Introduction

In this RUBICODE Newsletter we report on two recent major workshops within the project. The first was aimed at the scientific community and focused on methods for assessing the effects of environmental change on ecosystem services. The second had a strong focus on stakeholder interests and discussed the relationship between ecosystem services and biodiversity conservation.

Workshop on Ecosystem Services and Drivers of Biodiversity Change

Helsingborg, Sweden, 25-28 February 2008

Aims and structure of the workshop

The workshop brought together a selected, varied group of scientific experts (64 invited participants plus 32 RUBICODE partners) from a wide range of backgrounds and disciplines. All participants were provided with a background report prior to the workshop which summarised a series of scientific reviews that were undertaken in the first phase of the project (obtainable from www.rubicode.net/rubicode/outputs). The purpose of the workshop was to provide feedback on the RUBICODE reviews, frameworks and concepts, and to identify critical gaps in knowledge to inform the development of future research strategies. The format of the workshop consisted of a mixture of plenary sessions with talks given by internationally recognised experts and a series of breakout sessions where different aspects of the RUBICODE approach were actively explored.

Keynote presentations

Twelve keynote presentations were given by RUBICODE project partners and external experts in five plenary sessions:

- Putting ecosystem services on the map – Taylor Ricketts, Director of Conservation Science, WWF, USA
- The concept of socio-ecological systems – Sigrid Stagl, University of Sussex, UK
- Valuation of ecosystem services – Kerry Turner, University of East Anglia, UK (presented by Michalis Skourtos, University of the Aegean, Greece)
- Quantifying the contribution of organisms to the provision of ecosystem services – Gary Luck, Charles Sturt University, Australia
- Identifying and assessing drivers of ecosystem service change – Mark Rounsevell, University of Edinburgh, UK
- Ecosystem services in agro-ecosystems – Lene Sigsgaard, University of Copenhagen, Denmark
- Biodiversity in Amazonian landscape: socio-economic determinants and provision of ecosystem services – Patrick Lavelle, University of Paris, France
- Vultures and mad cow disease: some lessons on socio-ecosystem resilience – Nicolas Kosoy, Institute of Environmental Science and Technology, Autonomous University of Barcelona, Spain
- Indication of ecosystem services and biodiversity – Paulo Sousa, University of Coimbra, Portugal
- Plant traits, soil organisms and ecosystem properties – Richard Bardgett, University of Lancaster, UK
- Plant traits, functional diversity and ecosystem services – Sandra Lavorel, CNRS, France
- Ecosystem services: buzz word and evidence gap – Andrew Stott, Defra, UK.

Breakout groups

Four breakout group sessions took place throughout the workshop focusing on different research elements.

Breakout Group Session I: Participants were divided into six groups covering three themes related to ecosystem service assessment. The first theme considered frameworks for ecosystem service assessment and specifically discussed the RUBICODE concepts and frameworks presented in the preceding plenary session and summarised in the Workshop Background Report. These included the integrated framework based on the Drivers-Pressures-State-Impact-Response (DPSIR) framework, the concept of Socio-Ecological Systems (SES) and the Service Providing Unit (SPU) concept.

The second theme considered the valuation of ecosystem services and addressed the following questions: Do we need quantified value estimates in conservation management? How well do economic approaches perform? What is the future role of benefit transfer? How can the complexity of service provision be addressed? What is the role of non-economic approaches? What are the future research directions?

Finally the third theme focused on drivers and scenarios for ecosystem service assessment. Three specific questions were posed: What temporal and spatial scales? What types of scenarios (exploratory, normative, Business-As-Usual)? Which scenario variables are needed (should be prioritised) for ecosystem service assessment?

Breakout Group Session II: A participatory exercise was undertaken to benefit from the experience and expertise of the workshop delegates in considering how effectively ecosystem services are incorporated into approaches for the conservation of biodiversity? Participants worked in small groups (5-6 people) using the HAP (H form

and action planning; Hunsberger and Kenyon, 2008[1]) approach.

Photo: Breakout Group II exercise.

