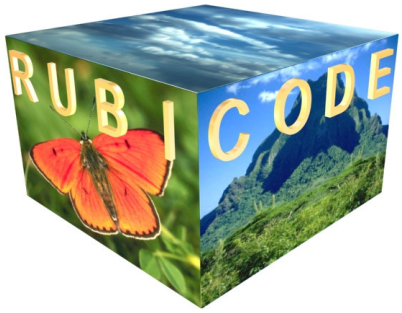

The **RUBICODE** Project

Rationalising Biodiversity Conservation in Dynamic Ecosystems

Combined Analysis and Results Report

for the

First Stakeholder Workshop

on

Establishing the Link between Threat and Action

By

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1. Introduction

1.1. About the RUBICODE project

RUBICODE (Rationalising Biodiversity Conservation in Dynamic Ecosystems) is a pan-European project that is defining and evaluating those components of biodiversity which provide specific services to society. These services include the provision of food, fibre and fuel, regulation of air and water quality, flood protection, erosion control, pollination, pest control, recreation, ecotourism and many others. RUBICODE is funded by the European Union's 6th Framework Programme for Research and Technological Development. Further information on the project is available from the project's website (www.rubicode.net).

A central aim of the project is to extend general awareness of the importance of conserving biodiversity to maintaining our own quality of life. The project should deliver a "road-map" to the EC to permit future development of efficient policies for biodiversity conservation in Europe, particularly in the light of climatic (and other) environmental change. The project thus aims to translate threats to biodiversity into tangible and quantifiable factors for use by policy-makers in decision-making processes.

1.2. About the workshop

The first RUBICODE stakeholder workshop took place in Brussels on 15-16 May 2007, bringing together 18 stakeholders and 11 RUBICODE researchers (see Annexes I and II for participant lists). Within the 18 stakeholders, there was reasonable representation of the high-level governance and NGO community from across Europe, however industry and direct resource managers were less represented.

The aim of the workshop was to present the RUBICODE concepts and framework to stakeholders in order to obtain their feedback on the relevance of the RUBICODE approach for linking threat to biodiversity to action in practice. At the workshop, presentations of the project, its key concepts and a selection of case studies were accompanied by open discussions and opportunities for stakeholders to react to the project, express their needs and make suggestions for changes (see Annex III for the workshop agenda).

1.3. About this report

This report analyses some of the key points arising at the workshop. It is not intended to be a set of minutes of the workshop, nor a comprehensive listing of points arising. Rather, the intention is to present briefly some central themes, to stimulate further thinking and debate amongst RUBICODE partners regarding the best ways in which the most important of the many valid concerns arising at the workshop can be addressed in the project and how the potential and strengths of the RUBICODE approach can be demonstrated in practice. Comments made by participants as captured during the event - without additions, exclusions or analysis - are listed in Annex IV.

2. General views of usefulness

Overall the results were very useful for the RUBICODE project. They include both positive feedback and constructively critical comments which need to be addressed in the future work of RUBICODE. On the one hand the stakeholders broadly welcome research which could help to improve methods of understanding and sustainably managing links between biodiversity and

ecosystem services. RUBICODE aims to fit squarely in this description. On the other hand the stakeholders still pointed to many open questions regarding the value in this regard of the key concepts and framework methodology being applied by RUBICODE.

This suggests some fundamental challenges and issues which should be resolved in the coming months. It seems we are approaching the right issues, but not necessarily in the right way, at least from the perspective of uses to which stakeholders might put results.

The core message from stakeholders is that we should keep our eye on the goal of improving knowledge of how to make sustainable management decisions regarding real human-ecosystem interactions.

The way in which RUBICODE can contribute to this is by developing concepts for understanding and representing the links between biodiversity, ecosystems and ecosystem goods and services; and by demonstrating how these concepts can help in the formulation of appropriate management responses to key drivers ("linking threat to action").

But this general requirement still leaves scope for different specific approaches, and the presentation of key concepts and case studies raised numerous comments in this regard. At the most fundamental level, this related to lack of clarity regarding the RUBICODE output. Is it a framework for real-life applications? Or a framework for focusing discussion? Does it seek to provide a management tool? If so, what kind of tool, for what purpose?

