

6

Challenges of interdisciplinarity for forest management and landscape perception research

John L. Lewis[#]



Abstract

Forest managers and academics seeking to forge an interdisciplinary blend of natural and social scientific research confront a formidable challenge. In addition to the daunting array of conceptual and methodological frameworks, there are fundamental questions and methodological issues regarding the respective roles of biology, social context and culture as influential factors in environmental perception. The purpose of this chapter is to present a conceptual roadmap for land managers and researchers attempting to achieve some form of disciplinary integration. I critically evaluate the theoretical postulates used in current landscape-perception research, examine the role of aesthetics and culture in landscape perception, and speculate on

[#] Collaborative for Advanced Landscape Planning, Faculty of Forestry and Landscape Architecture, 2045-2424 Main Mall, Forest Sciences Centre, University of British Columbia, Vancouver, British Columbia, Canada, V6T 1Z4, E-mail: johnlew@interchange.ubc.ca

the potential contribution that interdisciplinary landscape-perception research can make to forest management and practice.

Keywords: landscape perception; culture; forest management; interdisciplinarity

Introduction

As government and industrial resource interests across North America strive to implement new, more sustainable approaches to forest management, stories accumulate of 'state-of-the-art' management frameworks that have been thwarted due to the inability of land managers to incorporate the knowledge, perceptions and preferences of environmental stakeholders (McCormack 1998; Satterfield 2002). A major, yet often overlooked impediment to socially acceptable resource management is the fact that stakeholders may interpret management proposals quite differently from one another. This plurality of perspectives, combined with the tendency on the part of different stakeholders to believe that their point of view is the most legitimate, may result in myriad problems, including divergent problem definitions, misunderstanding and the eventual breakdown of decision-making processes.

Resource managers and related environmental professionals caught in the crossfire of land-management controversy need to know how to respond in a manner that respects the perceptions and preferences that different stakeholders have of and for particular landscapes. For forest managers who have the technical and legal capacity to alter the living landscape, designing change that delivers commercially marketable products while sustaining the quality of experience for a wide range of users remains a significant challenge. This challenge is amplified by the daunting array of theoretical and methodological approaches confronting environmental professionals from the various disciplines that specialize in the investigation of human environmental perceptions. This complexity is reflected in the extent to which the fields of environmental psychology, environmental sociology, ecological psychology, cultural anthropology and phenomenology differ in their conceptions of the source(s) of human environmental perceptions (e.g. biological, cognitive, intersubjective, embodied) and the methods by which they ought to be investigated (e.g. experiments, surveys, interviews, participant observation).

Incorporating any one (or more) of these theoretical and methodological approaches into forest-management research and practice is potentially facilitated by mapping out their respective postulates, thereby allowing forest managers and researchers to make judgments based on clear, broadly informed theoretical rationales. Throughout much of the world, the integration of this traditionally natural-science-based discipline with social-scientific research has been a relatively recent undertaking. Sustainable forest-management projects often begin as interdisciplinary enterprises with teams of experts from a variety of fields collaborating on problem definitions and objectives. However, integration tends to break down as academics and planning professionals withdraw to their respective disciplinary camps, invariably due to theoretical misconceptions and methodological differences on how best to pursue project objectives (Tress, Tress and Fry 2005, p. 186). The purpose of the following discussion is to provide a kind of conceptual roadmap, largely to inform the field of forest management and thereby facilitate the communication that is essential to sustaining integrative projects. More specifically, this chapter will seek to:

- present and critically assess the broader theoretical frameworks used in current landscape-perception research;
- present aesthetic theory as an underrated but potentially significant contributor to interdisciplinary perception research;
- assess the role of ‘culture’ as an independent variable in perception studies;
- speculate about the potential contribution of integrative landscape perception studies for forest management practice.

Landscape perception: current theoretical and empirical frameworks

There is one problem that, perhaps more than any other, motivates inquiry in the broad area of landscape perception. When people from different social or cultural backgrounds encounter the same landscape, they often differ in their interpretations and evaluations of the setting (Meinig 1979; Steele 1981). However, why should this be the case? Advocates of extreme positions in environmental sociology and psychology are not hard to find, from those who insist, on the one hand, that there is nothing in the natural environment that is not socially or culturally constructed (Evernden 1992; Greider and Garkovich 1994) to those, on the other hand, who contend that environmental information is acquired and mediated by cognitive frameworks established over the course of human evolution (D’Andrade 1981; Johnson-Laird 1988).