Breakout Group Session III: Prior to this session a parallel workshop on traits and ecosystem services was held which was attended by nine RUBICODE partners and 12 invited experts. The objectives of the traits parallel workshop were to present results of the review paper summarising the state of the art on links between biological traits and ecosystem service provision and to discuss a proposed framework for determining impacts of change on services dependent on more than one trophic level (the `trait cascade' concept). Finally, the workshop aimed to discuss examples of the use of the trait cascade framework suggested by participants. Seven examples were discussed, six of which were presented to the Breakout Group Session III the following day in order to solicit wider feedback on the framework. These involved: (1) impact of changes from spring to autumn crop sowing on pollination by insects, (2) impact of loss of uncropped land on conservation biocontrol of insects, (3) impact of precipitation on leaf litter decomposition, (4) impact of disturbance and fertility on provision of butterflies for enjoyment, (5) impact of agricultural intensification on freshwater self purification, and (6) impact of an invasive plant on a range of services provided by native flora.

[1] Hunsberger C. and W. Kenyon (2008). *Journal of Public Deliberation*: Vol. 4, No. 1, Article 1.
http://services.bepress.com/jpd/vol4/iss1/art1

Breakout Group Session IV: Participants were divided into six groups corresponding to different ecosystem types: agro-ecosystems, forests, grasslands and heathlands, mountains, soils and freshwater. The services provided by these ecosystems have been reviewed as part of the RUBICODE project (see http://www.rubicode.net/rubicode/RUBICODE_Review_on_Ecosystem_Services.pdf). The aim of the session was to enhance this information by creating a qualitative ranking of importance of services within each ecosystem with four categories: no contribution, some contribution, key contribution and contribution poorly known. In addition, each group aimed to identify knowledge gaps that could contribute to the development of research strategies.

Workshop conclusions

This workshop has taken a lead in encouraging the emergence of a European research community committed to the development of methods for the assessment of ecosystem service provision and ecosystem responses to environmental change. In doing so, the workshop has highlighted a number of issues and research gaps that this community should seek to address. It is clear, for example, that a better definition of appropriate analytical frameworks would provide structure, coherence and improve communication in the assessment of ecosystem service provision. Such developments remain, however, difficult in practice and working out appropriate frameworks that are acceptable to many people is not a trivial task. The conceptual frameworks that underpin RUBICODE, *viz.* Service Providing Units, the Drivers-Pressures-States-Impacts-Response framework, Socio-Ecological Systems and the trait cascade framework have great potential, but further investigation is needed to test their applicability and make them more understandable. This includes defining system boundaries and thus distinguishing between exogenous and endogenous factors, defining relevant temporal and spatial scales and methods for scaling between them, and examining interactions and trade-offs between multiple drivers, pressures, services and policy and management decision-making. It is increasingly important to raise awareness of ecosystem services with different stakeholders in order to improve communication and transparency in making decisions that underpin biodiversity conservation strategy. Highlighting the benefits to society of ecosystem services is one way of increasing the involvement of stakeholders.

Workshop on Habitat Management and Conservation Policy - Strategies for a new dynamic approach focused on ecosystem service provision

With official endorsement by the Slovenian Presidency of the European Union

Kranjska Gora, Slovenia, 29/30 April 2008

Aims and structure of the workshop

This was the second RUBICODE workshop to combine the views of both stakeholders and scientists. It brought together a selected group of 17 stakeholders from policy-making institutions, civil society and business from across Europe, and 20 RUBICODE researchers.

Building upon the experiences and feedback from the first such combined workshop in May, 2007, the aim of this professionally facilitated meeting was focused on habitat management and conservation strategies. We wanted to explore how existing pan-European approaches may be supported and complemented by taking better account of the dynamic nature of ecosystems and by considering the provision of ecosystem services as a new, "value-added" component. The results of the workshop are intended to aid the design of a roadmap for future research as well as the production of clear recommendations on habitat management and conservation policies.

After the official opening, which included a speech by Dr. Gordana Beltram, Undersecretary, Ministry of the Environment and Spatial Planning of the Republic of Slovenia, a series of introductory presentations on RUBICODE were given to set the scene, all with facilitated open

discussions. These were followed by work in break-out groups around four pre-selected case studies and finally a plenary discussion of conclusions and next steps.

Photo: Workshop location at the Kranjska Gora ski resort in Slovenia.

Photo: Official opening of the workshop by Dr. Gordana Beltram, Undersecretary, Ministry of the Environment and Spatial Planning of the Republic of Slovenia.