One query related to the role of the SPU framework within the wider context of the ecosystem approach and the MA framework. Further attention should be given to a clear exposition of the relationships. Ideally this needs also to be sensitive to different frameworks in vogue at national levels. We need to explain more clearly similarities and differences with alternative frameworks, and the added value of the RUBICODE approach.

A specific requirement here is to establish links between RUBICODE and the EEA work EUREKA (European Millennium Assessment). EUREKA will take a story-based case study approach to analysis of particular ecosystem services in particular areas, underpinned by environmental accounting. There is potential for interesting convergence with RUBICODE both on analysis and on communication. It was recognised that one strength of the RUBICODE approach in this regard is its capacity to provide detailed case analysis.

The difference between the ecosystem approach and the SPU concept may be that SPUs gives us a new, intermediate angle not captured in the traditional hierarchy gene – individual – population – community – ecosystem. A SPU is a (minimum) set of attributes (or characteristics) needed to provide a service, which might arise at different levels in this hierarchy, or could lie outside it, combining entities from the same or from different levels.

A further advantage is that the "set of attributes" allows for inclusion of dynamics (for example climate-change-mediated shifts in community composition) in management even as the specific species in an area change. However, we need to prepare further case studies which demonstrate how we can really take into account ecosystem dynamics without getting embroiled in complex dynamic interactions not represented directly in the SPU under consideration.

The definition of an SPU as that particular level of some characteristic(s) which is essential for provision of a given service has the benefit of simplicity for communication, but at the cost of being

dichotomous, and therefore not allowing adequately for small improvements / declines in service provision where clear thresholds cannot be identified.

The flexibility of the SPU concept can therefore be viewed as a weakness. The point was raised that stakeholders may not all agree on what the SPU is. When the definition is somewhat arbitrary, who makes the decision on what the SPU is? Against this criticism, it might be stated that the SPU framework at least provokes debate on the most appropriate level of analysis for management. Indeed the opinion was voiced that the approach may only provide a framework for discussions, and may not provide solutions.

A further nuance here was the issue of bias towards existing knowledge in SPU definition, if units are defined as a result of limited existing knowledge. However this would be true of any framework; a case might be made for SPUs helping to direct attention towards key knowledge gaps. This avenue could be pursued in the framework of Workpackage 8 which aims at proposing a roadmap for future research.

From an academic perspective, some applications of SPU might be seen as too reductionist, failing to take into account the wider complexity of ecosystems, or being too linear. Some expressed concern at the danger that the SPU concept could not reflect the complex interactions that actually provide many ecosystem services. But for practical management purposes, it is rarely possible to take wide complexity concerns into full account. Management needs to focus on a sub-set of measurable characteristics on which to base a management strategy. The further point was raised that oversimplification can be useful for communication. If the SPU concept helps tread the line between practical usefulness and excessive reductionism, within the context of particular management or communication objectives, then it could be useful. A practical suggestion was to present the complex picture first then focus down on specific services.

There was wider discussion on the appropriate areas and levels of application. This included some support for the greater applicability at relatively local scales. There was a request to investigate the possibilities of 'scaling-up'. The possibility for a role complementary to Environmental Impact Assessments was flagged up.

It was suggested that the concepts would be harder to apply to cultural and supporting services than to provisioning or regulating services. However this remains a moot point. Certainly the case study that most impressed the stakeholders was the river buffer zone case, which primarily fits the "regulating" category. The Farmland Bird Index case study was less well received: while the link here from biodiversity to cultural services was accepted, it was not clear that the SPU concept was appropriate in the context. The jay/seed dispersal case can be interpreted in the context of both provisioning and cultural (recreation, heritage) services, but it was not immediately clear to stakeholders that the SPU framework added an important new perspective to this case due to its focus on SPUs defined as a single species.

