

### Appendix 3. Review phase 2 - online survey questions

Review questions relevant to the analysis and results presented in manuscript:

1. Does the paper include both social and ecological aspects?

*Please note that the inclusion of both social and ecological aspect was a key criteria when selecting papers for this review. Please double check the paper carefully before answering this question.*

- Yes
- No

2. How is the interaction between social and ecological aspects considered?

- Unidirectional (the interaction captured/considered is from the ecological to the social system, or vice-versa, but not both)
- Bidirectional (both types of interactions are captured/considered i.e. from the ecological to the social system, and vice-versa)
- N/A

3. What is the value orientation behind the application of the approach?

- Conceptualisation is from an anthropocentric perspective (defines the ecological system based on its utility for humans)
- Conceptualisation is from an ecocentric perspective (defines the ecological system based on its internal functioning)
- Conceptualisation is from an relational perspective (defines the ecological systems based on how humans relate to it – pertains to all manner of relationships between people and nature –see picture below)

4a. What types of social variables are included?

*Tick all that apply*

- Demographic (e.g. gender, educational level, location, ethnicity, race, family size, education, income and occupation)
- Economic (e.g. population, poverty rate, available resources, investment, costs/payments, profits, gross domestic product, employment indicators, inflation rates)
- Politics or power
- Governance (laws and policies, rules, institutions, procedures)
  
- Management (resources, professionals, plans and actions taken to manage a resource)
- Wellbeing
- Infrastructure (physical structures and facilities)
- Management systems (policies, processes and procedures of an entity)
- Land use / resource use
- Social relations/interactions/processes (e.g. social capital, collaboration, social movements, social learning)
- Psychosocial constructs (e.g. norms, values, attitudes, beliefs, preferences)
- Cultural aspects
- Historical accounts
- Behavioural (e.g. actions/decisions of individual(s) that have an effect on the ecological systems)

- Experiences (e.g. human experiences of the environment)
- Other (please specify)

4b. What types of ecological variables are included? (empirical papers only) Tick all that apply

- n/a
- Ecosystem services (i.e. provisioning - food, raw materials, fresh water, medicinal resources; regulating - climate and air quality, carbon sequestration, moderation of extreme events, waste water treatment ; cultural - spiritual, recreation, tourism, education, aesthetic appreciation and inspiration for culture and art)
- Biophysical aspects (e.g. habitat type/land cover type, climatic variables)
- Biodiversity aspects (e.g. richness, distribution, abundance, functional diversity, phylogenetic diversity)
- Ecological processes (e.g. Ecological functions - erosion control, soil fertility, pollination, biological control, nutrient cycles, energy transfer, community dynamics)
- Geomorphological processes (e.g. erosion, weathering)
- Evolutionary aspects (e.g. life-history traits)
- Genetics (e.g. phenotypic traits, fitness)
- Animal behaviour (e.g. how animals interact with each other, with their environment and with other living beings including humans)
- Other (please specify)

5a. Does the paper involve a tool, method, model or conceptual framework for integrating social with ecological aspects?

- Yes
- No

*Conceptual framework: Presents and explains and organises concepts and terms that may be used to construct the kinds of causal explanations expected of a theory. It can be an existing or a new framework.*

*Theory: posits specific causal relationships among core variables.*

*Model: Detailed manifestation of the functional relationships among variables important in a particular setting (different models can be used to represent different aspects of a given theory).*

*Tools and methods: instruments to help us undertake research.*

5b. Please select the category that best describes the tool, method, model or framework used to integrate social with ecological aspects

*Note: if the paper integrates more than one tool/method/framework please choose all that apply. Under "Other" you can include more information about your selection.*

- Agent-based modelling
- Bayesian Belief Network (BBN)
- Behavioural economics
- Bio-economic modelling
- Collection/comparison/combination of social and ecological data

- Conceptual models (e.g. mental models, casual-loop diagrams, cognitive maps, fuzzy maps/models)
- Dynamic modelling
- Decision support tool/approach (e.g. structured decision making, modelling + expert elicitation, decision tree analysis, multi- criteria decision analysis)
- Descriptive approaches (case study analysis, historical analysis)
- Driver-Pressure-State-Impact-Response (DPSIR)
- Ecosystem services framework
- Game-theoretic modelling
- Human appropriation of net primary production
- Integrated index (please provide further info under “Other”)
- Integrated modelling (e.g. ecological modelling with agent-based modelling, population model with human/social parameters/scenarios)
- Institutional Analysis and Development (IAD)
- Institutional design principles (Ostrom)
- Institutional fit (social-ecological fit)
- Long-term social-ecological research
- Management Strategy Evaluation
- Multi-agent modelling
- Participatory approaches (e.g. participatory impact assessment, cognitive mapping, community values mapping, participatory modelling, participatory scenario building, role-playing games, participatory GIS, PRA)
- Pressure-state-response (PSR)
- Qualitative models
- Resilience framework/Adaptive capacity/Panarchy/Adaptive cycle
- Scenario assessment/analysis
- Simulation modelling
- System modelling
- Social-ecological experiments
- Social-ecological systems framework (e.g. Ostrom’s or other – please clarify under “Other”)
- Social-ecological networks
- Spatial integration of social and ecological data
- Statistical analysis of social and ecological data
- Sustainable livelihoods
- Sustainability assessment
- Telecoupling
- Vulnerability assessment
- Other (please specify - if more than one please separate answers with a comma)

5c. Please tick on the particular theory (or theories) driving the approach?

