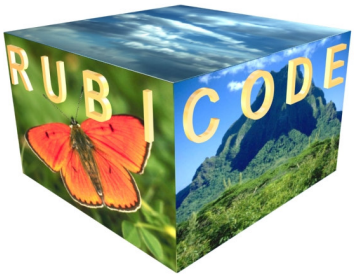


The **RUBICODE** Project

Rationalising Biodiversity Conservation in Dynamic Ecosystems

Newsletter N$^{o.}$ 1, January 2007

What is RUBICODE?

RUBICODE is a €2m Coordination Action Project funded by the EU to review and develop concepts of dynamic ecosystems and the services they provide. Those components of biodiversity which provide specific services to society are being defined and evaluated in order to increase our understanding of the value of biodiversity services and, consequently, of the cost of losing them. This will give decision-makers a more rational base and will help the understanding of the need for adequate conservation policies, which are essential to halting biodiversity loss.

The RUBICODE approach

Nature is fundamentally dynamic, as are the pressures of human activities on biodiversity, yet most conservation strategies focus on protected areas and are still developed around a static view of nature and environment. For the realisation of future conservation objectives it is critical that new strategies and policies incorporate these dynamics. RUBICODE will address this by developing innovative concepts for conservation strategies that concentrate on managing dynamic ecosystems for maintaining their capacity to undergo disturbance, while retaining their functions, services and control mechanisms (ecological resilience).

Our approach in developing concepts of dynamic ecosystems and the services they provide is based on a new category of population, the Service Providing Unit (SPU), which provides a recognised service at some temporal or spatial scale (1). For example, if the service required is the European-wide sequestration of carbon then the SPU would be the biodiversity of Europe. If the ecosystem service relates to community recreation then the SPU may come from multi-species forests that can be reached by a community. If the service is timber production then the SPU would be trees of suitable species and the size of the SPU would depend on whether the service was to support the economy of a continent, a nation, a region or an individual grower. If the service is conservation of a rare insect for its own sake, the SPU would be the population of its host plant(s) present in suitable habitat in the area over which special conservation measures are required. Thus service provision and the delineation of SPUs can occur at multiple levels and will depend on social institutions as well as scientific issues.

SPUs often comprise more than one species and any given species may contribute more or less than another species to a given service. They may also contribute to more than one service or be antagonistic to another service (termed Service Antagonising Units (SAUs)). For example, wild flowers may support crop pollinators and biocontrol agents, but also harbour pests or compete directly with crops. Quantifying the potential positive effects of biodiversity on a service should involve the subtraction of the effects of SAUs. Additionally, one person's SPU may be another's SAU and thus, stakeholder involvement in the process is required from an early stage.

The SPU/SAU concept provides a framework for linking changes in key characteristics of populations with implications for service provision. The concept is also easily extendable to include other levels of organization (e.g. functional groups). Identifying quantitative links between components of ecosystems and service provision is crucial to guiding the management of services. Indeed, it is this quantitative information that is of most value to policy-makers and land managers because it facilitates specific rather than vague management guidelines, which ensure the sustainability of nature's services.

The RUBICODE structure

RUBICODE consists of eight work packages (WPs):

WP1: Establish a link between threat and action: stakeholder and policy liaison.

The link between the threat of biodiversity loss and action in terms of complex decision-making processes is being explored in direct collaboration with stakeholders and policy-makers to ensure our research is of practical relevance and to enhance the legitimacy of the tools developed.

WP2: Review and develop concepts of dynamic ecosystems and the services they provide.

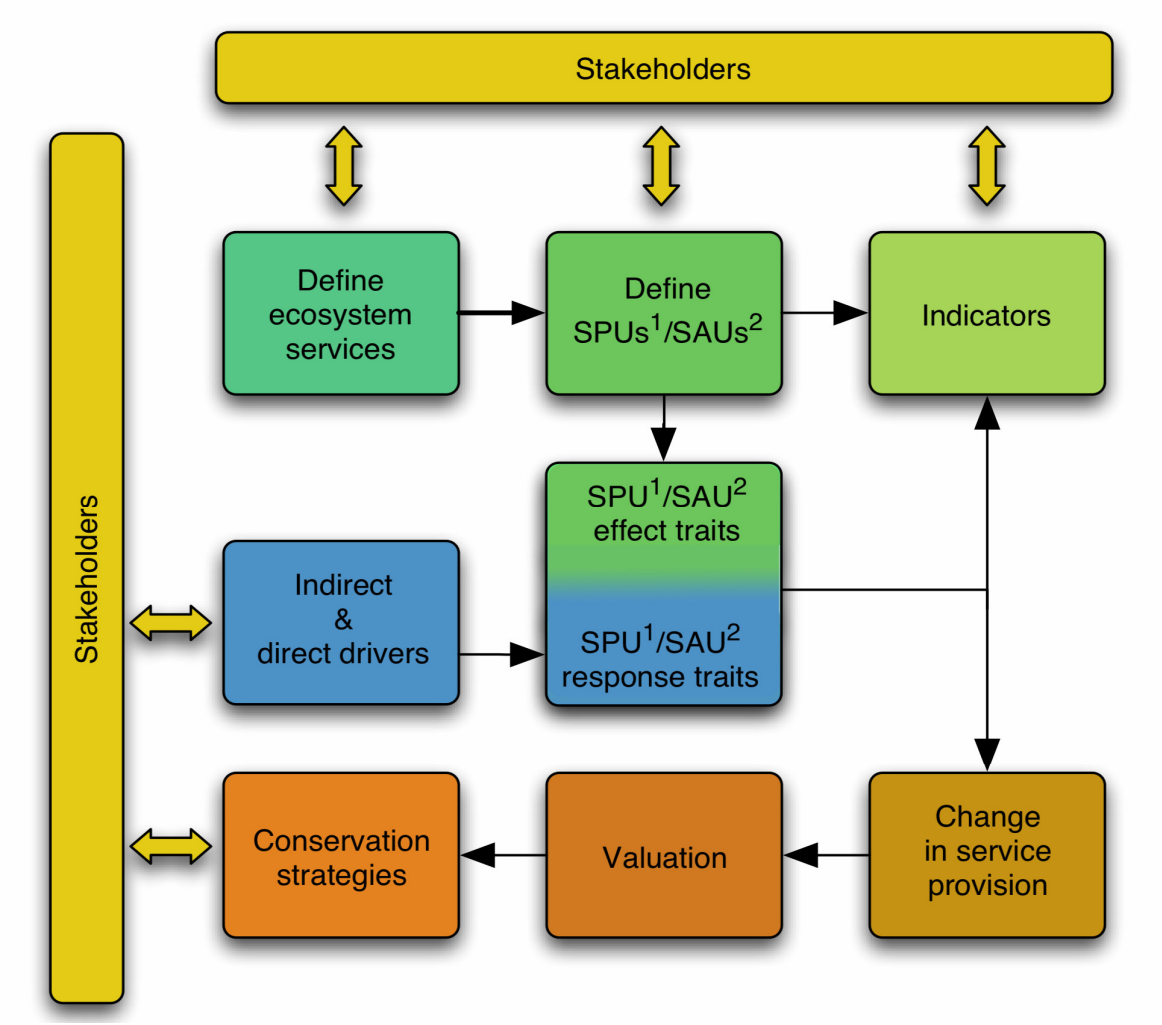
The value of the Service Providing Unit (SPU) concept for informing innovative conservation strategies is being examined and tested in a wide range of terrestrial and freshwater ecosystems. Ecological and economic information will be brought together in case studies covering the main ecosystem service categories of the Millennium Ecosystem Assessment (www.millenniumassessment.org) across multiple scales.