The applicability to assessment of single management actions where a service is easily defined is the simplest case to appreciate. However in practice it may be difficult to justify as a basis for action, because management generally needs to consider a wider range of services arising from a given system (bundles of services). The risk is that the SPU concept may be too simplified, too reductionist, and oversimplify a complex issue, failing to reflect complex interactions. A primary challenge for the next stage of the project is to expand the framework to include the assessment of multiple services, in general and in specific case studies.

RUBICODE needs first to summarise a range of complex issues, and then get down to a straightforward message explaining how the concepts help produce clear management-relevant information in the face of the complexities identified. But trying to develop a single methodology to account for a wide range of services and complexities is very difficult, and there may inevitably be issues with scales and boundaries. Key questions are:

- How does it help to link threat to action?
- How does it help communicate threats to policy-makers?
- How does it help us decide how to act on complex systems?
- Is it oversimplifying what biodiversity does for us?

Overall stakeholders were interested in understanding where the added value of the RUBICODE framework lies. Although some stakeholders were progressively convinced of (the potential of) the approach, in particular through examples such as the river buffer case study, others felt that we have yet to demonstrate convincingly the usefulness of the framework, either in general or in specific cases and its added value compared to other frameworks and approaches dealing with ecosystem services. Although it was never expected that RUBICODE would be able to provide such demonstration less than one year into the project, this is a matter for focus in the coming months and must remain a priority in our actions to engage with stakeholders.

3. Concept definitions and terminology

Several concerns arose regarding the exact meaning of terms employed. There was a view that we may need to be more flexible in the definition of the unit, and consider different "elements" which come together and define the "unit". What defines a unit is a series of attributes (traits, abundance, distribution, etc.) One suggestion was to focus more on explicit definition of the service in each case, allowing the boundaries of what is providing it to be a bit more fuzzy (one could talk about "service providers" rather than SPUs).

Various terms were suggested, but none met with broad consensus approval. “Entity”, “System” and “Service Providers” were the favourites. “Unit”, “set”, “subsystem”, “element”, “group”, “component”, “item” and “thing” were also mooted.

In many respects the specific term does not matter too much, provided the underlying concept is one which a wide range of stakeholders can understand and use in practical situations. A key requirement is to avoid becoming too bogged down in detail and specifics – we need broad, comprehensible concepts which decision-makers find useful.

4. Issues of valuation

The further step from the SPU framework to ecosystem service valuation generated substantial debate. A wide range of views was presented and there was no clear consensus. The clear interface with methods of putting a quantitative value to a service (and therefore to aspects of an ecosystem) was viewed simultaneously as a strength (clear communication and policy relevance) and as a weakness (excessively anthropocentric). Similarly, the perceived proximity to economic language and analysis (strength) was contrasted with perceived inadequacies in dealing with complex ecological concepts (weakness).

Some, though not all, felt that RUBICODE should not feel obliged to demonstrate monetary valuation in all case studies. This is because valuation remains a controversial step, it is already

widely studied, and applied (or not) in various policy contexts; the key concerns of RUBICODE lie in developing and demonstrating the usefulness of the SPU framework and proposing a roadmap for future research that is required to develop innovative pan-European conservation strategies for terrestrial and freshwater ecosystems. Showing how the SPU framework can link to valuation is a useful addition to the work, but should not be pursued to the extent that RUBICODE key objectives become obscured by debate regarding valuation issues.

The clearest example of the risk of embroilment in valuation arose in the river case study, where points arising included:

- the general issue of comparison of services provided by ecosystems with the same services provided by technology
    - the potential to estimate values based on the cost of restoration
    - the potential to estimate values based on service replacement cost
    - the usefulness of these methods for communication…
    - …set against their inappropriateness in the context of valuation theory
- options for including lost income/opportunities for farmers in the valuation
- specific problems of valuing cultural services
- the idea that some services are "beyond value" and that inability to ascribe a value may in some cases be a strength not a weakness.

