

The Ecosystem Approach

What does it mean in practice?

Conference/Workshop 8th July 2008

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1 Agenda

From 9:15 Getting Started - Registration, coffee and tea will be available.

9:45 Welcome

The Ecosystem Approach and systems thinking

- What is the Ecosystem Approach Dr Diana Mortimer - Joint Nature Conservation Committee (JNCC)
- Systems Thinking Prof Andy Lane - OU Systems Group

Core Elements of the Ecosystem Approach

- Stakeholder participation Diana Pound - dialogue matters
- Ecosystem Function Philip Bubb –Ecosystem Assessment Programme of UNEP- WCMC
- Ecosystem Services Prof Roy Haines Young and Dr Marion Potschin - Centre for Environmental Management at the University of Nottingham

11:30 Tea and Coffee

11:50 The Ecosystem Approach in Practice

- At a strategic level - The Defra Action Plan Dr Robert Bradbourne - NESU Defra
- At organisational level - the challenge of delivery Dr John Hopkins - Natural England
- At a local level - Thanet Coast Diana Pound - dialogue matters

1:00 Lunch

1:45 Thinking about the Ecosystem Approach? - Workshop session

1. What are the strengths and benefits of the Ecosystem Approach?
 2. What new opportunities does the Ecosystem Approach present?
 3. What are the challenges of implementing the Ecosystem Approach?
 4. What are we already doing that is on the right track?
 5. What skills and knowledge do we need to develop?
 6. What are the benefits of focusing on ecosystem services?
 7. What are the risks of focusing on ecosystem services?
 8. How do we shift from reductionist science and sectoral policy to systems thinking?
 9. What other case examples are there?
- Out of everything you have heard or discussed today what topic or idea do you most want to discuss further?

2:50 Tea and coffee

3:10 Workshop Sessions

- Based on topics to emerge from the earlier session.

4:00 Wrap up

4.30 Finish

1.1 What is it all about?

In preparing for this event, my discussions with speakers often included whether or not it matters that so many different terms are being used – sometimes to mean the same thing and sometimes the same phrase is used to mean different things. The phrases being used include: Ecosystem Approach, ecosystems approach (lower case sometimes used deliberately to denote something different), ecosystem-based approach, ecosystem function approach, ecosystem services approach, and ecosystem thinking.

If this change in language means we are all starting to think more holistically then that can only be a good thing. If on the other hand, our casual use of these terms is confusing each other, watering down what they mean, resulting in us reinventing wheels, and missing out on realising that (particularly for the Ecosystem Approach) there are well-developed principles and guidance that could, when implemented, deliver good practice in management and genuine sustainability, then there is a problem.

The Ecosystem Approach

The Ecosystem Approach has been adopted by the Convention on Biological Diversity (CBD) as the main way of delivering genuine sustainability and the primary framework for action. It is defined as '**a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way**' (CBD).

To guide implementation the CBD has agreed 12 Ecosystem Approach principles and 5 points of Operational Guidance and provided implementation guides.

The 12 ecosystem approach principles are:

1. The objectives of management of land, water and living resources are a matter of societal choice.
2. Management should be decentralised to the lowest appropriate level.
3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
4. Need to understand and manage the ecosystem in an economic context.
5. Conservation of ecosystem structure and function to provide ecosystem services should be a priority.
6. Ecosystem must be managed within the limits of their functioning.
7. The approach should be taken at the appropriate spatial and temporal scales.
8. Process and objectives for ecosystem management should be set for the long term.
9. Management must recognise that change is inevitable.
10. Seek the appropriate balance between integration, conservation and use of biodiversity.
11. Decision-making should consider all forms of relevant information (scientific, indigenous and local).
12. Involve all relevant sectors of society and scientific disciplines.

The 5 points of operational guidance are:

1. Focus on the relationship and processes within the ecosystem.
2. Enhance benefit sharing.
3. Use adaptive management practices.
4. Carry out management actions at the scale appropriate to the issue, with decentralisation to the lowest level appropriate.
5. Ensure intersectoral co-operation.

Descriptions

Description:

The 12 principles plus explanation can be seen at:

<http://www.cbd.int/ecosystem/description.shtml>

<http://www.cbd.int/ecosystem/principles.shtml>;

The 5 points of operational guidance at:

<http://www.cbd.int/ecosystem/operational.shtml>

Implementation Guides

Beginners: <http://www.cbd.int/ecosystem/sourcebook/beginner-guide.shtm>;

Advanced: <http://www.cbd.int/ecosystem/sourcebook/advanced-guide.shtml> .

The ecosystem services approach

The ecosystem services approach has a focus on understanding and quantifying the services the natural environment provides for us, and then managing the environment so that the provision of these services is sustained over the long term.

The approach is defined by the Millennium Ecosystem Assessment as a way of ***“identifying, valuing and enhancing the goods and services that the ecosystem provides for us by conserving ecosystem structure and function in a way that ensures these services can be provided over the long term”***.

Services include:

- **Supporting services:** The services that are necessary for the production of all other ecosystem services including soil formation, photosynthesis, primary production, nutrient cycling and water cycling.
- **Provisioning services:** The products obtained from ecosystems, including food, fibre, fuel, genetic resources, biochemicals, natural medicines, pharmaceuticals, ornamental resources and fresh water;
- **Regulating services:** The benefits obtained from the regulation of ecosystem processes, including air quality regulation, climate regulation, water regulation, erosion regulation, water purification, disease regulation, pest regulation, pollination, natural hazard regulation;
- **Cultural services:** The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences – thereby taking account of landscape values;

In effect, this is a focus on Principle 5 of the 12 Ecosystem Approach principles.

Millennium Assessment

<http://www.millenniumassessment.org/documents/document.300.aspx.pdf>

Ecosystem Services

<http://www.ecosystems-services.org.uk/ecoserv.htm>

The following terms are also used – working definitions are provided

ecosystem function

Includes the following:

- The flows of energy, nutrients, minerals, and water within a system.
- The spatial and temporal processes which include connectivity and succession.
- The sensitivity and resilience of the system.
- The predator prey relationships, age structure of species, and whether or not all trophic levels are present and functional.
- The effect of human interventions on ecosystem function arising from extracting and harvesting resources or disposing of waste.

ecosystem thinking

A move away from a focus on habitats and species to consider the structure and function of the natural systems that support them. When used the phrase ‘Ecosystem thinking’ seems not to include the socio and economic parts of the system.