In the latter case, research across several disciplines has been brought together to support the hypothesis that there exists a fundamental, genetically based human propensity to identify with particular environments (Kellert 1993). The Evolutionary Theories of landscape perception, exemplified by the work of Jay Appleton (1975), emphasize the evolutionary advantages of landscapes that simultaneously afford prospect, wide open views from which hazards can be identified, with refuge, protected settings that prevent one from being seen. Evolutionary theories have influenced the work of academics in the social and behavioural sciences (e.g. cognitive and social anthropology, environmental psychology) and landscape research, who have attempted to determine through their empirical research whether human beings possess innate preferences for particular environments. Evidence taken to confirm this possibility suggests that these environments exhibit the structural characteristics of an East-African savannah defined by its characteristic open expanses (i.e. prospect), interspersed with tight clusters of broad canopy trees (i.e. refuge). Stephen Kaplan, for instance, posits that his findings are not only consistent with evolutionary theory but also partly explained by it:

“Interpretation of new findings repeatedly suggested parallels between what people preferred and the environmental circumstances under which humans evolved” (Kaplan 1992, p. 589)

Some advocates of theories about bio-basic human perception interpret evidence for biologically conditioned human learning and perception as a justification for research designs and policies that treat different stakeholder communities as conceptually similar. This interpretation in turn allows for the development of generalized, quantitative models for predicting preferences and perceptions of land management (Daniel and Boster 1976). However, the point of departure from the static determinism of biological perception stems from the proposition that human beings are not passive sensory automata, and that basic functioning in the world

depends on the collection and synthesis of information. People are extremely adept at extracting information from the environment, and even the very briefest glimpse of the passing landscape provides information to the receiver. This view is represented in what we might call the Information-Processing Theories of environmental perception. For James Gibson (1979) and Stephen and Rachel Kaplan (1982; 1989), environmental perception is not the achievement of a passive mind in a physical body but rather, it is a process involving active and exploratory movement through the world. They stress that the potential for movement through and interaction with an environment is critical to human perception of a given environment's affordances.

The premise that perception is a function of active and engaged (i.e. 'embodied') observers immersed in a particular environmental context is central to the fields of environmental psychology (Ittelson 1973) and landscape phenomenology (Bourdieu 1977). Among the more influential writers in the phenomenological movement has been the French philosopher Maurice Merleau-Ponty, who argued that perceptions, rather than being imported by a singular mind into contexts of experience, are themselves generated within these contexts in the course of people's involvement with others in the practical business of existence (Merleau-Ponty 1962). Thus, if people from different cultural backgrounds differentially perceive and orient themselves within an environment, this is not because they are interpreting the same sensory experience in terms of different biologically programmed schemata. Rather, because landscapes are almost always encountered as part of a socially constructed activity (e.g. labour, leisure, worship, research), the knowledge that is acquired through purposeful activity differentially attunes our senses to the environment.

The notion that people are likely to have differing knowledge frameworks, and therefore differing environmental perceptions, is supported by the considerable empirical work on expertise, largely from the field of cultural anthropology (Berkes 1999; Bierwert 1999; Nazarea 1998). Recent anthropological research affirms phenomenological theory by arguing that human culture, as a conditioning agent of human perceptions and values, does not function in a static capacity. More appropriately, it is crafted within an intersubjective and 'embodied' history of multiple engagements within practical domains of human activity (Ingold and Kurttila 2000). For instance, in various societies one learns how to farm (DeBuys and Harris 1990), harvest fish (Bierwert 1999), or how to modify a forest ecosystem to improve its yield of edible fruits (Lewis 1983) from the accumulated experience of working the land (i.e. embodied knowledge), as well as from the knowledge that is received from others of past trials and successes (i.e. intersubjective knowledge). In other words, culture has been recast as a process rather than an artefact of human existence; a process that is lived by real people who define their perceptions of the world in relationship with one another and with their environments.

Thus, concepts such as forest health, integrity and beauty can have very different meanings depending on whether the person expressing them is a long-time resident, a forest ecologist, an aboriginal plant expert or a timber sale manager:

“Different visual information is available to different people with different knowledge, experience, belief systems and paradigms. ... For example, a forest ecologist, biologist or soil scientist ... may be able to make informed judgements about sustainability by a visual inspection of the plants and soil. ... To the average urbanite, the visual indicators so revealed may well be invisible; they would be uninterpretable and not recognized as indicators” (Kimmins 2001, p. 50).

Differences in the perception of landscape condition are likely to be a result of specific knowledge frameworks associated with particular environmental settings. It is this variability in evaluative standards between expert and stakeholder communities that can be a source of conflict in natural-resources management.