All these issues are widely (and repeatedly) addressed in the valuation literature. RUBICODE should not seek to resolve them directly, in part to avoid duplication of effort, in part because dealing with such controversial issues might detract from key messages, and in part because on a practical level different stakeholders (e.g. different national environment agencies) follow their own different guidelines for uses of valuation. Different audiences have different needs for different purposes, and RUBICODE usefulness will be maximised by demonstrating the flexibility to interface with a wide range of existing approaches. Similar points arose in regard of the potential for RUBICODE concepts to inform further moves towards payments for ecosystem services.

A particular request in the context of pluralism in value paradigms was that the 'service-based' approach needs to be supplemented with caveats regarding non-anthropocentric[1] arguments for biodiversity conservation. This would hold whether or not monetary valuation methods were applied. Related points included the need to accept that valuation is not necessarily useful in all contexts, and a call for explicitly taking distributional impacts into account, for example through identification of winners and losers. Where monetary values are used, there is a need to avoid oversimplification with single figures – uncertainty should be accepted and properly represented, for example by using ranges of values, and sensitivity analysis.

Specific instances of concern regarding excessive focus on anthropocentric and in particular monetary value arose in the context of ecosystems or species that do not deliver any measurable service: are there "useless" ecosystems (e.g. would this approach imply that we don't need deserts)? This criticism is not specific to RUBICODE, but rather applies to the whole ecosystem services framework; again the need to supply appropriate caveats is clear.

[1] After reflection it seems that what stakeholders meant by non-anthropocentric in this context was rather non-instrumental / non-utilitarian.

Similar points arise in the context of the future potential of ecosystem services we do not yet know about: a specific example in the forest ecosystem case study was the observation that 20 years ago we would not have had a value for carbon sequestration. We probably have the same situation with other services which we do not know about or "require" yet.

5. Case studies

The key role of the case studies is in demonstrating the range of application, and usefulness, of the SPU concept. In this respect our case studies were only partly successful. While they were seen as useful stories for communicating the importance of biodiversity, they failed to communicate the "added value" of the SPU concept, with the exception of the river buffers example.

One comment suggested that we should not focus on isolated cases but rather on policy questions and how the SPU concept can help in these. To a certain extent this is an issue of framing – we might use the same underlying cases to illustrate policy questions – but there might also be a need to consider more carefully the choice of case studies in the context of policy issues.

The river restoration case has the strongest direct link to a wider policy issue (water quality / Water Framework Directive) and it is notable that this was the best-received case study. It was seen as the most useful example, because it starts from the service, then looks at what is needed to obtain the service, then links it to a political context.

Other suggestions for policy contexts included water management, ecotourism development, aquaculture, wetland restoration and management, and alternative energy and the impact of bio-fuels. Overall it was felt that the cases used should not be stand-alone illustrations but rather should build up and support an overall framework and set of policy-relevant tools. This corresponds closely with the internal RUBICODE vision, but substantial work remains to be done to meet this goal.

The question of scale arose again here. Some stakeholders felt that RUBICODE needs to demonstrate how results at the local scale carry up to national and international policy levels, hence the need for a bottom-up approach.

It was felt that RUBICODE might make a clearer distinction between ecosystem functions and ecosystem services. Both need to be addressed, but differences should be clarified and respected.

The Farmland Bird Index case seemed to be pushing the applicability of the SPU concept a little far. The index was recognised as a good communication tool for media and the general public, though there are some shortcomings from a scientific (or social-scientific) perspective. However the definition of the SPU was not clear. Is the SPU the index? Or the underlying populations? Or is it the biodiversity required for these birds to exist? Other services support the birds, and the birds can be linked to SPUs providing other services.

In the context of the biological pest control case study, the point was raised that (big) business will respond better to cases in which there is a product to sell than to cases in which we are dealing with services provided by ecosystems which can be substitutes for the products of business. Clearly there is a valid point here, relevant to the issue of the uses to which RUBICODE outputs might be put, and to the possible focus of some future research funding. However the point relates only to a specific subset of stakeholders. To the extent that RUBICODE concepts could help to demonstrate and enhance non-marketed aspects of ecosystem services, and ecosystem-service alternatives to

traded goods, this would be of benefit to conservation interests, and most likely to society and sustainability overall. But for the interests of business stakeholders and because of the rising importance of developing strategies and tools in support of more biodiversity-friendly business practices we might consider more case-studies of direct business relevance. Moreover in the future business is likely to become more and more interested in cases identifying services from which they directly benefit.