2 The Ecosystem Approach and Systems Thinking

2.1 What is the Ecosystem Approach - *Dr Diana Mortimer*

Dr Diana Mortimer has been leading on the Ecosystem Approach for the Joint Nature Conservation Committee since 2003. She was a key contributor to the CBD's Advanced and Beginners User Guides to implementing the Ecosystem Approach.

What is the Ecosystem Approach?

The ecosystem approach is an exciting concept. Its application seeks to create a world where natural resources and human well-being are both fully taken into account. Adopting this balanced approach enables people and their natural resource use to be placed squarely in the centre of decision-making. Where this takes place a more equitable and long-term future for all can be secured.

The Convention on Biological Diversity (CBD) defines the ecosystem approach as a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

The ecosystem approach can be thought of as a method for working towards sustainable development where this is based on the maintenance of fully functioning ecosystems. The core concept of the approach lies in integrating and managing the range of demands we place on the environment, such that it can indefinitely support essential services and provide benefits for all without deterioration to the natural environment.

The ecosystem approach is not a formula but a framework which can be adapted to suit all issues and situations. It includes processes, functions and interactions among organisms and their environment, and recognizes humans and cultural diversity are an integral part of ecosystems. There are twelve principles that together make up the approach (see <http://www.cbd.int/ecosystem/description.shtml>).

My presentation will explain the links between the ecosystem approach, the goals of the Convention on Biological Diversity (CBD) and sustainable development. It then considers how the ecosystem approach can be used; the relationship between the ecosystem approach and other similar approaches (such as integrated coastal zone management and sustainable forest management) and finally will examine some of the issues that arise when putting the approach into action.

2.2 Systems Thinking – Prof Andy Lane

Prof Andy Lane is currently Director of the OpenLearn initiative at the Open University. He is also Professor of Environmental Systems in the Open University Systems Group working on applications of Systems Thinking to Environmental Decision Making. He has authored or co-authored many teaching texts and research papers dealing with systems and environmental management and also the use of diagramming to aid systems thinking and study. He is a Chartered Environmentalist and founding member of IEEM.

Presentation

One of the difficulties facing newcomers to systems ideas is the notion that thinking about a topic or situation in a different way actually makes a difference. When confronted with a complex situation most people want to do something to solve it or change it; it is not part of everyday culture that simply thinking in a different way will help the situation.

One of the reasons why many people find difficulty with this idea is that the **reductionist** way of thinking has come to dominate our culture. This is a very powerful way of tackling problems, as witnessed by the successes of industrial technology in the realms of increasing levels of material production, well-being and comfort and of science in our understanding of the workings of Nature. So successful has this way of thinking become that there is a widespread, though often unrecognised, assumption that this is the best way to think about everything and so is used in just about every academic discipline and in all aspects of life.

Although the reductionist way of thinking is a powerful way of thinking, it is, nevertheless, limited. Reductionist methods cannot help to cope with problems that arise as a result of the **complexity** and **interconnectedness** between components in a system. Under these circumstances, any severing of the connections in order to make the situation simpler actually changes the situation to be solved. It's not too bad when one knows that the situation is caused by connectedness, but in many situations one isn't even sure of this, and one is certainly not sure which connections are significant and which are not. This is even more so when dealing with **human activity systems** that include human behaviours and purposive decisions in them compared to natural **biological systems** where measurement and modelling can help support the creation of complex mathematical models to represent purposeful behaviours. In these circumstances it is necessary to take the situation as a whole, and approaches which do this are termed **holistic**.

Thinking holistically does not mean that one cannot do anything to simplify the issue at hand. Owing to our inability to think of many things simultaneously, it is essential to simplify complex situations in some way. An holistic approach emphasizes that the simplification should be accomplished in a way that does not overlook the significant connectedness. There are two conclusions that follow directly from this.

1. Since in many situations we will not know which the significant connections and factors are, we should not expect our first attempt to analyse the situation to lead us to the best representation or 'answer'. In general, we should expect to need several attempts at approaching the situation before gaining the confidence that we have identified the important features. This is in contrast to the reductionist approach, which usually presumes that there is one, and only one, right approach and right answer until proven otherwise. The holistic thinker will welcome techniques that generate many approaches, whereas the reductionist thinker will be looking for criteria for reducing the approaches to just one.

2. In order to simplify the situation without reducing the connectedness it will normally be necessary to reduce the level of detail in the representation. This will usually involve regarding the situation in a more abstract fashion. This is another strong characteristic of systems thinking

- that in tackling an issue the first steps are to go up several levels of abstraction; the later stages involve 'coming back down to earth' (even using reductionist methods where appropriate) and relating the general conclusions reached to the specific issue in hand.

One of the central devices used in facilitating a holistic approach to problems is the representation of an issue or situation as a **system**. Perceiving an issue as if it were a system entails representing that issue in such a way as to capture the essential connectedness of the issue. This requires the identification of a **boundary** that separates the system (a chosen selection of interconnected components) from its **environment** and a method or device for representing the system. Systems thinking is an approach for understanding messy situations for some purpose, usually to effect some changes. The key is that it often does it by representing a chosen system of interest, and that is often best done through diagrams or models.

All representations are sense making models of messy situations or complex systems. Diagrams are pictorial representations of our thinking that can help by attempting to capture as much of a situation as possible on one or more sheets of paper or computer screens, showing both components and connections in different ways. Physical or mathematical models provide the means to test assumptions about, predict the behaviour of or understand the dynamics of a chosen system of interest. These models can guide our actions and learning as it is often difficult to express and comprehend complex systems in words alone, particularly where you are covering many discipline areas. They can be used for personal actions or learning or for collective action or learning where many participants contribute to their construction and interpretation, sharing their thinking about a situation.

It cannot be emphasized too much that the point of using the systems way of describing an issue is not to say 'this is how it actually is' but deliberately to generate variety in the way the issue is thought about. This variety is useful, indeed usually necessary, where our conventional or established way of thinking about the issue has not led to a satisfactory outcome. The only criterion for deciding whether a particular representation is a 'good' one or not, is whether it leads to fruitful insights.

Further reading

Lane, A.B. (1999) T551 Systems Thinking and Practice: A Primer, 79 pp, The Open University, ISBN 0 7492 5581 1.

Lane, A.B. (1999) T552 Systems Thinking and Practice: Diagramming, 93 pp, The Open University, ISBN 0 7492 4167 5.

Morris, R.M. and Chapman, J. (2000) T553 Systems Thinking and Practice: Modelling, 100 pp, The Open University, ISBN 0 7492 84080.

