Participatory modeling of Protected Area Social-Ecological Systems with managers

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Abstract

Effectively managing social ecological systems is essential to improving their resilience to environmental change and anthropogenic pressure. However an explicit understanding of the system being managed is often lacking. This study investigates the use of collaborative workshops to produce social ecological conceptual diagrams of Protected Areas. The production and use of conceptual diagrams by managers is hoped to assist them in reflecting on their decision making process with the aim of improving resilience of the system.

Baseline management decision-making processes were evaluated for twenty Australian Protected Areas managers, including how much time is currently allocated to various management actions. Using paired experimental design, half of the managers were then engaged in one day workshops where an explicit social ecological model of their park was developed. Models incorporated both social values (cultural, visitor, and community values) as well as natural values (ecological, geological and landscape values). There was a focus on the linkages between values, as well as external threats. Current management actions were identified and linked to the threats and values that they impacted on. Managers were asked to rate their current performance for each management action they carried out and to consider the required actions to maintain the values of their park in an acceptable state, preventing a switch to a highly degraded state. This process was designed to align with the NSW National Parks Service who is aiming to integrate more detailed threshold based models for individual management issues such as specific weed species.

Baseline interviews with managers indicated decisions about time allocations prior to workshops were heavily influenced by budgetary documents (64% respondents), and were guided more by in-house accumulated knowledge passed on orally (45% respondents) than by written management documents (18% respondents). There was a wide range of adherence to management plans. On a scale of 1 to 10 with 1 being not at all and 10 being to the letter, parks reported values between 3 and 9 with an average of 6. The most common reason for not following management plans were that they were out-dated (55% of respondents) and they did not fit with the allocated budget (36% of respondents).

Immediately after being exposed to the social ecological modelling workshops managers were asked to rate how well models represented the way the park functions on a scale of 1 (not at all) to 10 (perfectly). Responses ranged between 8 and 10 with an average of 9.25. Larger parks with higher visitor numbers commented that the system was too complex and they weren’t sure that this complexity was or could be captured. Smaller less complex parks generally commented that they were surprised that they were able to come up with a working model considering that they saw the park and its management as a complex system. Future

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work will include assisting managers to use social-ecological models in decision making, including mathematical Bayesian versions of the conceptual models and monitoring the overall impact of models on changes in decision making processes and management effort allocation.

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