Emerging contributions of aesthetic theory to landscape perception

The significance of phenomenological theory to perception research is the notion that within each physical setting is a social, cultural world that is saturated with environmental references by which people form distinct mental constructs that allow them to understand their environment. Anyone needing to work with diverse stakeholders concerning, for example, land-use or forest management, should acquire some understanding of why people make and/or value certain landscape patterns. In effect, the knowledge that is obtained through experiential learning affects where the observer looks and what properties of objects or features are sought, such as easy walking places, good settlement sites, and fertile ground or clean water supplies. Due to the basic differences in purpose and lived experience with which people from distinctive ways of life approach a setting, some may readily see objects and patterns in a landscape, while others will contend that they are viewing an undifferentiated expanse. Paradoxically, all may believe they are seeing the same reality in objective terms.

To many people, aesthetic perception implies trivial decoration and a superficial appreciation for the beautiful and picturesque. However, philosophers have convincingly argued that aesthetic perception has a fundamental affect on how we see the world. Eaton's characterization of aesthetic experience is fundamental to an understanding of human perception, in part because it reflects the purposeful basis of environmental valuation:

“... aesthetic perception is marked by perception of and reflection upon *intrinsic properties of objects ... that a community considers worthy of sustained attention*” (Eaton 1997, p. 88; emphasis mine).

Similarly, theorists such as Nassauer (1995) and Sheppard (2001) posit that the power of landscape aesthetics rests in its ability to deliver personally or culturally salient knowledge to the perceiver. While such knowledge may include a basic appreciation for the scenic attributes of an environment, there are other aspects of aesthetic experience that invoke different levels of cognition and affect, or emotion (Lewis 2000):

- symbolic: the representation of abstract ideas or beliefs by physical objects and features – e.g. Mount Sinai and God, the Teutoburg forest and Germanic nationalism;
- expressive: the apprehension of physical signs or cues that manifest or reflect environmental condition – e.g. foliage colouration as an indication of disease or pestilence.

Although knowledge apprehension and emotional response are central attributes of all three aesthetic experiences, expressive appreciation is perhaps the most difficult to comprehend and elusive to obtain. This is particularly the case for those of us who are accustomed to living an urban or suburban way of life that is, in varying degrees,

detached from the environments from which we all subsist. From this higher form of aesthetic response, it is hypothesized that emotional responses vary according to the recognition of favourable or unfavourable landscape conditions. Moreover, to attain this level of aesthetic cognition, some understanding or knowledge of landscape patterns and processes must be acquired, often through prolonged and active involvement with the landscape.

Expressive aesthetic perception is often reflected in the specialized environmental knowledge that is possessed by people who are close to the land and contend that they can read the landscape (Lewis 2000). Folk knowledge, local knowledge or indigenous knowledge is based on observations, interactions and repeated feedback from the environment, and from this is built a set of observations and classifications about the local environment (Ellen and Harris 2000). The knowledge that is obtained through purposive encounters with a setting, such as to procure sustenance or to fulfil ritual obligations, affects where the observer looks and what perceptual cues are sought. For instance, through my research in northwestern British Columbia, I have learned that aboriginal hunters develop their skills by learning how to read the landscape, by looking for tangible indications of the presence of valued species, as well as identifying the plants and forest associations that different species require for sustenance and refuge. Similarly, when local (both aboriginal and Euro-Canadian) land users are presented with simulated forest-management scenarios (Figure 1), assessments of landscape condition are often based on visually recognizable landscape conditions or patterns that either sustain or impede particular land-based activities (e.g. hunting, food- or medicinal-plant collection, in-land fishing, timber harvesting, agriculture). The recognition of and preference for these patterns comes from direct, purposive encounters with a landscape that are driven by particular human needs and aspirations (e.g. sustenance, recreation, employment, spiritual encounters). Such knowledge is, in turn, rooted in particular landscapes and what they can afford to satisfy these human requirements. Recognizing and accommodating this kind of knowledge in forest management or ecological restoration may permit land managers to modify or conserve a forest landscape in a manner that is consistent with or, more appropriately, respectful of local land-uses uses and their particular physical requirements in the landscape. More will be said about the prospect for a culturally sensitive approach to forest management and design through the concluding discussion.