Stakeholders felt we should give some clear ideas for future work. Suggestions included the potential for an overall mapping of ecosystem services arose, though it was also suggested that this might be "dangerous". The upcoming production of a Stern-like report for biodiversity was considered by many stakeholders as likely to have major public impact. Further work was called for on asking stakeholders about their demands for ecosystem services and the values they place on them. An overarching point was the need to specify data requirements, and to identify which data are likely to be available, and where key gaps in knowledge and data exist.

6. Conclusions

RUBICODE is not a research project *per se* but a Coordination Action project which aims to improve the integration and coordination of existing research on dynamic ecosystems and their services. Two of the key objectives of the project are: (1) to explore in more depth the potential of an approach in terms of ecosystems services in support of innovative conservation strategies for terrestrial and freshwater ecosystems; and (2) to propose a roadmap for future research that is required to develop such strategies. To this aim, RUBICODE is developing and investigating the potential of a series of concepts and a framework, some of which have been presented in their preliminary form at this first stakeholder workshop. We are continuously improving our definition and exploration of these concepts and framework, and systematically identifying knowledge and research gaps for inclusion in the roadmap. In this regard, the comments and recommendations received from stakeholders during this first workshop are of high value to the continuation of RUBICODE. The project consortium has already started to take these comments on board and we will continue to adjust our work plan and actions over the coming months in order to reinforce the policy-relevance of our project based on stakeholders' suggestions.

The second stakeholder workshop is scheduled for spring 2008 and will focus on "Habitat management and conservation policy – strategies for a new dynamic approach focussed on ecosystem service provision". We hope that the stakeholders that attended our first workshop will join us again to hear about progress in the project and see how we have taken account of previous suggestions.

7. Acknowledgements

The RUBICODE consortium is grateful to all stakeholders who participated in the Brussels workshop and kindly offered their valuable input.

Annex I: Stakeholders participating in the workshop

SURNAME	FIRST NAME	ORGANISATION
Arndt	Thorsten	World Business Council for Sustainable Development (WBCSD), Switzerland
Barov	Boris	BirdLife International, European Division, Belgium
Feehan	Jane	European Environment Agency, Denmark Biodiversity Group/Desk Officer for Ireland (Environmental Policy Analysis)
Glante	Frank	Soil State, Soil Use, Federal Environmental Agency, Germany (Umweltbundesamt)
Márkus	Ferenc	WWF Hungary
Mardiste	Peep	Environmental Advisor to Estonian MEP, European Parliament, Belgium
Mastrogiovanni	Domenico	Condeferazione Italiana Agricoltori for COPA COGECA, Italy
McKenzie	Emily	Joint Nature Conservation Committee (JNCC), United Kingdom
Moon	Sarah	Department for Environment, Food and Rural Affairs (DEFRA), United Kingdom
Mortimer	Diana	Joint Nature Conservation Committee (JNCC), United Kingdom
Richard	Dominique	European Topic Centre on Biological Diversity BD/NC, France
Salm	Jüri-Ott	Estonian Fund for Nature, Estonia
Savio	Jorge	European Commission, Belgium
Sharman	Martin	European Commission, DG for Research, Belgium
Tack	Jurgen	Belgian Biodiversity Platform; International Press Centre for Biodiversity
Torta	Giuliana	European Commission, DG Environment, Belgium
Tsotos	Spiros	GESASE Young Farmers, Greece
Zaunberger	Karin	Management of Natural Resources Section, Biodiversity & Ecosystems, European Commission, Belgium

