem-services.aspx?lang=ens>

At a more local scale, work by *Environment Systems* has taken this forward for the Bridgend area in greater detail as well.

4.5 Environment Agency (EA)

The current approach towards embedding an Ecosystem approach into the operations of the EA can be described as “learning by doing”. They are working to set up an internal community of practice, supported by an intranet site of resources, areas for discussion, case studies, etc.. Whilst there is no



formal clear overall strategy (as yet) to embed the approach in the next cycle of river basin plans, scoping work for its use in river basin planning has been under way, and the intention exists to start putting it into early characterisation work in a more narrative way initially, leading to a gradual change in methodology and way of thinking, rather than a sudden new activity.

Initial drafting of top-level guidance on performing an ecosystem service assessment is ongoing. At this stage, essentially this is about “testing a process” to see if it is possible to ‘map’ an ecosystem approach onto the current steps and processes undertaken by the EA in river basin management planning, using a series of internal workshops and worked examples - the river Wandle (urban London); the river Ray (rural Oxfordshire) and the Tamar (Devon). The aim is to deliver the key beneficial ecosystem services associated with the river basin management target objectives, while at the same time improving, or at least not negatively impacting, other ecosystem services. This has been done using the Defra screening methodology (as described in their Guide to Valuing Ecosystem Services) using +/- scoring, rather than attempting an economic evaluation. At this stage no attempt is being made to map services either and, as the aim is to embed within river basin planning, a catchment approach has naturally been followed.

At the same time as capacity building in this manner, the EA has also produced a report (Everard 2009) into the application of ecosystem services in two historical case studies; at a catchment scale (the Tamar) and at a single location (Alkborough managed realignment site). In these cases, the research aimed to evaluate the benefits across the suite of ecosystem services as reclassified by the Millennium Assessment. This served to highlight the increased cost:benefit ratios and net societal value achieved if valuation is spread across a wide range of ecosystem services, rather than only those measured in more traditional assessment methodologies. In doing so, it also showed the necessity to look to integrate the ecosystem approach within operational tools for use by non-specialists, and the importance of inclusive and deliberative stakeholder participation in the process.

4.6 Other policy leads and participants

In addition to the policy directions being followed by the main organisations above, both these and other bodies are actively involved in supporting policy development for ecosystem services and catchment management both directly and indirectly, through research funding, case studies and knowledge exchange.

In January 2012 Defra launched the Ecosystems Knowledge Network, with the aim of sharing experience from projects taking an ecosystems approach: ekn@naturalcapitalinitiative.org.uk. This will include, for instance Defra’s three Demonstration Test Catchments <http://www.demonstratingcatchmentmanagement.net/> which assess water quality improvements from tackling diffuse pollution in an integrated manner at the catchment scale

In 2011, Living With Environmental Change (LWEC) held a number of events to develop a Strategic Framework for the Ecosystems challenge (LWEC 2011). Whilst following the production of the UKNEA, NERC has prioritised further work on biodiversity science and ecosystem services (e.g. BESS), and through the development of new funding streams and networks, such as the Valuing Nature Network,



<http://www.valuing-nature.net/about> and the Catchment Change Network, <http://www.catchmentchange.net/>

Non-governmental Organisations have also helped influence both policy and practice in ecosystem assessment and catchment management, notably the Rivers Trusts, the West Country Rivers Trust, RSPB, WWF and the Wildlife Trusts. Often working in partnership with each other and statutory agencies, their role is key to effective delivery of policy and practice in the ground. See for example the Joint Wetland Vision for England (www.wetlandvision.org.uk) launched in July 2008.

5. ECOSYSTEM APPROACHES IN PRACTICE

5.1 Background to the research

In reviewing potential case studies for investigation, it became apparent that very few indeed had deliberately begun with an Ecosystems approach, reflecting the 12 principles of the CBD, less still from an ecosystems service perspective. From discussions with interviewees, workshops and literature reviews, and building on the long list of Integrated Catchment Management pilots reviewed in *CATCH II*, we selected a range of studies that included, at heart, at least a majority of elements of the ecosystem approach, and which represented a variety of institutional arrangements and scales of engagement in catchment projects. Of these however, many focused on the development of scenarios, tools or stakeholder engagement, rather than actual delivery on the ground and are in effect research studies, rather than reports of implementation in practice.

Key studies include:

- Upland Ecosystem Pilots - Natural England: pilot delivery programme in 3 catchments; in the Lake District, North Pennines, and South West
- SCaMP - United Utilities / RSPB: catchment delivery for biodiversity and water management
- Upstream Thinking (and associated initiatives) - West Country Rivers Trust / South West Water: integrated multi-benefit catchment management delivery, research & development
- East of England Pilots - Government Office East and partners: development of tools for applying an Ecosystem approach in planning and environmental impact assessment at various scales
- Parrett Catchment – Nottingham university & partners: development of tools & methodologies for delivery of an Ecosystem approach for management of wetlands
- Beckingham marshes - RELU funded research project: scenario development for integrating farming, biodiversity & flood management in lowland floodplains
- Somerset levels - Centre for Ecology & Hydrology: research on wetland service trade-offs
- Wandle river – EA / Wandle Trust: scoping processes within river basin management planning
- URSULA – Sheffield university & partners: urban river corridor research on tools and methodologies for development of sustainable communities

Other projects examined included elements of the ecosystems approach and even more may be able to “back cast” to claim that they too adopted elements of an ecosystem approach. In reaching conclusions

to the main questions posed however, we have drawn on all these experiences, rather than just those referred to above.

