Appendices

Appendix A: List of studies reviewed for valuation methods


Appendices


Appendix B: Selection of landscape attributes for the spatial analysis

We based our selection of landscape attributes on a literature review. We looked for articles (until December 2016) through web of knowledge using the search string (TS= (map* AND (recreat* AND ("ecosystem service" OR landscape)))). This rendered 215 results. We excluded all papers that did not explicitly map or explain nature-based recreation on the basis of proxies. We therefore also excluded studies that made use of survey data (quite often PPGIS) and only aimed at describing hotspots of particular landscape values, while we included survey-based studies that made an attempt at explaining the spatial distribution of the data with the use of indicators. This left a total of 68 papers.

To code the papers, we used the framework by Deng, King, and Bauer (2002), who, based on the literature on nature-based recreation and tourism, summarize what they believe are the major components contributing to the overall attractiveness of protected areas: the importance and number of peripheral attractions (i.e. substitutes), accessibility (including both distance and connectivity), resources (divided between cultural and natural resources), the presence of facilities and the characteristics of the local community. This allows us to infer to what extent scholars mapping recreation as an ES also make use of indicators other than biophysical landscape attributes. Consequently, of all the papers that included ‘natural resources’ as an indicator, we noted the specific indicators that were used and later categorized these using an inductive approach.

The outcome of the literature review revealed that natural resources are most commonly included in studies mapping recreation as an ES. All but five of the studies in our sample made use of physical landscape attributes to map nature-based recreation. Accessibility, often measured by road or population density, was taken into account in 60% of the studies. The number of facilities present, including for instance the number of hiking trails or accommodations, was included in 35% of the studies, while cultural resources (i.e. cultural heritage and historic buildings) were included only in 16% of the studies. The availability of substitute sites was only accounted for in 4% of the studies.

Following our review of commonly used landscape attributes (Fig. C.1), we chose the following variables as covariates: land cover, topography, proximity to water, status of protection, and area size. This means we did not include a variable capturing the potential effect of landscape elements. Although landscape elements have been shown to play an important role in the recreational experience of land, their particular role in the larger process of deciding where to go for nature-based recreation is not straightforward. Indeed, in our sample, when asked for the motivations for marking a place, only 7% of the respondents mentioned ‘cohesion’ (which was described as not fragmented or visually cluttered). Preliminary modeling results indeed showed no relation between indicators for landscape structure and perceived attractiveness. We did, however, include
Fig. 7.1 Landscape attributes used for mapping nature-based recreation
area size of urban green, as large urban parks may be preferred as they tend to feel less crowded. In our sample 42% of the respondents marked a location for its 'quiet' (described as an indicator for few other people) character. We therefore included an interaction variable, to review whether, in addition to the presence of urban green, respondents also predominantly chose such urban green space of larger size.

Furthermore we did not include variables that reflect the ecological functioning of, disturbance or naturalness of, and the emblematic species present in an area because, as pointed out by several scholars, ecological naturalness is related to but not equivalent to perceived naturalness (Lamb & Purcell, 1990; Williams & Cary, 2002). Studying landscape preferences in Australia, Williams and Cary (2002) find minimal differences across landscapes with distinct variation in ecological quality. We did, however, include the protected area status which may also capture ecological values to some extent, as such areas are often managed with the aim of preserving particular functions and/or species.

References


Studies included in the literature review