- N/A. There doesn't seem to be a specific theory driving the approach
- Resilience theory
- Common Pool Resource (CPR) theory
- Game theory
- Panarchy
- Adaptive cycle theory
- Systems theory
- Complexity theory

- Decision theory
- Other (please specify)

5d. How is the framework, tool, model, or method being (or proposed to be) used?

*Tick all that apply*

- to describe/understand the system (e.g. understand elements, relationships, problems or gaps)
- to identify/explore/test management alternatives/strategies or policy evaluation
- to monitor and/or evaluate policies (efficacy)
- to identify priorities or "optimal" solutions (finding the best answer for a specific problem)
- to identify desired way forward/direction/predict future change (model future states)
- to describe historical changes
- to test hypothesis
- to build theories
- to build tools or create methods
- to engage stakeholders
- other (please specify)

6. Is the analysis conducted qualitative, quantitative or both?

- Qualitative
- Quantitative
- Both
- N/A

9a. Does the paper mention any of the following stakeholder types as having been involved as a collaborator in the research process?

- Resource users
- Scientific experts
- Cultural groups
- Community groups
- Industry groups
- NGOs
- Government organisations
- Private companies
- General public
- No one involved (none are mentioned)
- Unable to tell (seems that some stakeholder types were involved but it is not clear who)
- N/A (conceptual paper)
- Other (please specify)

9b. For each stakeholder type indicated in the previous question, at what stages of the study were they involved? (problem identification, study design, data collection, analysis/assessment, delivery of outputs)

	Problem identification	Study design	Data collection	Analysis/assessment	Delivery of outputs	Other (please specify below)	Unable to tell (how stakeholder type was involved)
Resource users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientific experts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industry groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government organisations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

10. To what extent does the paper/research lead to practical recommendations? (1: No recommendations, 5: Provides an extensive and clear list of recommendations for policy or practice)

11. On a scale of 1 to 5, to what extent would you say that social and ecological aspects are integrated? (Where 1 is minimal integration and 5 is a great amount of integration)

*Minimal integration : focus is on either the social/human or the natural/ecological system, and only one (or a few) variables/components of the other system are considered*

*A great amount of integration : Feedbacks between social and ecological components are explicitly accounted for/considered or multiple processes involving both social and ecological variables are considered at the same time*

Other questions:

Is it an empirical or conceptual\* paper?

- Empirical only
- Conceptual only
- Empirical and conceptual

- Neither. It is a review or other type of paper

*Conceptual paper: Presents and explains and organizes concepts (abstract descriptions of phenomena) together. It can be a new conceptualization, an existing conceptualization, or an adaptation of an existing conceptualization.*

*Empirical paper: reports the results of a study that uses actual data derived from observation or experimentation (this includes data derived from expert opinion or local knowledge).*

*A paper can be considered to be "empirical and conceptual" when the conceptual framework that is applied is first explained in detail (these type of papers usually have a diagram, but not all do).*

What type of problem or problems are being addressed through the application (or proposed application) of the approach?

*Tick all that apply*

- Residential and commercial development related problems or conflicts (including tourism related)
- Agriculture and aquaculture related problems or conflicts
- Energy production and mining related problems or conflicts
- Transportation and associated related problem or conflicts
- Biological resource use (e.g. hunting and collecting terrestrial animals, logging and wood harvesting, fishing aquatic resources)
- Human activities that may alter, destroy and disturb habitats and species associated with non-consumptive uses of biological resources (including recreational, war, civil unrest)
- Natural systems modifications (often to improve human welfare e.g. fire suppression or increase, change in water flow patterns)
- Invasive and other problematic species and genes (e.g. invasive non-native species, problematic native species, introduced genetic material)
- Pollution (e.g. agricultural and forestry effluents, domestic sewage and urban waste water, industrial and military effluents, garbage and solid waste, air-borne pollutants)
- Geological events (e.g. volcanoes, earthquakes, avalanches or landslides)
- Climate change and severe weather (habitat shifting and alteration, droughts, temperature extremes, storms and flooding)
- Community development issues (e.g. educational, cultural, economic, social and environmental wellbeing of communities)
- Other (please specify)