5.2 Research Results

5.2.1 *Aims and Objectives of Catchment Ecosystem Service Approach Projects*

- Project aims and objectives varied, depending on interests of lead institutions and funding mechanisms
- Overall, the objectives of Agency projects are aligned to meet the needs of the Defra Natural Value Programme (Natural England), or river basin management planning (EA)
- Research projects were in response to research funding opportunities (e.g. RELU) and reflected interest in bio-physical sciences; in environmental economics and valuation; or in societal engagement and stakeholder participation
- These and other NGO led projects often reflect either a community of interest (e.g. flood risk management), or a community of place (e.g. West Country Rivers Trust; SCaMP)
- The majority of projects are still at a research or capacity building stage, with emphasis on either stakeholder engagement to enable scenario planning, or on tool development and methodology testing (e.g. East of England pilots)
- Time scales for project delivery are dictated largely by funding streams (e.g. Water utilities Asset Management Programme; research grant constraints)
- Success criteria, where identified reflect the early stage of many projects (up until and including co-creation of a plan). Thus Natural England's pilots' success criteria are:
 - Local people working together making decisions about preferred scenarios
 - The consensual creation of a delivery plan
 - Pooling resources from a number of agencies, external public and private sources
 - Identification of what ecosystem services are currently provided in each area
 - Valuation as to whether this approach is worth taking in respect of results achieved
- There is no specific co-ordination across projects, except at either the Defra programme support level, or between the Natural England pilots, or the EA process mapping
- The EA has produced an initial map of ecosystem projects, but recognise that this is incomplete

5.2.2 *Choice of Pilot projects*

- Pilot sites were often “self chosen”, based on working with groups or individuals already known and willing to explore an ecosystem approach to tackle an existing location or issues (e.g. Natural England's 3 Upland choices were partially determined by Water company interests and initiatives)

- Stakeholder choice was seen as largely self-evident, reflecting those involved in addressing, or impacted by the main issues in a catchment
- Several interviewees recognised that not enough engagement was achieved with Local Authorities as wanted or could be beneficial (e.g. West Country Rivers Trust)
- An exception to the above is the East of England study which looked to develop planning tools for applying an Ecosystem approach around 5 demonstration pilots, including Marston Vale (landscape connectivity, restoration and regeneration); the Cambridgeshire Fens (river catchment management, soil & land use management over extensive rural areas); and the Blackwater estuary (shoreline management planning)

5.2.3 Methodologies used

- Very few studies set out to adopt an Ecosystem approach, let alone identify, measure and seek to deliver multiple ecosystem services at a catchment scale. Perhaps, only the West Country Rivers Trust's work in Cornwall and Devon can claim to have done this in any comprehensive manner to date, though Natural England's Upland catchment pilots aim to deliver this in due course, and have set out a framework to achieve this.
- The pilots are characterised by a wide range of methodologies and approaches, reflecting their different specific aims
- Methodologies utilised in delivery projects are heavily influenced by constraints on resources, land ownership, competencies and timescales (e.g. SCaMP)
- The lack of a standard methodology or widely-accepted tools for activities such as mapping the location and extent of ecosystem service delivery, or the providers and beneficiaries of ecosystem services is perhaps the most common complaint
- Research studies developed tools specific to the needs of their projects
- Scenario planning and enhanced stakeholder engagement was a feature of most pilots (e.g. URSULA)
- Few projects have so far used detailed monetary valuation techniques, with the exception of particular research studies focused on this issue
- Interest in monetary and non-monetary valuation though remains high, and the South Pennines Natural Character Area being taken forward as one of the Natural England pilots has seen extensive economic evaluation done with Yorkshire Water, leading to an internal report *Valuing land-use changes in the Keighley and Watersheddles catchment 2011*
- In this instance, the methodology used was the Value Transfer Guidelines (eftec 2010); the aim being to provide a "first cut" estimation of the value of ecosystem services under different scenarios of land use and management interventions, and compare with potential costs.