All three of these publications are available as part of standalone study packs available from <http://www.ouw.co.uk/classifications/SystemsPractice.shtm> or parts of them are free to study on The Open University's OpenLearn website (www.open.ac.uk/openlearn) under the Technology topic area.

3 Core elements of the Ecosystem Approach

3.1 Stakeholder Participation - Diana Pound

Diana Pound runs **dialogue matters**. She is an advocate for integrated management of the natural environment and the need for systems thinking through stakeholder dialogue. She designed and facilitated the first process in England that deliberately addressed all 12 principles of the Ecosystem Approach for the management of a coastal and marine area. She has contributed to publications on the Ecosystem Approach including for English Nature and Bioforum, and has spoken on the subject at several conferences in England and Africa.

- [The Ecosystem Approach and Stakeholder Participation](#)

Over the last decade there have been significant advances in the science that underpins the management of natural resources (rivers, lakes, seas, biodiversity rich areas and landscapes). This has been made possible in part because of equally significant advances in complex computer modelling and GIS. These can now be used to analyse trends, predict change, create alternate scenarios, and present sophisticated models, data, and maps. It is now even possible to ‘walk’ around virtual land or seascapes and view them from different perspectives or at different stages of change.

These developments will help deliver the Ecosystem Approach, however the Ecosystem Approach requires something more. It is defined as *‘a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way’*.

For this to be achieved it will be necessary for people with very different interests and expertise to be brought together to share knowledge and develop common understanding. This includes different disciplines, different sectors, and the different interests of those who live, work or play in the ecosystem under consideration. It is only when this happens that it becomes possible to find mutually acceptable ways forward and to manage the ecosystem in an equitable way.

However the effort and energy that has gone into the science (and modelling) that is needed to implement some of the ecosystem approach principles, has not been matched by an equal effort in how that knowledge is to be used in decision-making.

We need a shift in understanding about decision-making. It is not commonly realised just how much the way decisions are made affects what decisions are made. A poor decision making process which alienates stakeholders, or ignores some forms of knowledge, will get poor results how ever good the quality of scientific information and expert advice.

It is true that there is increasing recognition amongst the natural environment sector of the importance and benefits of stakeholder participation, but there is less understanding of the principles of designing effective and coherent stakeholder processes, the techniques and skills used, and what constitutes good practice.

Of the 12 Ecosystem Approach principles, 4 mean that we have to get to grips with this and develop better and more equitable ways of making decisions. The four principles are:

Principle	
1	The objectives of management of land, water and living resources are a matter of societal choice.
2	Management should be decentralised to the lowest appropriate level.
11	Decision-making should consider all forms of relevant information (scientific, indigenous and local).
12	Involve all relevant sectors of society and scientific disciplines.

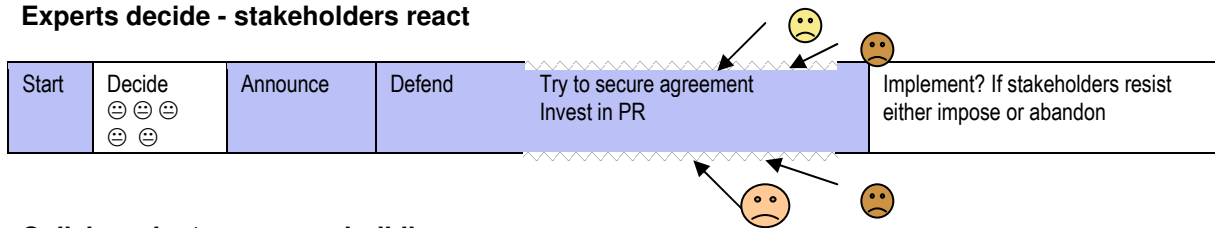
In fact, stakeholder participation and conflict management has now developed as a field of research and expertise in its own right, and the skill of process design and facilitation is emerging as a new profession.

To be regarded as good practice, stakeholder processes require a well-designed, coherent and inclusive participation process with impartial facilitation. Stakeholders are engaged at an early stage when options

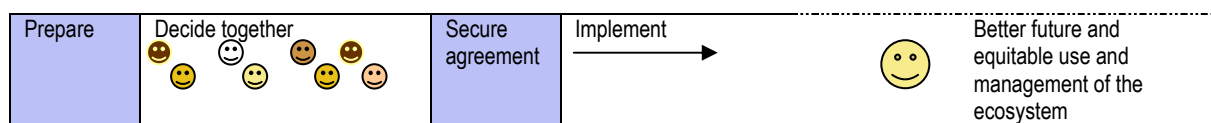
are open. Everyone shares knowledge and insights. Possible actions, ideas and consequences are explored before decisions are firmed up and committed to paper. The process captures the knowledge, views and ideas of a wider group; it builds social capital, enriches the discussion and leads to better informed, better-understood and better-supported outcomes.

The diagram below illustrates the difference between an ‘experts decide’ approach to decision-making to one of collaboration and consensus building:

Experts decide - stakeholders react



Collaborative/consensus building processes



▪ **Social Capital**

A key reason why well run stakeholder processes work, is because they develop and build ‘social capital’. Pretty and Ward (2001) argue that social capital should be seen as one of five key assets essential for sustainable living alongside: natural, physical, financial, and human. They define social capital as the sum of connectedness, trust and goodwill between people and suggest that it has four elements:

- Relations of trust
- Reciprocity and exchanges
- Common rules, norms and sanctions
- Connectedness networks and groups.

Social capital results in co-operation and collective action and so where the agenda is to plan and implement management of landscapes for sustainability, it is essential to understand how to build social capital and harness it for positive change.

▪ **Building Social Capital**

Organisation with decision-making power can relate to other stakeholders in one of four categories based on the extent that stakeholders influence the outcome. The more decision-making power is shared the more social capital will be generated.

