Uncertainties and new management strategies: solving the recreation-biodiversity conflict with local stakeholders

Rogier Pouwels[1], Paul Opdam[1]

Keywords: adaptive management, boundary management, incomplete knowledge, unpredictability

In the European landscape, conflicts between the conservation of biodiversity and recreation activities are intensifying. Managers of large nature areas are confronted with increasing numbers of visitors and decreasing biodiversity values. To accommodate the visitors and protect biodiversity values at the same time, they need to make changes in the landscape. Current laws, a lack of knowledge on the recreation-biodiversity relationship and the involvement of stakeholders complicate finding agreed upon solutions. Scientists can contribute to conflict management by providing objective information (Young et al. 2005) and help to justify management plans and actions (McCool et al. 2007). However, in the context of the emerging knowledge society (Nowotny et al. 2001) science is questioned as the credible provider of irrefutable knowledge (Hanssen et al. 2009). Especially because of high levels of uncertainty and low consensus on how to combine the conflicting functions in nature areas (Young et al. 2005). To solve this type of conflict, (Hanssen et al. 2009) propose two strategies. In the pacification strategy, research is started to decrease uncertainties with the aim of enhancing consensus building about solutions. In the facilitation strategy, first consensus about beliefs, ambitions and directions of solutions is built before research is started to decrease the uncertainties. Managers can choose to follow the pacification strategy by following an adaptive management approach and the facilitation strategy by following a boundary management approach (Fig. 1).

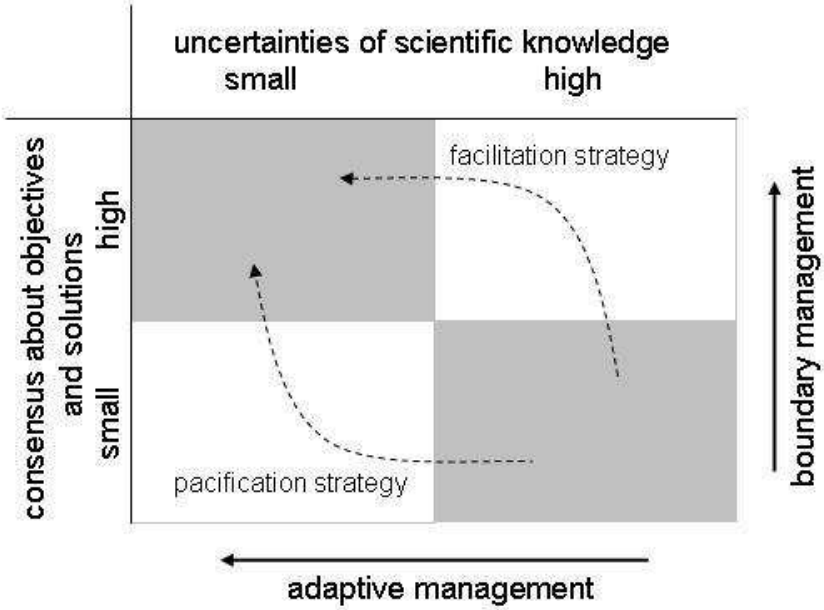

Figure 1: Managing the recreation-biodiversity conflict with the strategy of pacification and facilitation that includes the frameworks of adaptive management and boundary management. Figure modified from Hanssen et al. (2009).

Adaptive management is considered as the appropriate approach if the manager can strongly influence the system but uncertainty levels about the impact of management measures are high (Peterson et al. 2003). Because recreation patterns can be managed in many ways with highly uncertain outcomes (Cole 2006), we conclude that adaptive management is a proper framework to

[1] Alterra, Wageningen UR, P.O.Box. 47, 6700 AA, Wageningen, Rogier.Pouwels@wur.nl, Paul.Opdam@wur.nl

deal with uncertainties in the biodiversity-recreation conflict. However, it is ineffective in dealing with the conflict itself (Williams et al. 2007).

Boundary management is considered as the appropriate approach if the manager can influence the system in many ways but consensus on the impact is low. In a conflict with a high degree of uncertainty and many solutions, the boundary between knowledge and action needs a management focusing at 'communication', 'translocation' and 'mediation' (Cash et al. 2003). This so called boundary management is most effective if the credibility, saliency and legitimacy of information is enhanced simultaneously.

The current recreation management approaches include a sequence of steps similar to adaptive management (McCool et al. 2007). In these steps scientific knowledge is mostly used in a one-way direction to inform stakeholders (Fig. 2). However, adaptive management and boundary management imply the involvement of stakeholders in the development and use of scientific knowledge and tools. Knowledge of stakeholders has to be regarded as part of the common knowledge basis and it should be used to decrease uncertainty (Fig. 2).