If, as Orr (1996, p. 9) posits, sound landscape management requires that “human artefacts and systems” fit well with “the larger patterns in which they are embedded”, then a clear view of those patterns is essential to successful – that is socially acceptable – land management. In effect, bringing aesthetic expectations into play in a way that provides mutual benefits to natural and human ecosystems requires designing landscapes and crafting policies with an awareness of what different stakeholders value and require from their environment. Doing so will first require that environmental-perceptions studies are more effectively designed to elicit the varying forms of purpose-driven or culturally based knowledge retained by different communities.



Figure 1: A subset of the scenarios used to elicit perceptions of landscape change among different cultural groups in northwestern British Columbia. Simulations prepared by John L. Lewis using Visual Nature Studio release 2

Discussion

Having reviewed some of the major concepts in landscape-perception theory, a major question confronting forest managers is: wherein lies the challenge in attempting to integrate human preference and perception research into forest management? In addition to the considerable breadth of theoretical frameworks described briefly in the foregoing, there are several methodological issues that may affect the sensitivity of perception studies to culture as a mediating factor in landscape perception. In the following discussion, I will argue briefly that several purportedly cross-cultural perception studies have not dealt appropriately or defensibly with culture as a construct and, as a consequence, managers and other researchers are encouraged to approach the findings of these and similar studies with some prudence. Following this, I will conclude with an assessment of the potential for integrated forest-perception research.

Landscape-perception methods

As the concept of culture is all encompassing and used so ubiquitously, operationalizing it for use in perception studies has proven to be rather difficult, generating some questionable definitions that are weakly, if at all grounded in recognized definitions in the anthropological literature. For instance, it is worth noting that several perception studies use the concepts culture, nation and society interchangeably. However, comparing subjects drawn from two or more nations, as is often done, does not necessarily imply that a true cross-cultural comparison is being done because the nations may be closely related historically or ethnically – e.g. Americans, Australians or Canadians (Kaplan and Talbot 1988; Orians and Heerwagen 1992; Zube and Pitt 1981). Moreover, such studies tend to underestimate the considerable cultural diversity that may exist intra-nationally, as well as neglect the potential for social and environmental context to influence preferences for landscapes within *individuals* over time (Staats and Hartig 2004; Hartig et al. 2003).

An additional methodological issue stems from the fact that, although subjects may be drawn from countries with very different historic and symbolic traditions (e.g. South Korea and the United States), most use urban or suburban residents as subjects (Yang and Kaplan 1990; Yu 1995). In many cases, such subjects are likely to have highly similar experiences with natural environments that are limited to the occasional camping trip, scenic drive, television documentary, or National Geographic article. Studies that operationalize culture in this manner will tend to obscure the kinds of lived experience and knowledge that come from different modes of existence (i.e. cultures) that function both within and across national boundaries. Thus, the limited between-person variance that is reported in the bulk of the landscape-perception literature may not be due to an inherited scenic perception schema, but to research designs that are based on an inappropriate conception or definition of culture.

Potential contributions to forest-management research and practice

As professional land managers continue to address the social and cultural dimensions of the landscape, in the absence of working guidelines or a systematic framework or methodology, these dimensions will become increasingly salient for resource-management research and practice. Throughout the 1980s and '90s, the planning techniques for biophysical and ecological inputs have increased in sophistication and, with varying degrees of success, have been integrated into the standard practice of environmental planning and design, comprehensive planning,

integrated resource management, multi-criteria analysis, and so forth. However, despite considerable discussion of and research into the spiritual, social and cultural aspects of the environment, the integration of cultural inputs and development of interdisciplinary forest management and research continues to be outside the realm of ordinary practice (Boyd and Williams-Davidson 2000, p. 127; Clayoquot Sound Scientific Panel 1995).

One possible solution may derive from a nascent body of work that has documented indigenous landscape classifications and patterns pertaining to forests, wildlife, soils and water, and evaluated their use by local communities as resource-management standards and models (Nazarea 1998; Wiersum 1997). On the one hand, this research has initiated a shift in the way that aboriginal knowledge is regarded, from viewing Native systems of thought and classification as anecdotal, unscientific and subjective, to a recognition that local cultures know their plant, animal and other biophysical resources intimately and are experts at fine-tuning their land-use strategies to environmental opportunities and constraints (Berkes 1999). The examples of indigenous cultures throughout much of the world, demonstrate that sustainable ecosystems include active human use and management, and have done so for thousands of years (Doolittle 2000; Kay 1997). In my current research with aboriginal communities along the remote north coast of British Columbia, I am attempting to underscore the importance of culturally salient and visually recognizable patterns in local perceptions of landscape condition and forest management. In particular, I hypothesize that in settings that have been actively managed to satisfy particular human requirements (e.g. sustenance, habitation) or aspirations (e.g. spiritual, symbolic), culturally rooted conventions of 'visible stewardship' (Sheppard 2001), 'cultured naturalness' (Hull and Robertson 2000) or 'cues to care' (Nassauer 1995) may be found which have a direct bearing on local perceptions of sustainable or socially acceptable forest management. In light of a critical need for more context-sensitive and culturally relevant indicators, the practical objective of my research is to present a case study that suggests a way for government agencies and resource industries to understand and accommodate locally defined perceptions and standards of forest management. These culturally defined standards may include the kind of expressive aesthetics described earlier that have a direct bearing on perceptions of healthy and culturally appropriate forest management.