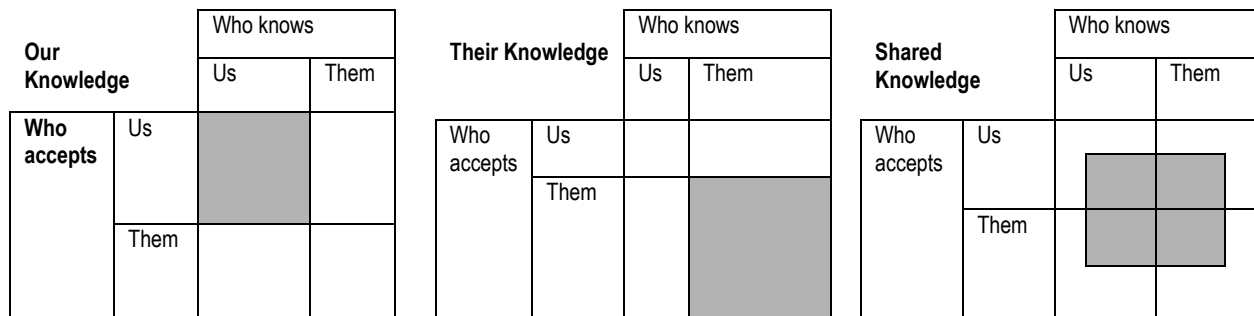
	Role of Stakeholders	Stakeholder's influence over outcome	Amount of social capital likely to be acquired
Information giving	Stakeholders are told what has been done or decided	None	Least
Information gathering	Stakeholders are asked for data that informs the decision making	↕	↕
Consultation	Stakeholders views are passed to decision makers		
Shared decision making	Stakeholders share directly in the decision making	Most	Most

Where issues are controversial or complex (as with ecosystem management) investing time and money in shared decision-making is the best approach because it builds the social capital required for change. In this situation, if specialists decide amongst themselves and then just tell those affected it is likely to prompt a backlash from other sectors.

Whose knowledge counts

When entering into a dialogue with other parties, each person comes with their own knowledge base and their own view of reality. For example nature conservationists frame reality through science, tend not to consider the value judgements that have been used to develop that science, and find it hard to understand how others cannot accept this ‘reality’. However, people from other sectors or interests frame reality differently and use different forms of evidence and knowledge to shape their understanding.

Part of a well-run stakeholder process is to develop a shared understanding of reality so that decisions are well informed from all perspectives. Of course not all of each interests knowledge will be used, and not all will be accepted, but by working to share knowledge and find agreement more sustainable outcomes will result.



Managing conflict

There is now sufficient example of conflict management to know that it demands the very best practice to have a chance of success. It requires careful preparation to: understand the situation, identify all key stakeholders, and evaluate existing or likely tension. Having done this, a trained and skilled person can design a process that deliberately encourages people to build consensus and focus on common ground (not difference). The process should help people to work up from small areas of agreement towards developing trust and finding mutually acceptable solutions. Conflict is immediately reduced when stakeholders feel:

- They have been involved at an early stage when options are open
- They have a genuine opportunity to influence the outcome
- Their knowledge and insights are respected
- They feel listened to

A shift in attitude

Interestingly (and depressingly) at an IUCN workshop of experts (Managing Change in Conservation and Sustainable Development. Valsain, Spain. June 2004) people agreed that one of the biggest problems to achieving better ecosystem management was the attitude and actions of ecologists and other natural scientists. For effective management to take place a shift in attitude towards other stakeholders is needed (see box below).

Change in attitude of environmental managers	
From:	To:
Focus on scientific and technical knowledge	→ Many forms of knowledge are needed and used
Seeing other stakeholders as the problem	→ Realising we are all part of the problem - and all part of the solution
Seeing other stakeholders as a distraction and drain on resources	→ Realising they are a resource – of information, ideas and endeavour
Telling others what to do	→ Listening with an open mind
Pushing others to change	→ Working with others to agree change
Behaving as experts	→ Behaving as partners
Formal approaches	→ Informal and interactive approaches
Our ideas and solutions	→ The best most workable ideas and solutions

Diana Pound 2004 Adapted from Conservation Results by Managing Change. The role of Communication, Education and Public Awareness. IUCN

The IUCN workshop concluded that real progress would only be made when environmental managers understand good practice in communication, have an attitude of respect towards others, engage in principled (the desire to find win/wins and mutual benefit) negotiation and participation, and when capacity has been built to establish good skills and deliver good practice.

If we care deeply about the genuinely sustainable use and management of the natural environment, then good practice stakeholder participation is vital. Stakeholder participation must not be an afterthought in the budget and planning of change. Process need to be well-designed and well-run. When they are, they do what is needed. They:

- Handle complexity
- Integrate science
- Harness other forms of knowledge and know-how
- Handle uncertainty
- Build understanding
- Integrate agendas
- Can be used to plan for the long-term
- Build momentum and support for delivery of crucial actions
- lead to better informed, better-understood and better-supported outcomes

▪ Drivers for participation

Most of this paper has focused on the benefits of stakeholder participation and the importance of process design and good practice. There are also many European and International commitments that promote or require stakeholder participations in environmental decisions. The list includes:

- The Aarhus Convention and the Participation Directive, which give the public the right to participate in environmental decisions at an early stage when options are open.
- Agreements under The Convention on Biodiversity (CBD) which urge parties to ‘...foster stakeholder participation in biodiversity conservation and sustainable use’.
- The Ramsar convention has similar undertakings
- The Ecosystem Approach

▪ Conclusion

A key part of implementing the Ecosystem Approach will be to build good understanding amongst resources managers about the role of participation and the crucial importance of good practice process design and facilitation. It will also be necessary to build the capacity needed to run effective, interactive participation processes with all sides entering into a genuine dialogue to understand each other's perspectives and find an acceptable way forward.

3.2 Ecosystem Function – Philip Bubb

Philip is a Senior Programme Officer with the Ecosystem Assessment Programme of UNEP-WCM. Philip is currently developing materials on understanding ecosystem functioning and the roles of biodiversity as the basis for management actions for the supply of ecosystem services.

Ecosystem Function

The aim of this presentation is to give an introduction to some key concepts of ecosystem function in relation to making management decisions, including application of the CBD Ecosystem Approach and management for ecosystem services. In the spirit of an event designed to promote dialogue, some of the concepts presented differ from the terms in the Ecosystem Approach, as there is not a consensus on many of the key terms in this still developing field.

- What is an ecosystem?

The CBD definition of an ecosystem is, “A dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit”. However, I and other ecologists challenge the concept of an ecosystem as a ‘functional unit’, as ecosystems have no firm boundaries and are not self-replicating units in the way that an individual organism can be. A lake ecosystem is as much determined by the interactions of its organisms with the land and atmosphere as it is determined by the organisms within the lake. Also, ecosystems are not systems in the sense of a system that has a particular purpose and self-regulating structures, such as the thermoregulation system of the human body that maintains it at 37 degrees Celsius. The concept of an ecosystem is a human construct to describe the natural world, and I believe it is a useful concept to help us better understand and manage the natural world, but we must be careful to not give properties to the complexities of the natural world that come from our human-made systems.