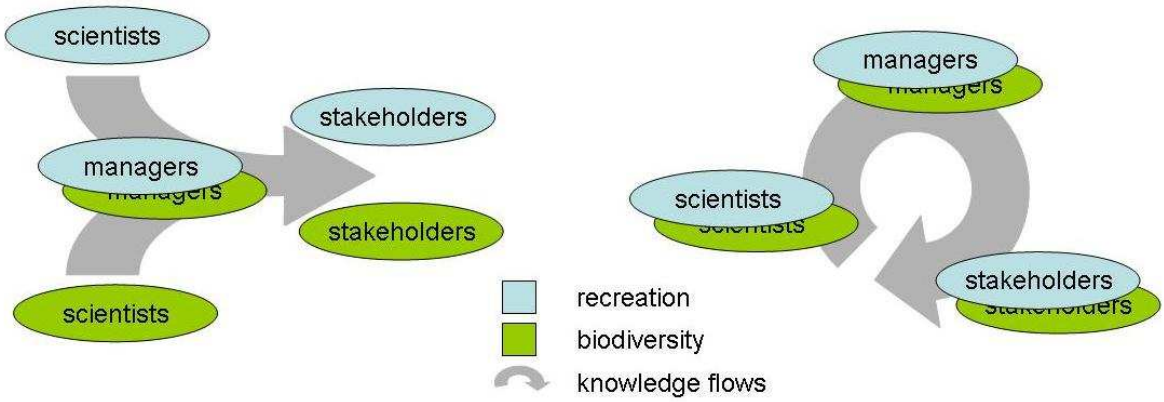

Figure 2: Left figure represents the use and evolvement of scientific knowledge in current recreation management frameworks and right figure in adaptive and boundary management.

Both management strategies deal with different types of uncertainties (Brugnach et al. 2008, Opdam et al. 2009). A first type of uncertainty, related to imperfect knowledge, may lead to a loss in credibility of scientific knowledge and tools. This uncertainty can probably be reduced by using local data and expertise. A second type, uncertainties related to ambiguity, may cause a loss in legitimacy. Efforts to clarify goals and values and make hidden agendas visible could help in reducing the impact of this type of uncertainty, and scientific concepts and tools can facilitate communication by visualizing relationships between recreation and biodiversity. The third type of uncertainty is related to the unpredictability of ecological systems and human behaviour. Neglecting this type of uncertainty might lead to a loss in transparency, but too much focus might offer an easy way out to do nothing.

As a topic of future research, we suggest investigating how the three types of uncertainties can be managed in adaptive management or boundary management, and find out how the way uncertainties are clarified affect the learning process. As a hypothesis, we propose that boundary management deals better with uncertainties related to ambiguity, and adaptive management with uncertainties related to incomplete knowledge (Fig. 3). Therefore we amend that managing the recreation-biodiversity conflict should alternate between a pacification strategy and a facilitation strategy (Fig. 1) as a stepwise learning strategy of adaptive management and boundary management.

Figure 3: Schematic representation which types of uncertainties are addressed more in boundary management and which types are addressed more in adaptive management.

References

Brugnach, M., A. Dewulf, C. Pahl-Wostl & T. Taillieu. 2008. Toward a relational concept of uncertainty: about knowing too little, knowing too differently and accepting not to know. In: Ecology and Society (13), art. 30.

Cash, D.W., W.C. Clark, F. Alcock, N.M. Dickson, N. Eckley, D.H. Guston, J. Jager & R.B. Mitchell. 2003. Knowledge systems for sustainable development. In: Proceedings of the National Academy of Sciences of the United States of America (100), p 8086-8091.

Cole, D.N. 2006. Visitor and recreation impact monitoring: is it lost in the gulf between science and management? In: The George Wright Society Forum (23), p. 11-16.

Hanssen, L., E. Rouwette & M.M. van Katwijk. 2009. The Role of Ecological Science in Environmental Policy Making: from a Pacification toward a Facilitation Strategy. In: Ecology and Society (14).

McCool, S.F., R.N. Clark & G.H. Stankey. 2007. An assessment of frameworks useful for public land recreation planning. Gen. Tech. Rep. PNW-GTR-705, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

Nowotny, H., P. Scott & M. Gibbons. 2001. Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty. Polity Press, London.

Opdam, P., M. Broekmeyer & F. Kistekast. 2009. Identifying uncertainty in judging the significance of human impacts on Natura 2000 sites. In: Environmental Science & Policy (12). p. 912-921.

Peterson, G.D., G.S. Cumming & S.R. Carpenter. 2003. Scenario planning: a tool for conservation in an uncertain world. In: Conservation Biology (17), p 358-366.

Young, J., A. Watt, P. Nowicki, D. Alard, J. Clitherow, K. Henle, R. Johnson, E. Laczko, D. McCracken, S. Matouch, J. Niemela & C. Richards. 2005. Towards sustainable land use: identifying and managing the conflicts between human activities and biodiversity conservation in Europe. In: Biodiversity and Conservation (14), p 1641-1661.