The identification of culturally specific landscape perceptions can have important implications for policy strategies in the area of planned landscape change. If acknowledged and integrated into forest management, differences in environmental perceptions between communities may be sources of creativity and discussion. Interaction among people with different cognitive models may facilitate learning and temper inappropriately single-minded management activities. As in many other respects of environmental planning, recognition of diversity of thoughts, ideas, attitudes and perspectives among members of a society seems an important step towards fostering socially acceptable forest management and reducing conflicts that hinder the attainment of this goal. Moreover, acknowledging the plurality of perspectives, both within and between communities, may facilitate the search for common ground in the pursuit of broader goals such as environmental conservation and sustainable forest management.

References

- Appleton, J., 1975. *The experience of landscape*. Wiley, Chichester.
- Berkes, F., 1999. *Sacred ecology*. Taylor and Francis, Philadelphia.
- Bierwert, C., 1999. *Brushed by cedar, living by the river: coast salish figures of power*. The University of Arizona Press, Tucson.
- Bourdieu, P., 1977. *Outline of a theory of practice*. Cambridge Univ. Press, Cambridge.
- Boyd, D. and Williams-Davidson, T., 2000. Forest people: first nations lead the way toward a sustainable future. In: Salazar, D. and Alper, D. eds. *Sustaining the forests of the Pacific Coast: forging truces in the war in the woods*. UBC Press, Vancouver, 123-147.
- Clayoquot Sound Scientific Panel, 1995. *First nations' perspectives: relating to forest practices standards in Clayoquot Sound*. Clayoquot Sound Scientific Panel, [S.l.].
- D'Andrade, R.G., 1981. The cultural part of cognition. *Cognitive Science*, 5, 179-195.
- Daniel, T.C. and Boster, R.S., 1976. *Measuring landscape esthetics: the scenic beauty estimation method*. U.S.D.A., Fort Collins. USDA Forest Service Research Paper no. RM-167.
- DeBuys, W. and Harris, A., 1990. *River of traps: a village life*. University of New Mexico Press, Albuquerque.
- Doolittle, W., 2000. *Cultivated landscapes of native North America*. Oxford University Press, Oxford.
- Eaton, M.M., 1997. The beauty that requires health. In: Nassauer, J. ed. *Placing nature: culture and landscape ecology*. Island Press, Washington, 85-106.
- Ellen, R. and Harris, H., 2000. Introduction. In: Ellen, R. and Parkes, P. eds. *Indigenous environmental knowledge and its transformations: critical anthropological perspectives*. Harwood Academic Publishers, Amsterdam, 1-33.
- Evernden, N., 1992. *The social creation of nature*. Johns Hopkins University Press, Baltimore.
- Gibson, J.J., 1979. *The ecological approach to visual perception*. Houghton Mifflin, Dallas.
- Greider, T. and Garkovich, L., 1994. Landscapes: the social construction of nature and the environment. *Rural Sociology*, 59 (1), 1-24.
- Hartig, T., Evans, G.W., Jamner, L.D., et al., 2003. Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23 (2), 109-123.
- Hull, B. and Robertson, D., 2000. The language of nature matters: we need a more public ecology. In: Gobster, P. and Hull, B. eds. *Restoring nature: perspectives from the social sciences and humanities*. Island Press, Washington, 97-118.
- Ingold, T. and Kurttila, T., 2000. Perceiving the environment in Finnish Lapland. *Body and Society*, 6 (3/4), 183-196.
- Ittelson, W.H., 1973. Environmental perception and contemporary perceptual theory. In: Ittelson, W.H. ed. *Environment and cognition*. Seminar Press, New York, 1-19.
- Johnson-Laird, P.N., 1988. *The computer and the mind: an introduction to cognitive science*. Fontana, London.
- Kaplan, R. and Kaplan, S., 1989. *The experience of nature: a psychological perspective*. Cambridge University Press, Cambridge.