Similarly, as ecosystems do not have an inherent purpose it is difficult to say that they have functions, unless this is in terms of functions to meet human objectives and values for ecosystems. The concept of ecosystem services, as the benefits people receive from ecosystems, is consistent with this functional view of ecosystems. The CBD Ecosystem Approach Principle 6, “Ecosystems must be managed within the limits of their functioning”, uses a different meaning for function. In this case functioning is used in the sense of how an ecosystem ‘works’, or the interactions and processes that occur within an ecosystem. As there are two different meanings for ecosystem function, neither of which is used in the science of ecology, I prefer to think in terms of management of ecosystem processes, as does Wallace (2007).

- Understanding and managing ecosystem processes

Considering an ecosystem as the dynamic interactions between living organisms and with the atmosphere, soils and water of their environment, there are some fundamental processes which occur and make possible these interactions. These fundamental ecosystem processes are solar energy flow, mineral cycling and water cycling.

Solar energy flow starts with the capture of the sun’s energy by plants through photosynthesis, and then flows as organic molecules through the food web of herbivores, predators and decomposers. The amount of solar energy captured by plants that becomes biomass determines the potential size and complexity of the rest of the food web, with approximately 90% of the energy lost at level of interaction in the food web.

Mineral cycling occurs as plants take up minerals from the soil, water and air and they are passed through the food web of an ecosystem. Decomposers, including vertebrates, insects, bacteria and fungi, are obviously key to mineral cycling, especially in soils. Whether conditions are favourable or not for a biologically active living soil determines to a great extent the availability of minerals for the plant growth that is the basis for the ecosystem. Especially in semi-arid environments, the mineral cycle is accelerated by the decomposition of plant matter in the digestive systems of herbivores, as soil conditions do not facilitate organic decomposition. The ecosystem process of water cycling occurs through the transpiration by plants of water from soils and the infiltration of precipitation into soils and seepage to rivers, springs and aquifers. The structure of the ecosystem determines how much of the precipitation falling on a locality is cycled through living organisms (the ecosystem) and retained in soils to enable plant growth and organic decomposition. If rain falls on a simplified ecosystem, with few plants and areas of bare soil, much of the water will either quickly evaporate back to the atmosphere, or run off the soil surface, or seep through the soil because there is little organic matter to retain it.

The three core ecosystem processes of solar energy flow, mineral cycling and water cycling are different aspects of an ecosystem, and change in any one of them will change all of them. These core ecosystem processes are also the same as the supporting ecosystem services in the conceptual framework of the Millennium Ecosystem Assessment (MA). Since these services support the amounts or supply of the other ecosystem services (provisioning, regulating and cultural), the interactions of the core ecosystem processes determine the benefits that humans get from ecosystems.

- [Management of ecosystem structure and composition](#)

Probably the key concept to consider for ecosystems is that of interactions, both between living organisms and with soils, water and the atmosphere. All of these interactions are affected by the structure and composition of the ecosystem, which has many aspects. Structure can be considered in terms of food webs, with the types of interactions including primary production by plants, herbivory, predation, parasitism, mutualism, decomposition, pollination and seed dispersal, and pathogens. Ecosystem structure can also be described in terms of vegetation (e.g. grassland or forest), soil structure, water bodies, and the spatial configuration of ecosystem types (e.g. patches and corridors).

Ecosystems can also be understood in terms of the composition of their living organisms or biodiversity. Diaz *et al.* (2006) classify the components of biodiversity which can be affected by human intervention as numbers of each type of organism, their relative abundance, composition, range of functional traits, spatial distribution, and vertical diversity (related to food web structure).

Management of ecosystems to obtain specific objectives, or services, can be described as determining what are the desired objectives and modifying the ecosystem structure and composition to achieve these objectives, considering how the three core ecosystem processes need to be and would respond to the changes. We need improved understanding of ecosystems and their responses to changes by all members of society, to enable setting objectives and designing actions which reflect the complexity of the natural world and work with natural processes, giving greater and more sustainable benefits.

References

- Díaz S, Fargione J, Stuart Chapin F III, Tilman D (2006) Biodiversity loss threatens human well-being. *PLoS Biol* 4(8): e277. DOI:10.1371/journal.pbio.0040277
- Wallace K J (2007) Classification of ecosystem services: Problems and solutions. *Biological Conservation* 139: 235-246.

3.3 Ecosystem Services – Part of the problem or part of the solution? - Roy Haines-Young and Marion Potschin

Prof Roy Haines Young and Dr Marion Potschin are from the Centre for Environmental Management at the University of Nottingham. They have been working on developing methods that quantify and assess ecosystem services as an aid to decision making.
CEM@nottingham.ac.uk

Ecosystem Services – Part of the problem or part of the solution?

The concept of ecosystem services is a challenging one because it makes us look at the ways in which natural capital and human well-being are linked. Using the idea people can be encouraged to look at the implications of policies and plans in a holistic way, so that the importance and value natural resources can be given proper consideration in debates. That is to apply the ecosystem approach in decision making. On the face of things, therefore, the concept of ecosystem services seems to be part of the solution the problem of how to ensure that the value of environmental systems is understood by society. The goal of restoring or maintaining the output of ecosystem services could help us explain what sustainable development is, in fact, all about.

It is only when we come to apply the rather seductive idea that ecosystems provide services to people, and try to use it operationally in sustainability and/or environmental assessments or for monitoring, that we discover it also poses a number of new problems. This presentation will draw upon our recent experience and reflect on the issues connected with defining exactly what we mean by an 'ecosystem service'. It will also look at the problems of identifying whether there are limits or thresholds for outputs of ecosystem services, and whether it is possible to map them in meaningful ways. Unless these kinds of problem can be overcome, it is unlikely that the idea of ecosystem services will deliver on the promise it apparently holds for helping us embed ecosystems thinking in decision making.

Sources:

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4 The Ecosystem Approach in Practice

4.1 An ecosystems approach in practice at a strategic level – the Defra Action Plan - *Robert Bradburne*

Dr Robert Bradburne leads the team in Defra's Natural Environment Strategic Unit that has carried out a programme of work to trial different ways of delivering on both the Ecosystem Approach and the ecosystems services approach.

Presentation

The importance that the Government places on the natural environment is set out in the new natural environment Public Service Agreement (PSA28) which details the Government's vision and responsibilities to secure a healthy natural environment. Along with climate change, it is one of Defra's top two strategic priorities.

