Monitoring and Management of Visitor Flows in Recreational and Protected Areas
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How Much is Too Much?
Carrying Capacity of National Parks and Protected Areas

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Abstract: Increasing recreational use of national parks and protected areas can impact natural and cultural resources and the quality of the visitor experience. Determining how much recreational use can ultimately be accommodated in a park or protected area is often addressed through the concept of carrying capacity. Contemporary approaches to carrying capacity – including the Visitor Experience and Resource Protection (VERP) framework developed by the U.S. National Park Service – rely on formulation of indicators and standards of quality of natural/cultural resources and the visitor experience. This paper describes the VERP framework and its application in the U.S. national park system, including a program of research designed to help formulate indicators and standards of quality.

INTRODUCTION

As the name suggests, national parks are resources of national and, increasingly, international significance. The United States national park system, for example, contains natural and cultural resources of great importance to the nation, and in many cases, the international community. Given the significance of this resource base, public demand to see and experience these areas should not be surprising. And data on national park visitation in the U.S. dramatically support this premise: the national park system now accommodates nearly 300 million visits annually.

The increasing popularity of national parks presents both an opportunity and challenge. The opportunity is to fulfill the mission of the national parks "to provide for the enjoyment of the people." The accompanying challenge, of course, is to fulfill the complementary component of the national park mission "to conserve the scenery and the natural and historic objects and the wildlife therein." This can prove difficult under conditions of high visitation.

Implicit in this dual mission of national parks is the issue of the quality of the visitor experience. The quality of visitor experiences must be maintained at a high level for national parks to contribute their full potential to society. Moreover, high-quality visitor experiences are more likely to develop public appreciation of, and support for, conservation of national park resources.

It is ironic that one of the greatest threats to national parks is commonly seen as their increasing popularity. To many observers, national parks, at least in some places and at some times, are crowded, and this detracts from the quality of the visitor experience. Moreover, natural and cultural resources can be degraded by excessive visitor use. In more formal terms, use of some national parks, or portions thereof, have exceeded their carrying capacity (Mitchell, 1994; Wilkinson, 1995).

This paper explores the theory and application of carrying capacity to national parks and related areas. Emphasis is placed on development and application of Visitor Experience and Resource Protection (VERP), a framework developed for managing carrying capacity in the U.S. national parks. The first section briefly traces the theoretical development of the carrying capacity concept. The second section describes development of the VERP framework, and the third section describes application of VERP to Arches National Park and other units of the U.S. national park system. A final section suggests that the conceptual framework underlying VERP and other contemporary approaches to carrying capacity can be applied to a variety of parks and protected areas, but that this will require a commitment to park planning, management and research.

THE CONCEPT OF CARRYING CAPACITY

The question of how much public use can ultimately be accommodated in a national park or related area is often framed in terms of carrying capacity. Indeed, much has been written about the carrying capacity of national parks. The underlying concept of carrying capacity has a rich history in the natural resource professions. In particular, it has been applied in wildlife and range management where it refers to the number of animals of any one species that can be maintained in a given habitat (Dasmann, 1964). Carrying capacity has obvious parallels and intuitive appeal in the field of park management. In fact, it was first suggested in the mid-1930s as a park management concept in the context of national parks (Sumner, 1936).

However, the first rigorous applications of carrying capacity to park management did not occur until the 1960s.

These initial scientific applications suggested that the concept was more complex in this new management context. At first, the focus was placed on the relationship between visitor use and environmental conditions. The working hypothesis was that increasing numbers of visitors causes greater environmental impact as measured by soil compaction, destruction of vegetation, and related variables. It soon became apparent, however, that there was another critical dimension of carrying capacity dealing with social aspects of the visitor experience. An early and important monograph on the application of carrying capacity to parks and related areas reported that it was:

> *"initiated with the view that carrying capacity of recreation lands could be determined primarily in terms of ecology and the deterioration of areas. However, it soon became obvious that the resource-oriented point of view must be augmented by consideration of human values." (Wagar 1964, preface)*

Wagar's point was that as more people visit a park, not only can the environmental resources of the area be affected, but so too can the quality of the visitor experience. Again, the working hypothesis was that increasing numbers of visitors cause greater social impacts as measured by crowding, conflict, and related variables. Thus, as applied to national parks, carrying capacity has two components: environmental and social.

The early work on carrying capacity has since blossomed into an extended literature on the environmental and social impacts of outdoor recreation and their application to carrying capacity (Lime & Stankey, 1971; Stankey & Lime, 1973; Graefe, et al., 1984 Manning, 1985; Shelby & Heberlein, 1986; Kuss, et al., 1990; Manning, 1999; Manning, 2000). But despite this impressive literature base, efforts to determine and apply carrying capacity to areas such as national parks have sometimes failed. The principle difficulty lies in determining how much impact, such as soil compaction and crowding, is too much. Theoretical development, backed up by empirical research, generally confirms that increasing use levels can lead to increased environmental and social impacts (Hammitt and Cole, 1998; Manning, 1999). But how much impact should be allowed in the national park? This basic question is often referred to as the "limits of acceptable change" (Lime, 1970; Frissell & Stankey, 1972). Given substantial demand for public use of national parks, some decline or change in the quality of park resources and the visitor experience appears inevitable. But how much decline or change is acceptable or appropriate before management intervention is needed? How much use and associated impacts are too much?