- Trade off techniques, where explored have largely involved scenario building, based on increasingly good bio-physical science evidence base (e.g. Somerset levels) and enhanced methods of stakeholder participation
- There is increasing interest in the development of Payments for Ecosystem Services, with work by the West Country Rivers Trust looking to embed this within a catchment context. (On PES, see also for example the EU WATER project, led by West Country Rivers Trust: - *Wetted Land: the Assessment, Techniques & Economics of Restoration* http://www.projectwater.eu/projects/adur_water.html and supported by EA, South West Water and the Association of Rivers Trusts, involving the rivers Adur, Ouse, Axe, Otter, Fal and Exe in England)

5.2.4 Integration with Catchment Management

- The EA have used the Wandle, Ray and Tamar as internal case studies to map the processes inherent in adopting an Ecosystem approach against those involved in river basin management planning. The aim is to embed this within the EA's existing catchment processes and activities
- The Parrett Catchment study examined how an Ecosystems Approach could be used within an English region at the catchment scale, and what tools and methodologies would help achieve this. It looked to promote the approach to improve decision-making on issues related to planning, development, waste, energy and land management activities in the catchment
- The Beckingham marshes study also looked to integrate a range of key ecosystem services within a catchment setting through scenario building around flood plain management options
- Other projects have largely begun as stand alone projects, such as Natural England's pilots and have addressed integration as a matter of consistency within the context of planning and development issues in the areas concerned
- Overall, integration with river basin management planning has not been a prime focus as such, but all studies recognised the need to integrate with wider catchment management issues and plans, and see the approach as consistent with this anyhow

5.2.5 Stakeholder and Community Engagement

- At a general policy level, all interviewees recognised a move towards a localism agenda; one with which the Ecosystem approach clearly fits and helps address at all scales
- Choice of with which stakeholders to engage was not seen as an issue, and very much followed experience and advice from local staff on the ground
- Consultation fatigue had not been an issue so far in the case studies examined, but all were aware of the possibility, and the need to deliver on proposals if participation and engagement is to be retained. That many of the pilots were not yet at a delivery stage means that it was difficult to assess how this might develop in the future

- The need for a national engagement plan and individual Communication plans for projects was seen as important (e.g. Natural England pilots)
- Projects have utilised stakeholder groups to help define ecosystem services, for example getting them to identify benefits from wetlands and mapping these on catchment maps provided in workshops (e.g. Natural England Bassenthwaite pilot)

6. OUTCOMES AND POLICY RECOMMENDATIONS

6.1 Implications for current Policy Debate:

This review reveals that (as in Scotland) there has recently been a major change in the UK environmental policy landscape, resulting in a move towards a wider and deeper adoption of the Ecosystem Approach across a wide part of government.

Externally, this has been driven by the findings of the Millennium Assessment, TEEB and the UK National Ecosystem Assessment; internally by Defra's Natural Value Programme. Together these reports paint a picture of degraded wetland environments, with continuing loss of biodiversity, where provisioning services (mainly agricultural production) have greatly increased, but at the expense of supporting, regulating and cultural services.

Drivers for change are often acting at a scale that is greater than individual and local community decision-making processes and the causes of environmental change are both complex and complicated. The ecosystem approach seeks to address the nature of such "wicked" problems by bringing together community and expert knowledge, involving multiple disciplines and, through the use of participative techniques to review alternative scenarios based upon different balances between ecosystem services.

By involving a wide range of stakeholders in the process, the ecosystem approach seeks to counter the trend for local communities to become remote from decision-making about the water and wetland environments that once were an essential and obvious part of their livelihoods.

Whilst there is a wealth of new policy advice, and an increasing array of research studies addressing valuation techniques, assessing individual ecosystem services (e.g. water quality improvement), or combinations of services (e.g. floodplain management options), there are few projects that have gone beyond the planning stages and have actually delivered improvements on the ground, and the number of truly integrated projects is limited.

There is a lack of standard accessible tools and methodologies for identifying, mapping and assessing the value of ecosystem services. This lack of competency, and often also capacity, remains a major barrier to the rapid and widespread uptake of the ecosystem approach.

Whilst all ecosystem projects rely on a partnership approach for effective planning and delivery, no one single governance structure is necessary to deliver improvements on the ground at the catchment scale.

Integration with existing processes and plans for catchment management has not been a barrier in taking forward the ecosystems approach at either a national, regional or local level.

6.2 Policy Recommendations

- The need to continue to embed the Ecosystem approach in a wide range of water and land management policies is fundamental to further integration and progress.
- Process mapping of the ecosystem approach to development planning, land use planning and river basin management planning is required, so as to embed and translate the approach into existing methodologies and practices.
- Pilot studies are required at a number of scales - regional and local - that transcend individual catchment boundaries and address a combination of ecosystem services together.
- Support for a series of Delivery pilots that go beyond the co-construction of ecosystem catchment plans are essential. Learning by doing and adaptive management needs to be fostered and resourced.
- Innovative funding mechanisms, such as Payments for ecosystem services need to be explored and tested in the field to bring new partners and organisations in to the process.
- New accessible tools and methodologies need to be produced urgently to help identify, map and value ecosystem services. Similar methodological requirements are necessary for enhanced stakeholder engagement, scenario building, measuring and monitoring.
- Capacity building is required to enable communities, Local authorities, Agencies, NGOs and academics to work in partnership towards delivery of improvements at the catchment scale.

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