The Government's vision, set out in PSA28 is: *"to secure a diverse, healthy and resilient natural environment, which provides the basis for everyone's well-being, health and prosperity now and in the future; and where the value of the services provided by the natural environment are reflected in decision-making."* Working in partnership across Government and wider stakeholders, we will measure progress towards delivering this PSA using indicators on water quality, air quality, biodiversity, marine health and land management, as well as ensuring progress towards delivery of the wider vision as a whole.

In order to improve our effectiveness at securing a healthy natural environment, Defra is committed to developing a more strategic approach and a more integrated framework for policy-making and delivery. We are therefore now taking further steps to embed an ecosystems approach in policy-making and delivery, based on a number of core principles set out in "Securing a healthy natural environment: An action plan for embedding an ecosystems approach", published in December 2007:

- 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 recognising the cumulative impacts of decisions
- promoting adaptive management of the natural environment to respond to changing pressures, including climate change.

We see that moving towards an ecosystems approach will deliver a number of important benefits:

- more effective delivery of our environmental outcomes
- better-informed decisions that take full account of environmental impacts, helping us to achieve sustainable development
- better prioritisation and more efficient use of our resources
- more effective communications and greater awareness of the value of the natural environment and ecosystem services.

This work is supported by an ongoing programme of research which is developing the tools and evidence needed to apply this approach to a range of policy and decision making situations across Government.

4.2 At organisational level- the challenge of delivery – *Dr John Hopkins*

Dr John Hopkins is leading on the incorporation of the ecosystems services approach within Natural England.

Presentation

Although the ecosystem services concept has great prominence in current thinking about environmental management, none-the-less it is not a phrase used to date in any legislation or statute.

Similarly few, if any, decisions about the environment have been framed explicitly in terms of ecosystem service protection, enhancement or delivery.

Natural England is a government agency which was formed in 2006 by the merger of three founding bodies. It has responsibility for conservation of biodiversity and landscapes and promoting access to the countryside. In addition NE is required to contribute to “social and economic well-being through the management of the natural environment” and aims to play a key role in the development of practical application of ecosystem based approaches.

Although NE’s inherited conservation programmes were not framed explicitly to deliver ecosystem services, in practice a significant contribution towards improvement of ecosystem services is being delivered.

NE’s agri-environment schemes provide the single largest amount of funding for ecosystem service protection and enhancement in England. Through the Catchment Sensitive Farming programme, NE is working with partners to enhance freshwater ecosystem and the services they provide, and in so doing learning lessons about effective approaches.

Careful scientific analysis at a local level is required and this can result in highly cost effective targeted interventions. In other cases, as with coastal realignment projects on England’s coasts, activities initiated to conserve biodiversity, are yielding a wide range of ecosystem services not initially foreseen.

Ecosystems are complex, and simultaneously provide a suite of services as diverse as clean water and recreation. Deciding upon which management option is appropriate for a given ecosystem is by no means straightforward. Economics provides tools for such decision making, but much further development of these is required. Understanding and responding to the wider views of society will also be critical to implementing decisions.

4.3 At a local level – The Thanet Coast - *Diana Pound*

- **Background**

In 1998/99 The Thanet Coast Natura 2000 site was an early example of where stakeholders participated in a deliberately designed and facilitated consensus building process. The process was initiated to help resolve conflict between biodiversity and economic regeneration and result in an agreed European marine site management scheme for 28 miles of the Kent Coast.

As part of resolving conflict the process broadened out to include better management of coastal recreation activities, and actively sought new ideas for economic regeneration that would be compatible with the important wildlife and also have broad support.

The consensus building transformed a situation of tension to active co-operation and a new partnership project that helped to pioneer further innovative approaches to coastal management. It is widely recognized as a success story.

However there was a problem. Whilst the consensus building had broadened out to include recreation and economic regeneration concerns it was not very holistic as far as the natural environment was concerned. The original scheme focused on three specially protected birds (Turnstone, Golden Plover and Little Tern) and key habitats (the chalk caves, the chalk reef on the shore and stretching out under the sea, and the sand and mudflats). Concentrating on particular birds and habitats made sense from the point of view of the UK and European laws that protect them, but it didn't make much ecological sense.

To address this problem the management group and science advisory group agreed that the first review of the management scheme should take the Ecosystem Approach. This meant including other habitats and species, how the natural systems function and the way humans interact with them.

- **The management scheme review process**

The stakeholder process was designed to be coherent with three workshops spread over 6 months with key tasks planned in and around each workshop. Each workshop was fully facilitated and designed in detail using tools and techniques that encourage good communication and help people to identify and talk about the issues that are of concern to them. The workshops included professionals and local people with interests in recreational activities, fishing, tourism, and economic regeneration, the natural and physical environment, and local communities.

The process was deliberately designed to meet all 12 of the Ecosystem Approach principles either in the way the process was designed (Principles 2,11 and 12) or in the content of the questions. The following tables list some of the questions that a participant considered and identifies which Ecosystem Approach principles the question fulfilled.

Table 1 - Scoping Questions

Scoping Questions	EA Principle
• It is 2020 and you are looking at the sea and shore delighted with what you see. What do you see?	1 & 7
• What do you value now that you want people to be able to see of do in many years to come	7
• What coastal and marine plants do you value	5
• What does this coast and shore provide for us	5
• In the last 6 years what has changed for the better?	9

<ul style="list-style-type: none"> • What has changed for the worst? • Thinking about different parts of the coast and sea <ul style="list-style-type: none"> • What are the issues? • What is working well? • What else needs to happen? 	
<p>Ecosystem Questions</p> <ul style="list-style-type: none"> • What kind of changes do you think are occurring and what evidence do you have? • Which of these changes do you think are part of natural cycles and processes? • What are the possible effects of locked in changes such as sea level rise and climate change? • Discuss possible ideas for long term objectives for the ecosystem and its function • What are the options for defining the ecosystem/s – which one do you think works best? • What research is needed? • What action is needed to make this happen? 	6,7,8,9

Following these overarching discussions, stakeholders were asked to consider in depth the management and sustainability of 49 activities categorised under the following headings:

1. Shoreline Management
2. Fishing and Harvesting
3. Shore Based Recreation
4. Water Based Recreation
5. Air Based Activities
6. Ports and Harbours
7. Research, Education and Wildlife tourism
8. Water Quality
9. Species Management
10. Extraction of Hard Materials

1	What is the long-term goal or vision for this activity?	1&8
2	What is the current situation?	
3	What are the current positive and negative effects of this activity on the following: <ul style="list-style-type: none"> • Social, economic and cultural interests • Habitats and species of local importance • Protected species and habitats • Ecosystem function • Other ecosystems 	1&4 1 1 5&6 3
4	What is the current management?	
5	Will it get us where we want to go?	
6	Can the ecosystem support this activity over the long-term? (Will people be able to do this activity at this level in 100 years if not why not?)	8
7	What if anything do we need to do differently?	
8	What is the long-term effect of what we want to do on: socio-economic and cultural interests the environment and ecosystem function?	3, 4,5 & 6
9	How will we know if we are going in the right direction?	

