Criteria for scientific tools for recreation planning in nature areas

Rogier Pouwels, René Jochem, and René J.H.G. Henkens

Abstract — Recreation is increasing the last decades in Northwest-Europe. Although these visitors might have a negative impact on biodiversity values, they are important for the support of biodiversity actions. Therefore a major objective for planning and managing of visitor landscapes is to avoid the negative effects of recreational use and to ensure that expectations of visitors can be afforded. Scientific knowledge and scientific tools always have and always will be important in managing recreation in visitor landscapes. However it is an illusion scientists will deliver ready-to-go answers. In this paper we will define criteria that scientific tools should meet. We will follow the arguments of Haider [1] and McCool et al. [2] that the use of knowledge and tools should be implemented in decision strategies like adaptive management and use experiences from a case study of recreation planning in the New Forest (UK). We will show that scientific tools should be flexible to adapt to local data to gain credibility and legitimacy and should be able to show which management alternative is most likely to meet recreation objectives and conservation objectives. Therefore the recreation tool has to be linked to the biodiversity tool. The scientific tools also should be useful in communication between stakeholders so they learn each other's key processes and values and better understand the "other side of the table". Especially because stakeholders have different views about what should or should not be considered a problem.

Index Terms — Adaptive management, integrating scientific tools, recreation planning, biodiversity.

1 Introduction

Many nature areas in Northwestern Europe are open for recreational use. Visitors enjoy restorative health benefits of contact with nature and they experience many other valued aspects of visiting the countryside such as tranquility, open space, fresh air, unpolluted waters and scenery. Health programs are stimulating people to go out in nature areas. Also different types of recreation are evolving. Although these visitors might have a negative impact on biodiversity values, they are important for the support of biodiversity actions. In order to accommodate the increasing number of visitors managers and decision makers need to make changes in visitor landscapes that includes parks, protected areas, and urban forests. Therefore a major objective for planning and managing of visitor landscapes is to avoid the negative effects of recreational use and to ensure that expectations of visitors can be afforded [3].

In this field of meeting human developments while protecting biodiversity confronts policy makers, scientists and local communities [4]. Since the mid 1970's recreation frameworks have been developed to help managers and decision makers to make plans for recreation in nature areas. Within recreation frameworks scientific tools always have and always will be important [5]. In this abstract we will define criteria that scientific tools should meet in order to be helpful in recreation frameworks. We will follow the arguments of Haider [1] and McCool et al. [2] that recreation frameworks should be imple-

R. Pouwels is with the team Ecological Modelling and Monitoring at Alterra, Wageningen UR, the Netherlands. E-mail: rogier.pouwelsr@ wur.nl.
R. Jochem is with the team Ecological Modelling and Monitoring at Alterra, Wageningen UR, the Netherlands. E-mail: rene.jochem@wur.nl
R.J.H.G. Henkens is with the team The Human Factor at Alterra, Wageningen UR, the Netherlands. E-mail: rene.henkens@wur.nl

mented in decision strategies like adaptive management [6] and research is conducted in a transdisciplinary setting [7].

2 ADAPTIVE MANAGEMENT AND TRANSDISCIPLINARY RESEARCH

Adaptive management promotes flexible decision making. Careful monitoring of the outcomes both advances scientific understanding and helps to adjust policies or operations as part of an iterative learning process. It is not a 'trail and error' process, but rather emphasizes learning while doing. Its true measure is in how well it helps meet environmental, social, and economic goals, increase scientific knowledge, and reduces tensions among stakeholders [6].

Adaptive management is appropriate if management can strongly influence the system and if uncertainty about management impacts is high [8]. Because recreation can be managed in many different ways and there is still a high uncertainty about which management actions are effective [9], adaptive management seems to be the most appropriate strategy for recreation management. In adaptive management research is always conducted in a transdisciplinary setting were scientists in different fields of expertise work together with local stakeholders and (local) managers [7].

The main difference with the current recreation frameworks [2] is that in adaptive management uncertainties have to be embraced by scientists, managers and stakeholders alike. An adaptive approach provides a framework for making decisions in the face of critical uncertainties, and a formal process for reducing uncertainties so that management can be improved over time [6]. The old frameworks are focusing on one future plan [2]. Also the learning process in adaptive management includes managers and decision makers, scientists and stakeholders and is based on long term monitoring plans [6]. Nowadays sufficient long term monitoring plans are a major omission in both recreation management [9] and biodiversity management [10].

3 BIODIVERSITY AND RECREATION IN THE NEW FOREST

The New Forest lies to the west of Southampton in the United Kingdom and covers over 57 thousands of hectares. Current figures show that there are 24 million people days spent in the Forest each year with 18 million of those comprising local residents. More then 80% of the visitors come by car. The last decade a lot of restorations for improving the quality of valley mires and wet heaths have been taken place in the New Forest. This restoration has been important for wader species like Lapwing (*Vanellus vanellus*), Snipe (*Gallinago gallinago*), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*). However, these species are still declining in South England [11] and are one the Red List or Amber List for the UK. One of the expected causes of declining heathland species is the increasing number of visitors enjoying the heathlands and woodlands [12], [13], [14]. In order to set a hold to the decline, the Forestry Commission, responsible for managing the New Forest, wants to create tranquil areas for the wader species by redirecting recreational use. Therefore changes to the accessibility of the heathlands should be made.