WP3: Identify socio-economic and environmental drivers that affect ecosystems and their services.

A wide range of drivers of biodiversity change are being identified for diverse European environments and further examined in case studies. These include social drivers (preferences, perceptions, traditions, trust), economic drivers (global trade, WTO, integration, privatisation, transition), policy drivers (CAP, rural development, agri-environment, conservation policy, CBD, UNFCCC), technology drivers (biotechnology, internet), environmental drivers (climate change, water resources, pollution), land use change (urban development, agricultural abandonment, reforestation, fragmentation) and governance.

WP4: Develop a framework to improve and test indicators.

Indicators and rapid assessment methods for ecosystem and habitat ecological quality are being reviewed and tested. Criteria of relevance to the development of future indicator and monitoring methods will be developed based on both ecological properties of ecosystems and policy and societal needs.



WP5: Develop a framework for linking ecosystem service provision to biological traits.

SPUs will be defined in terms of functional groups based on their response traits (that determine responses to change) and effect traits (that are important for service provision). The impact of the changes on service provision will then result from the overlap or co-occurrence between response and effect traits.

WP6: Derive habitat management strategies by integrating output from WPs 1 to 5.

Taking existing habitat and species management strategies for biodiversity conservation as a starting point, this work package will explore how these strategies 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 valid conservation aim. Guidelines for biodiversity management geared towards maintaining ecosystem dynamics and services will be produced based on the case studies of SPUs and their drivers developed in the other WPs.

WP7: Inform priorities for habitat, ecosystem and landscape biodiversity conservation policy.

The effectiveness and appropriateness of existing conservation policies and their integration with other policy areas is being reviewed. Innovative strategies for conserving biodiversity and the services it provides in terrestrial and freshwater ecosystems will be proposed.

WP8: Propose a roadmap for future research using output from WPs 1 to 7.

Each work package is reviewing the state-of-the-art in relation to the science and the needs of stakeholders and will identify critical gaps in knowledge. WP8 will synthesise this information, propose a roadmap for future research and define improved approaches for knowledge transfer.

RUBICODE workshops

Five workshops will be organised throughout the lifetime of RUBICODE to evaluate the concepts and methods developed within the project and identify gaps in knowledge. Stakeholders and/or scientific experts from a wide range of backgrounds and disciplines will be invited to attend each workshop to promote discussion and consensus.

Workshop 1: Assessing and monitoring ecosystems – concepts, policies and indicators; 27 February to 1 March 2007; Germany.

Workshop 2: Linking threats to biodiversity with action in the policy-making process; 15-16 May 2007; Belgium.

Workshop 3: Ecosystem services and drivers of biodiversity change; 25-29 February 2008; Sweden.

Workshop 4: Habitat management and conservation policy - strategies for a new dynamic approach focussed on ecosystem service provision; mid May 2008.

Workshop 5: Future research needs for developing innovative conservation strategies for terrestrial and freshwater ecosystems; September/October 2008.

The RUBICODE partnership

The RUBICODE project is coordinated by the Environmental Change Institute at the University of Oxford and involves 23 partners from 14 European countries and 5 other countries (South Africa, Argentina, Australia, New Zealand and the USA).

Further information and contact details for all partners can be obtained from the project's website (www.rubicode.net) or by contacting the Project Coordinator: Dr. Paula Harrison (paharriso@aol.com).

(1) Luck, G.W., Daily, G.C. and Ehrlich, P.R. (2003). Population diversity and ecosystem services. *Trends in Ecology and Evolution* 18, 331-336.

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