No one expected this process to be able to pin down the natural and human processes at work, that is a long-term challenge, but it has prompted a new discussion amongst scientists who are now thinking about the science needed to inform the Ecosystem Approach in a coastal context. This includes how to define the local ecosystem/s, ecosystems function, resilience and limits, the relationships with adjacent or linked ecosystems, and finding ways to distinguish natural from human induced change. The Ecosystem Approach also requires better understanding of the cultural, social and economic systems involved in managing, using, and harvesting, the resources of the area and the feedback mechanisms between these and the natural systems.

▪ Stakeholders view of the process

At the last workshop in the process stakeholders were asked to comment on the workshop and process itself. The following comments are direct quotes:

Integration

- *Integration of nature conservation/social/economic issues*
- *The wide variety of topics*

Good output

- *Good product in the end - the management scheme*
- *Seeing in management plan much of what we discussed*

Group discussion

- *Being able to go into problems in detail*
- *Focus on individual issues and time to explore and discuss in more depth*
- *Gathering of opinions and sharing of knowledge*

Being heard

- *To be allowed to put your own point of view over*
- *Small groups and facilitated discussions that give people the chance to be heard*
- *Facilitators approachable and non judgmental – and on-the-ball*

Working together

- *The range of stakeholders that attended and their willingness to participate*
- *Meeting people from other groups*
- *The knowledge that there are a lot of like-minded people working together to achieve the same aims*

This selection is of positive comments and there were also some helpful suggestions about how the process could have been improved.

▪ Conclusion

The original stakeholder process in 1998/99 transformed a situation of tension to active co-operation and resulted in a new partnership project that helped to pioneer further innovative approaches to coastal management. The management scheme review in 2006 again led the way as the first attempt in England (that we are aware of) to deliberately take the ecosystem approach, and integrate decision making across so many interests and sectors, for the better management of the coast.

It was a complex project to run but all those involved felt pleased at the outcome and there is good support for the contents of the management scheme.

5 Participants List

	NAME	Position	ORGANISATION
1.	Adriana Ford	PhD Student	University of York
2.	Ali Glaisher	Principal Ecologist	Staffordshire County Council
3.	Amy Stewart	Corporate & Forestry Support	Forestry Commission
4.	Andrew Budd	Grant Manager	Grantscape
5.	Andy Kenny	Team Leader	Cefas
6.	Barrie Cooper	International Education Manager	RSPB
7.	Bob Davidson	Section Leader – Aquatic Biodiversity	Environment & Heritage Service
8.	Catherine Martin	Science Policy Team	Institute of Biology
9.	Charles Taylor	Acting Deputy Director of Programmes	Devon Wildlife Trust
10.	Colin Studholme	Director of Policy & Research	Gloucestershire Wildlife Trust
11.	Dai Harris	Senior Environmental Policy Advisor	Welsh Assembly Government
12.	Dave Garner	Marine Policy	Defra
13.	Dr Gary Mantle	Director	Wiltshire Wildlife Trust
14.	Fabiola Blum	Biodiversity Partnership Co-ordinator for Cambridgeshire & Peterborough	Cambridgeshire & Peterborough Biodiversity Partnership
15.	Faith Culshaw	Public Sector Liaison/Science into Policy	NERC
16.	Fiona Bowles	Project Manager	Wessex Water
17.	Fiona Mulholland	Climate Change Advisor – Strategy Unit	Environment & Heritage Service
18.	Gary Grant	Director of Ecology	EDAW plc
19.	Gerry Clabby	Heritage Officer	Fingal County Council
20.	Glyn Jones	Environmental Economist	ADAS
21.	Harry Huyton	Policy Advisor	Environment Agency
22.	Heather Tidball	Partnership Manager	Dorset County Council
23.	Helen Howells	Regional Special Projects Officer	Countryside Council for Wales
24.	Henri Brocklebank	Landscapes Team Manager	Sussex Wildlife Trust
25.	Hugh Pritchard	Head of Research, Seed Conservation Department	Millennium Seed Bank Project
26.	Jackie Morgan	Policy Advisor	Planning and Environmental Policy Group
27.	James Russell	Woodland Development Manager	Forest of Marston Vale
28.	Jamie Rendell	Marine Policy	Defra
29.	Janet Khan-Marnie	Marine Biodiversity Ecologist	Scottish Environment Protection Agency
30.	Janice Ansin	Biodiversity Observatory Project Manager	The Open University
31.	Jason Pole	Research Scientist	Warwick University
32.	Jemma Simpson	Landscape Planner	Countryside
33.	Jill Nelson	Chief Executive	People's Trust for Endangered Species
34.	John Donnelly	Project Officer	SSMEI Clyde Pilot
35.	John Edwards	Ecologist & Biodiversity Team Manager	Surrey County Council
36.	John Seager	Head of Environment Strategy	Environment Agency
37.	Jonathan Wilshaw	Projects Manager	Great Western Community Forest
38.	Kim Wallis	Conservation Advisor	Essex & Suffolk Water
39.	Laura Jones	Regional Director South West England	Forestry Commission
40.	Laura Newland	Regional Lead	South East Protected Landscapes
41.	Leon Debell	Conservation Advisor	Essex & Suffolk Water