Annex II: Project partners participating in the workshop

SURNAME	FIRST NAME	ORGANISATION
Bolton	Susannah	Rothamsted Research, United Kingdom
Feld	Christian	University of Duisburg-Essen, Germany
Gramberger	Marc	Prospex, Belguim
Harrington	Richard	Rothamsted Research, United Kingdom
Harrison	Paula	RUBICODE Coordinator, Environmental Change Institute, University of Oxford, United Kingdom
Rounsevell	Mark	Centre for the study of Environmental Change and Sustainability, University of Edinburgh, United Kingdom
Tieleman	Katia	Prospex, Belgium
Tinch	Rob	Median SCP, Spain
Van den Hove	Sybille	Median SCP, Spain
Vandewalle	Marie	Lund University, Sweden
Watt	Allan	NERC Centre for Ecology & Hydrology, United Kingdom

Annex III: Workshop agenda

Tuesday, 15 May 2007

12:30	Lunch and registration	
13:30	Welcome and introduction	Marc Gramberger Katia Tieleman
	The RUBICODE project	Paula Harrison
	Introducing the concepts: SPU and dynamic ecosystems	Richard Harrington Mark Rounsevell
	Two cases □ Oak seed dispersal by jays □ Biocontrol in vineyards	Marie Vandewalle Rob Tinch Facilitated by Marc Gramberger and Katia Tieleman
	Plenary discussion	Facilitated by Marc Gramberger and Katia Tieleman
18:00	End of work	

Wednesday, 16 May 2007

09:00	Three cases □ Buffering nutrient and sediment influx into rivers □ Climate regulation □ Farmland birds as a cultural service	Christian Feld Marie Vandevalle Richard Harrington Facilitated by Marc Gramberger and Katia Tieleman
	Group work and discussion □ Strengths and weaknesses	Facilitated by Marc Gramberger and Katia Tieleman
12:30	Lunch	
14:00	Group work and discussion □ Suggestions for overcoming key weaknesses	Facilitated by Marc Gramberger and Katia Tieleman
	Review and next steps	Facilitated by Marc Gramberger and Katia Tieleman
16:00	End of workshop	

Annex IV: Comments of participants

The following pages display the comments made by participants as captured during the event - without additions, exclusions or analysis.

Questions and remarks on the concepts presented (plenary discussion on day 1):

- Importance of definitions of biodiversity
- Added value of the approach? What is new?
  - We don't know what we need
  - Service approach / SPU makes that tangible
    - What do we need?
    - How can we safeguard that service at right level?
- Example: service as functions: 'You can't protect soil but certain functions of it'
- Do stakeholders understand the concept?
- What will the final products look like?
  - Showing value of particular biodiversity to defend it against other interests
  - Covering 10 ecosystems
- Useful to put a price on services/biodiversity. Compare different biodiversity services.
- How to communicate it to politicians/public. Not too high a level of detail.
- What about non-functional areas? Focus on service to *mankind*
  - Details are in function of showing importance of e.g. traits
  - Not an exclusive framework
- SPU
  - Obstacle
  - Image of package
  - Piecemeal
  - Way of convincing
- Will approach involve review of existing tools?

Review of the approach (group work on day 2)

Group A:

Potential and strengths	**Shortcomings and weaknesses**
Economic application makes in easier to explain choices	What about ecosystems/species that do not deliver any measurable service?
Visible for ordinary people	What about future potentials?
Statistical use	What about 'useless' ecosystems (e.g. deserts)?
Comparability	How to define the SPU?
"Attributes" in addition to species	Will it be useful to all stakeholders?
Supports dynamic approach	Things could be missed out
Enables stakeholders to explore choices	SPUs may become too complex
Framework	Much research needed
Enables 'uplift' of some areas/issues	Does it really help us identify important knowledge gaps?
Will trigger innovation	Is it right to put a price tag on biodiversity?
Value for 'traditional knowledge'	How to value/compare the variety of services/antagonizing services
Potentially beneficial for adaptation	

Technology versus SPUs Can provide a practical framework May be better applicable on a local level than on a global level. Complementary to EEA	Technology versus SPUs May only be able to provide a framework for discussion. Need business case studies! Cultural and supporting services may be difficult to measure Winners + losers.

