

A Blueprint for Ecosystem Services Assessment steps – Designing and reporting an Ecosystem Service study

(1) Purpose and design

- Rationale, scope of study, project goals *Why this study?*
- Main threats to ecosystem services *What drives change in this system?*
- Targets: ecosystem services, biodiversity, economic and social targets and governance objectives *Which questions were addressed?*
- Expertises of the scientist(s) *Who has done the study?*

(2) Scope of problemscape and concept

- Conceptual model of the assessment: clarification of terms and relations *What was the conceptual idea?*
- Details on study's socio-environmental system: spatial scale, extent, ownership, land use, developments, ... *Does the system match the question?*
- Definition of ecosystem services assessed; characterize with respect to its accessibility (rival/non-rival); right to use (excludable/non-excludable service); and markets *Which ES are important? Why?*
- Rational of stakeholder, practitioners identification & selection *Who was selected as stakeholder (why?), who is missing?*
- Policy measures: conservation activities, allowable use, subsidies *What is the current legal situation?*
- Storylines of possible futures *How could this system develop?*
- Clarify expectations, e.g. null hypothesis *What can the ES assessment help decide?*

(3) Analysis and assessment

- Selection process of ecosystem service indicators (incl. physical units, possibly qualitative description for some service indicators) *Why do these indicators represent the ES?*
- Inventory of ecosystem services and indicator quantification *How were the different ES indicators quantified?*
- Criteria for selection of models, biophysical realism, test criteria for reliability of model and analysis results, documentation of methods applied (models, assessments, indicators) *How good/valid are the quantification approaches?*
- Quantification of scenarios/management options/policy measures *How were the options for actions derived?*
- Analysis of suite of ecosystem service indicators, including valuation step (MCA) *How were ES weighted?*
- Sensitivity analysis with respect to scenarios and changes in values as well as internal parameters assumptions, test with real world data *How robust are the results to uncertainty in any of the steps in the analysis?*

(4) Results and recommendations

- Analysis of trade-offs between ecosystem services; define ecosystem service bundles *Are ES correlated? Do they form clusters responding similarly?*
- Analysis of flows of ecosystem services (sinks, depletion, use), e.g. identification of off-site effects *Where are beneficiaries located?*
- Suitability of policy measures (uncertainty analysis; conflicts/synergies) *Under which conditions can policy measures succeed?*
- Summary of scientific results *Which scientific knowledge has been gained?*
- Discussion of limitations of study *Which relevant aspects could not be addressed?*
- Interpretation of results with respect to stakeholder, practitioner assessments *Were results perceived as useful?*

(5) Beyond the study: Monitoring, improvements, pitfalls

- Proposal of core indicators for monitoring changes with respect to ecosystem services, biodiversity, economic and social targets and objectives *What must we measure to monitor management effects on ES?*
- Monitoring design, based on this study: which intensity and frequency *Where, what and when to monitor?*
- Options for modifications of measures or instruments *Are there promising alternative steering options?*
- Documentation and discussion of unsuccessful approaches (for future studies) *What did not work, and why?*

Based on

Seppelt, R., Fath, B., Burkhard, B., Fisher, J.L., Grêt-Regamey, A., Lautenbach, S., Pert, P., Hotes, S., Spangenberg, J., Verburg, P.H. & Van Oudenhoven, A.P.E. (2012) Form follows function? Proposing a blueprint for ecosystem service assessments based on reviews and case studies. *Ecological Indicators*, 21, 145–154.