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 a 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, causal-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)
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)