	NAME	Position	ORGANISATION
42.	Lindsay Maskell	Work package Leader for Integrated assessment using Countryside Survey data	Centre for Ecology & Hydrology
43.	Liz O'Brien	Senior Social Researcher	Forest Research
44.	Lori Frater	Research Manager	Cardiff University
45.	Lorraine Gray	SSMEI Shetland	NAFC Marine Centre
46.	Louise Mapstone	Biodiversity Officer	The Bat Conservation Trust
47.	Louise McAlavey	Biodiversity Policy Officer	Department of Environment, Belfast
48.	Lucila Lantscner	Senior Environmental Consultant	Envirocentre Ltd
49.	Matt Walpole	Head, Ecosystem Assessment Programme	UNEP WCMC
50.	Matthew Ryder	Environmental Consultant	Land Use Consultants
51.	Mike Wilkinson	Team Leader	Natural England
52.	Naomi Matthiessen	Marine Policy	Defra
53.	Natasha Madeira	Senior Environmental Policy Consultant	Envirocentre Ltd
54.	Nicholas Corker	Principal Consultant	Building Research Establishment
55.	Nicola Simpson	Principal Marine Scientist	RPS
56.	Nikki Williams	Assistant Scientist	Atkins
57.	Nikolai Friberg	Principal Scientist Hydroecology	Macaulay Land Use Research Institute
58.	Patrick Cregg	Council Member	Council for Nature Conservation and the Countryside
59.	Philip Bubb	Programme Officer	UNEP WCMC
60.	Philip Clark	Countryside Manager	Cambridgeshire County Council
61.	Rachel Bright	Consultant	ERM
62.	Rachel Newton	Policy Officer	Royal Society
63.	Richard Baines	Director – Food Chain Research	Royal Agricultural College
64.	Richard Moyse	Head of Conservation & policy	Kent Wildlife Trust
65.	Robert Clark	Senior Fishery Officer	Sussex Sea Fisheries District Committee
66.	Robert Deane	Associate	Land Use Consultants
67.	Robert Henderson	Economic Advisor	The Scottish Government
68.	Robert Holdaway	PhD student	Cambridge University, Dept of Plant Sciences
69.	Roger Proudfoot.	National Marine Monitoring Manager	Environment Agency
70.	Rosemary Collier	Research Scientist	Warwick University
71.	Russell Elliott		Countryside Council for Wales
72.	Sally Parker	Environmental Consultant	Land Use Consultants
73.	Sarah Hutcheon	Policy & Advice Manager – WFD & Freshwater Policy	Scottish Natural Heritage
74.	Seb Buckton	Community Wetlands Programme Manager	Wildfowl & Wetlands Trust
75.	Simon La Roche	Higher Executive Officer	Defra
76.	Sonia Ribeiro	PhD Student	University of East Anglia
77.	Sophie Churchill	Chief Executive	National Forest
78.	Stefanie Buell	Biological Records Officer	Essex Wildlife Trust
79.	Steve Peach	Conservation Ranger	Queen Elizabeth Country Park & Butser Hill National Nature Reserve
80.	Sue Young	Living Landscapes Team Leader	Kent Wildlife Trust
81.	Thomas Macagno	Sustainability Manager	May Gurney
82.	Victoria Whitehouse	Conservation Manager	Cornwall Wildlife Trust

Speakers

83.	Dr Diana Mortimer	Joint Nature Conservation Committee
84.	Prof Andy Lane	OpenLearn, the Open University
85.	Diana Pound	dialogue matters
86.	Philip Bubb	UNEP - WCMC
87.	Prof Roy Haines-Young	Centre for Environmental Management, University of Nottingham
88.	Dr Marion Potschin	Centre for Environmental Management, University of Nottingham
89.	Dr Robert Bradbourne	NESU Defra
90.	Dr John Hopkins	Natural England

Facilitators

91.	Lisa Chilton	Facilitator
92.	Heather Squires	Facilitator
93.	Jackie Fisher	Facilitator
94.	Jane Pelly de Jocolt	Facilitator
95.	Diane Dumashie	Facilitator
96.	Innes Aguire	Facilitator

6 About dialogue matters

▪ Who we are:

dialogue matters was set up in 2000. Our unique strength is that we combine qualifications and experience in management of the natural environment, with the skills and experience to design and facilitate stakeholder participation in ecological and environmental discussions. We write user-friendly documents and reports based on what stakeholders have said. We also provide advice and training.

We undertake work here and abroad, and work at local, regional and international levels. We also facilitate events that help specialists discuss science or best practice.

UK:	Defra, the Countryside Agency, Natural England/English Nature, Countryside Council for Wales, The Environment Agency, Cefas, Local and Regional Authorities, The Wildlife Trusts, Finding Sanctuary, The National Trust, Universities, Research Institutes such as the Tyndall Centre for Climate Research, UKCIP, and the Macaulay Institute.
European:	European Commission - DG Environment, Regional Environment Centre for Eastern Europe (REC), and various InterReg Projects. We have worked in Ireland, France, Estonia, Hungary and Croatia.
Beyond Europe	We have carried out work for a UN Regional Seas Convention in the Middle East and regularly work in Africa to help scientists share knowledge and influence policy makers and the media on a wide range of topics (eg water management, the science and innovation to help Africa adapt to climate change, integrated river basin management)

▪ What we do:

advise	We can advise you when stakeholder involvement is appropriate, when it is not and how it works.
design	If participation is the best way forward, we design a process that is coherent and fit for purpose. This could be a one-off event or a longer process involving a sequence of workshops interspersed with activities such as gathering information, checking ideas or drafting text.
include	We help you identify who needs to be involved whether this is at a strategic or local level, or to build agreement within your organisation. We help get people involved and we brief them about the issues and their role in the process. We also help manage their expectations about what can be achieved.
facilitate	We run workshops to help people do the following: agree the long-term vision; scope the issues; share and collate information; think of ideas and solutions and seek out win/wins. In longer processes we ensure time is given to allow people to check back with those they represent before decisions are firmed up and committed to paper.
record	We record what is said on flip chart paper to ensure all participants see what is written and know they have been listened to. After the event, this is typed up and put in a user-friendly format.
write	We can write plans, strategies and reports that express what was agreed in the process. We do this in a user-friendly way that is easy to read and easy to navigate - or we can advise you how to do this yourself.
train	We provide training courses for environmental professionals that include: how to work with stakeholders, relevant skills and principles of good practice.
explain	We offer briefing seminars that include the following: the benefits of stakeholder dialogue; why consensus does not mean 'selling out'; the role of science and expert knowledge; and the policy and legislative drivers for participation (e.g. the Participation Directive and the Ecosystem Approach).



▪ How to contact us:

dialogue matters. 3 Upper Bridge Street, Wye, Ashford, Kent. TN25 5AF.
01233 813875
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3 I felt my input was heard

1 2 3 4 5 6 7 8 9 10
I disagree I agree

C. OTHER COMMENTS

	
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D. HOW DID YOU HEAR OF THIS EVENT ?

E. FUTURE EVENTS?

*** ECOSYSTEM APPROACH?**

If we did another event on the Ecosystem Approach, would you be interested? Yes No

If yes what aspects would you want to hear more about and discuss?

*** SIMILAR STYLE – DIFFERENT THEME/TOPIC/SUBJECT?**

If we did another one-day event in this style, what theme or subject would you be interested in?

**Please hand this page in on your way out
Thank you**