4 ADAPTIVE RECREATION MANAGEMENT IN THE NEW FOREST

4.1 Setting objectives

Adaptive management requires stated management objectives to guide decisions about what to try [6]. In this study the recreation objectives and biodiversity objectives were set by stakeholders together with the managers of the New Forest. The stakeholders agreed on compensating measures if management actions would

lead to reduced accessibility of the area. The objective for wader species was to create tranquil areas of 750 ha of good habitat. These areas should hold so called key populations [15].

4.2 Monitoring data

No detailed monitoring data for recreation were available. Because this information is needed to indentify problems and opportunities a large monitoring program was set up that covered almost one third of all parking lots and on third of the area. Visitor counts were held at parking lots, questionnaires were filled in and visitors were monitored using GPS.

Monitoring programs for wader species were more scattered, but covered large areas of the New Forest. Also data on vegetation structure, slopes and soil type is available. These data are somewhat outdated [16], but most of the area still has the same vegetation structure and is useful for mapping potential breeding habitat of most species.

4.3 Scientific tools

Scientific tools can be used to show which management alternative is most likely to meet conservation objectives. If these scientific tools are used in recreation frameworks the recreation tool has to be linked to the biodiversity tool. Therefore the recreation tool has to simulate the relevant recreation processes and deliver results for an ecological footprint; type of recreation and the intensity in space and time. Fig. 1 gives an example how two separate tools can be linked into one management tool. In the New Forest we used the model LARCH [15] for evaluating the wader species and the model MASOOR for evaluating recreation [17].

The monitoring data was used to validate the result of the models. The validation with local data improved the credibility of the models for the stakeholders and managers.

4.4 Selecting management alternatives

Together with the stakeholders several management alternatives were developed. These included among others closing car parks, redirecting visitors by signage and habitat restoration. Especially on the locations were the managers planned to close car parks, the stakeholders were very critical. For these locations we gathered more data and used MASOOR to evaluate the effect of management actions on the visitor patterns in the area.

In one of the locations the models showed that closing the car park would lead to a large, tranquil patch of suitable habitat for wader species, without affecting other habitat patches in the surroundings. In another location the models showed that closing the car park would lead to a large, tranquil patch of suitable habitat for wader species, but habitat patches in the surroundings would be affected. Because of these results the stakeholders selected the first alternative as pilot action and rejected the second alternative. We think that the acceptance of some of the management alternatives was higher because the models predicted that other alternatives will not be effective. If all management alternatives would be positive, the acceptance will be less.

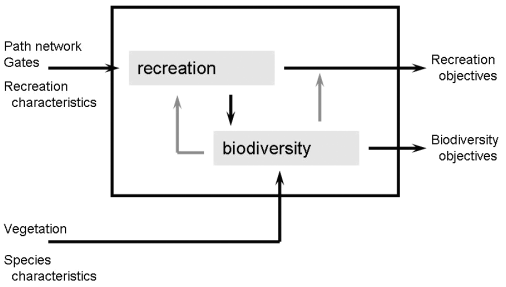

Fig. 1 Example of scientific tool containing a recreation tool and a nature tool [18]. The input are GIS-maps containing landscape characteristics and attributes managers can control. The output are indicators that can be linked to the objectives in the recreation framework. The arrow between the recreation tool and the biodiversity tool indicate the negative impact of recreation on biodiversity. The grey arrows indicate possible interactions between biodiversity values and recreation.

4.5 Follow up monitoring

The pilot actions were selected in spring 2007. A monitoring programme for 5 years should reveal if the pilot actions will lead to solutions profitable for recreation as well as for biodiversity.

5 WHY WERE THE SCIENTIFIC TOOLS USEFULL IN THE PROCESS?

Within an adaptive management or transdisciplinary setting adaptation of existing scientific tools to local data is crucial. Local scientists play a crucial role as a key information conduit between participants (stakeholders, managers) and the team that is responsible for the adaptation of the scientific tools [19]. Regular meetings between manager, scientists and stakeholders help to transfer local knowledge and scientific knowledge between the different partners [7].

The visualization effects associated with, especially, agent based models are important tools for the discussion with stakeholder groups. It contributes to the awareness [20] and learning [21] of the different stakeholder groups. Stakeholders will learn each other's key processes and values and better understand the "other side of the table" [7].

Scientific tools should also meet general criteria. The tools have to be credible, salient and legitimate [4], [6]. To be credible the tool needs to be credible for scientists as well as for other parties [4]. Credibility is increasing when the tool is helpful in the translocation of knowledge [20], [21]. To be legitimate the tools should be transparent and user friendly. Different stakeholders often have competing demands, obligations and viewpoints. Therefore stakeholders should be involved in an early stage of development or they will see the process and the tools as illegitimate [4], [7], [19].

6 REFLECTIONS

Adaptive management is a promising approach to deal with changing landscapes in combination with uncertainties and conflicting objectives. However, it can only be used if the organisation that manages the nature area has a structure that is open, flexible, used to interrelated teams, and has a focus on incentives, innovation and shared learning [6].

Another drawback might be the current laws on biodiversity. Often they restrict managers to make any changes in the area if the consequences are uncertain [6], [7]. However, at this moment the problem is that doing nothing is unaccepted either, because increasing numbers of visitors is one of the reasons why many bird species are declining in nature areas in Northwest-Europe.

Finding the right balance between reuse or adaptation of existing tools and creating of new ones will always be a challenge [19]. Scientist should be aware not to try to use "ever-more" precise techniques [23], but bypassing scientific tools in favour of simplistic alternatives may restrict the flow of scientific knowledge into the planning process [19].

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