Introductory talks

Paula Harrison, Coordinator of RUBICODE, provided participants with an overview of the entire project. Two presentations focusing on the state-of-the-art of approaches to biodiversity conservation then followed. John Haslett discussed current approaches to habitat management for biodiversity conservation in Europe, while Rob Jongman addressed the effectiveness and appropriateness of existing conservation policies and their integration into other policy sectors. This was followed by Michael Samways' presentation on "Challenges to biodiversity conservation", placing the ecosystem service approach in a broader

perspective and using comparative examples from South Africa to emphasise the importance of spatial and temporal change. Pam Berry then spoke on "Needs for future conservation approaches" in which she considered the integration of ecosystem service protection with current species and habitat conservation strategies.

The case studies

The morning of the second day was spent working in break-out groups on a series of four case studies exploring the potential of an approach in terms of ecosystem services. The cases were briefly presented to the groups who were then asked to address a number of pre-set questions about the effectiveness of existing relevant policies, present and future needs and obstacles in implementing required actions. The cases were:

- Riparian buffers in the context of the EU Water Framework Directive (Presented by Christian Feld).
- Protected areas and climate change (Presented by John Haslett & Pam Berry).
- Agri-environment schemes: Pest control and agricultural biodiversity (Presented by Rob Bugter).
- A new policy for ecosystem services? (Presented by Rob Jongman).

Reporting back of the groups and the ensuing discussions were held in plenary session. The wealth of discussions throughout the workshop, whether formally facilitated or less formal, but also very productive meetings of minds at the bar in the evening, brought our combined thinking many steps forwards. The final session of the workshop was dedicated to taking stock of the key input from these discussions, with the help of summarising comments from the project leader, Paula Harrison.

Conclusions: Facing the challenges

As a result of the workshop, we are able to identify key challenges that must be addressed. We need better communication and education within and between scientific circles and the public sectors, at all levels of

organisation. This is needed to improve general knowledge and acceptance of the key importance of nature in our lives. We also need new research to improve basic scientific understanding of ecosystems, their dynamics, and the ways we depend on their services. However, the views of those with other (non-scientific) interests must also be recognised, confronted, and taken into account. Debates exclusively involving experts and convinced conservationists will not lead to successful policy in practice.

All this implies close integration of the ecosystem services approach into other policy sectors to develop more realistic policy-making and implementation that is flexible enough to cope with different and changing needs.

Further major challenges arise in relation to policy and governance of the relationships of human societies with ecosystems:

- mismatch of political boundaries and spatial scales with those of functional ecosystems, landscapes and ecosystem service boundaries (implies improving transboundary, transdisciplinary and cross-governance level cooperation);
- mismatch of political (short term) and ecologically sustainable (long term) time scales;
- pervasive problem of uncertainty, including variability in ecosystem services;
- integrating nature conservation and climate change - conservation networks will need to have flexible and negotiable borders, management strategies, objectives and indicators, with full acknowledgement of the importance of presently widespread species and of biodiversity that occurs outside present Protected Areas;

There are important applied research needs in designing better strategies and institutions for coping with these challenges. For maximum benefit, research should involve a wide range of disciplines, and stakeholders, including business and civil society. It is important to improve the interface between science and policy to ensure that research is focused on filling those gaps in knowledge needed to develop and implement policy.

Other project activities

We are now organising our final workshop aimed at both stakeholders and the scientific community on "Ecosystem Services and Biodiversity Conservation: Gaps in knowledge and future research needs" which will be held in Leipzig, Germany on 12-14 January 2009.

The "Outputs" page of the RUBICODE website now contains many documents produced by the project, including:

- The RUBICODE flyer.
- The RUBICODE glossary.
- Reports from the four RUBICODE workshops.
- Report from the RUBICODE e-conference.
- All four RUBICODE newsletters.
- Eight review papers and reports covering frameworks and concepts for ecosystem service assessment, drivers of biodiversity change, ecosystem service valuation, indicators of biodiversity and ecosystem services, functional traits underlying service provision and conservation strategies.

Further information on the project, can be obtained from www.rubicode.net or the Project Co-ordinator: Paula Harrison (paharriso@aol.com). Full reports from both workshops are available from the project website.