- Kaplan, R. and Talbot, J.F., 1988. Ethnicity and preference for natural settings: a review and recent findings. *Landscape and Urban Planning*, 15 (1/2), 107-117.
- Kaplan, S., 1992. Environmental preference in a knowledge-seeking, knowledge-using organism. In: Barkow, J.H. ed. *The adapted mind: evolutionary psychology and the generation of culture*. Oxford University Press, New York, 581-598.
- Kaplan, S. and Kaplan, R., 1982. *Cognition and environment: functioning in an uncertain world*. Praeger, New York.
- Kay, C.E., 1997. Is aspen doomed? *Journal of Forestry*, 95 (5), 4-11.
- Kellert, S., 1993. The biological basis for human values of nature. In: Kellert, S.R. and Wilson, E.O. eds. *The biophilia hypothesis*. Island Press, Washington, DC, 42-69.
- Kimmins, H., 2001. Visible and non-visible indicators of forest sustainability: beauty, beholders and belief systems. In: Sheppard, S.R.J. and Harshaw, H.W. eds. *Forests and landscapes: linking ecology, sustainability and aesthetics*. CABI, Wallingford, 43-56.
- Lewis, H., 1983. Why Indians burned: specific versus general reasons. In: Lotan, J., Kilgore, B., Fischer, W., et al. eds. *Proceedings, symposium and workshop on wilderness fire, Missoula, Montana, November 15-18, 1983*. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, 75-80.
- Lewis, J., 2000. *Ancient values/new technology: emerging methods for integrating cultural values in forest management*. University of British Columbia. Masters Thesis, Faculty of Forestry
- McCormack, P., 1998. Native homelands as cultural landscapes: decentering the wilderness paradigm. In: Oakes, J., Riewe, R., Kinew, K., et al. eds. *Sacred lands: aboriginal world views, claims and conflicts*. Canadian Circumpolar Institute, University of Alberta, Edmonton, 25-33.
- Meinig, D.W., 1979. The beholding eye: ten versions of the same scene. In: Meinig, D.W. ed. *The interpretation of ordinary landscapes*. Oxford University Press, New York, 33-48.
- Merleau-Ponty, M., 1962. *Phenomenology of perception*. Humanities Press, New York.
- Nassauer, J.I., 1995. Messy ecosystems, orderly frames. *Landscape Journal*, 14 (2), 161-170.
- Nazarea, V., 1998. *Cultural memory and biodiversity*. University of Arizona Press, Tucson.
- Orians, G. and Heerwagen, J., 1992. Evolved responses to landscapes. In: Barkow, J.H. ed. *The adapted mind: evolutionary psychology and the generation of culture*. Oxford University Press, New York, 555-579.
- Orr, D.W., 1996. Virtual nature. *Conservation Biology*, 10 (1), 8-9.
- Satterfield, T., 2002. *Anatomy of a conflict: identity, knowledge and emotion in old-growth forests*. UBC Press, Vancouver.
- Sheppard, S., 2001. Beyond visual resource management: emerging theories of an ecological aesthetic and visible stewardship. In: Sheppard, S.R.J. and Harshaw, H.W. eds. *Forests and landscapes: linking ecology, sustainability and aesthetics*. CABI, Wallingford, 149-172.
- Staats, H. and Hartig, T., 2004. Alone or with a friend: a social context for psychological restoration and environmental preferences. *Journal of Environmental Psychology*, 24 (2), 199-211.

Chapter 6

- Steele, F., 1981. *The sense of place*. CBI Publishing Co, Boston.
- Tress, B., Tress, G. and Fry, G., 2005. Integrative studies on rural landscapes: policy expectations and research practice. *Landscape and Urban Planning*, 70 (1/2), 177-191.
- Wiersum, K.F., 1997. Indigenous exploitation and management of tropical forest resources: an evolutionary continuum in forest-people interactions. *Agriculture, Ecosystems and Environment*, 63 (1), 1-16.
- Yang, B. and Kaplan, R., 1990. The perception of landscape style: a cross-cultural comparison. *Landscape and Urban Planning*, 19 (3), 251-262.
- Yu, K., 1995. Cultural variations in landscape preference: comparisons among Chinese sub-groups and Western design experts. *Landscape and Urban Planning*, 32 (2), 107-126.
- Zube, E. and Pitt, D., 1981. Cross-cultural perception of scenic and heritage landscapes. *Landscape Planning*, 8, 69-87.