Group B:

Potential and strengths	**Shortcomings and weaknesses**
Good for single action analysis * Another useful tool, and complimentary to other tools So we need to consider the entire service Knowing the service helps define the scale it should be used at Clearly shows value of services provided by saved costs	*… But hard to use to base action because action needs to consider all the other services Fragmented ('unit') Oversimplified Does not reflect complex interactions, which provide service Self-selection - bias towards existing knowledge Unit = false boundary Not useful at all scales Valuation should/isn't always a way of deciding what savings are being made Don't like the word unit Careful consideration of comparison: carbon mitigation from Kyoto is not the same as considering carbon stored in a forest – especially when it gets to action.

Group C:

Potential and strengths	**Shortcomings and weaknesses**
Putting a quantitative value Use of a language close to economists Good stories to communicate importance of biodiversity Innovative approach to link biodiversity science to a topic of high momentum = ecosystem services	Only looking at *monetary* value Very anthropocentric Possibility for aggregation? Economic language versus ecological universally agreed concepts (inconsistency?) Fails at addressing the complexity of biodiversity SPU concept is ok, but 'U' is wrong
Recommendation: Functional ≠ cultural, provisional. Describe both economic and ecological restrictions	

Key weaknesses identified in plenary:

- Oversimplification/fragmentation in an area of complexity. Not all agree as simplification in communication is good -> distinction between research and communication.
- Scale
- Is it applicable to business -> cases (suggestion)
- Language/terminology
- Valuation, including future value and how to value the irreplaceable?
- Common framework agreeable to different stakeholders: framework for real life or framework for discussions.

Suggestions by stakeholders concerning oversimplification, communication and terminology:

- Start by presenting the bigger picture
  - state all services provided by the ecosystem
  - recognize intrinsic values
  - only then: *focus on specific cases*
  - link to Millenium Ecosystem Assessment / European Ecosystem Assessment (Eureka)
- Retrofit-bias
  - comprehensive context
  - use available data + selection of cases in this wider context
  - gaps will then emerge/be identified
- 'Unit'
  - the service as the 'unit'
  - what's providing it less interesting
    - Service providers
    - Series of attributes
  - concept useful
- Purpose
  - Management of ecosystem services
  - Communicating threats into action/stories
- Lessons from risk management? Also opportunities!
  - Stakeholders need to accept approximation
- Resilience
- Unit alternatives (including deselected suggestions)
  - ~~Thing~~
  - ~~Component~~
  - ~~Group~~
  - Entity
  - System
  - ~~Item~~
  - Service providers
  - Or change all words in SPU

Suggestions by stakeholders concerning valuation:

- Don't need valuation as primary focus for Rubicode to be useful to stakeholders (*point contested among participants*)
  - Added value already from exploring links between characteristics of biodiversity and ecosystem services. This is useful for valuation in itself.
- Use of valuation is dependent on context - policy, geographic, etc.
- Audience matters – who are you communicating to and why? Policy-makers, service users, stakeholders.
- Holistic and robust – ensure!
- Caveat 'service-based' approach with non-anthropocentric arguments for biodiversity conservation.
- Role of markets - observation that this matters and thus valuation is important, but probably beyond RUBICODE's remit. But can show how valuation matters for PES. (*Point contested among participants*)
- Accept that valuation not necessarily useful in all contexts.
- Don't oversimplify with single figures - accept and acknowledge uncertainty, spread of values, sensitivity analysis.
- Focus on 'production' – links between biodiversity and services
- Presenting, defining & measuring SPU's and services they provide. -> identification of winners and losers -> distribution matters.

Suggestions concerning case study application areas:

- Pilot projects, e.g. WWF and Lafarge
- What are the different uses of SPU's. Direct business application / improving GDP indicators
- Water as a possible application area?
- Bottom/scaling-up approach necessary within the framework of RUBICODE as have to use exiting work.
- RUBICODE should indicate perspectives for future work.
- Eco Tourism/Tourism
- Fish farms
- Wetlands /land-use
- Don't look at isolated cases but at policy questions and how this concept can help!
- Alternative energy -> impact of biofuels
- Include 'functions' in addition to 'services'
- Local versus global.
- Cases should support an overall framework / tools
- Mapping?
- *Ask us (stakeholders) for list!*