This issue is illustrated graphically in Figure 1. This figure addresses the social impact of crowding. In this figure, a hypothetical relationship between visitor use and crowding is shown. It is clear from this figure that visitor use and crowding are related: increasing numbers of visits cause increasing percentages of visitors to report feeling crowded. However, it is not clear at what point carrying capacity has been reached. The hypothetical relationship in Figure 1 suggests that some crowding is inevitable, given even relatively low levels of visitor use. Thus, some level of crowding must be tolerated if national parks are to remain open for public use. For the hypothetical relationship illustrated in Figure 1, X1 and X2 represent levels of visitor use that result in differing levels of crowding as defined by points Y1 and Y2, respectively. But which of these points – Y1 or Y2, or some other point along this axis – represents the maximum amount of crowding that is acceptable? Ultimately, this is a value judgment. Again, the principal difficulty in carrying capacity determination lies in deciding how much crowding (or of some other impact) is acceptable. Empirical relationships such as that in Figure 1 can be helpful in making informed decisions about carrying capacity, but they must be supplemented with management judgments.

To emphasize and further clarify this issue, some writers have suggested distinguishing between descriptive and evaluative (or prescriptive) components of carrying capacity (Shelby & Heberlein, 1984; Shelby & Heberlein, 1986). The descriptive component of carrying capacity focuses on factual, objective data such as the type of relationship in Figure 1. For example, what is the relationship between the number of visitors entering an area and the number of encounters that occur between groups of visitors? Or what is the relationship between the level of visitor use and visitor perceptions of crowding? The evaluative or prescriptive component of carrying capacity concerns the seemingly more subjective issue of how much impact or change in resource conditions and the quality of the visitor experience is acceptable. For example, how many contacts between visitor groups are appropriate? What level of perceived crowding should be allowed before management intervention is needed?

Recent experience with carrying capacity suggests that answers to the above questions can be found through development of management objectives and formulation of associated indicators and standards of quality (Stankey, et al., 1985; Stankey & Manning, 1986; Graefe, et al., 1990; Shelby, et al., 1992; Manning, 1997; Manning, 1998). This approach to carrying capacity focuses principal emphasis on defining the degree of resource protection and the type of visitor experience to be provided and maintained.

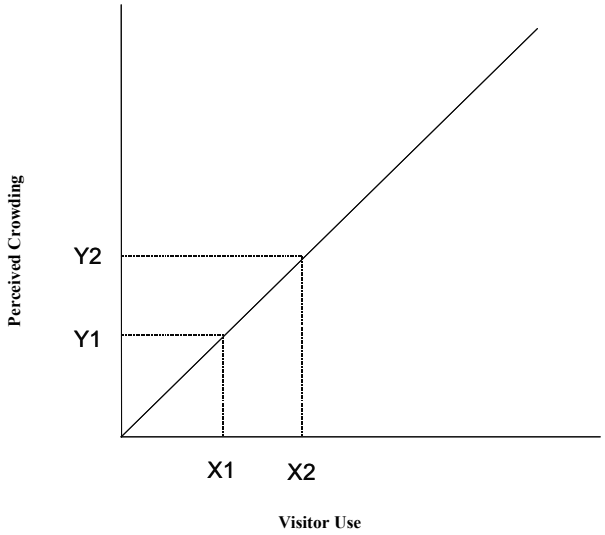

Figure 1. Hypothetical Relationship Between Visitor Use and Crowding

Management objectives are broad, narrative statements that define desired future conditions: the degree of resource protection and the type of visitor experience to be provided. They are based on review of the purpose and significance of the area under consideration. Development of management objectives may involve review of legal, policy and planning documents; consideration by an interdisciplinary planning and management team; historic precedent; local, regional, national or international context of the park; and public involvement.

Indicators of quality are more specific measurable variables that reflect the essence or meaning of management objects; they are quantifiable proxies or measures of management objectives. Indicators of quality may include elements of both the resource and social environments. *Standards of quality* define the minimum acceptable condition of indicator variables.

An example of management objectives, indicators and standards may be helpful. Review of the U.S. Wilderness Act of 1964 suggests that areas of the national park system contained in the National Wilderness Preservation System are to be managed to provide opportunities for visitor solitude. Thus, providing opportunities for solitude is an appropriate management objective and desired future condition for most wilderness areas. Moreover, research on wilderness use suggests that the number of visitors encountered along trails and at campsites is important to wilderness visitors in defining solitude. Thus, trail and camp encounters become key indicators of quality and help to make operational the general management objective of providing opportunities for solitude. Further research suggests that wilderness visitors may have standards about how many trail and camp encounters are acceptable before the quality of the visitor experience declines to an unacceptable degree (Heberlein, et al., 1986; Vaske, et al., 1986; Whittaker & Shelby 1988; Roggenbuck, et al., 1991; Shelby & Vaske, 1991; Manning, et al., 1996b; Manning, et al., 1999a; Manning, et al., 1999b). Such data may help to define standards of quality.

By defining indicators and standards of quality, carrying capacity can be determined and managed through a monitoring and management program. Indicator variables can be monitored over time and management actions taken to ensure that standards of quality are maintained. If standards have been violated, carrying capacity has been exceeded. This approach to carrying capacity is central to contemporary park and outdoor recreation planning frameworks, including Limits of Acceptable Change (LAC) (Stankey, et al., 1985), Visitor Impact Management (VIM) (Graefe, et al., 1990), and Visitor Experience and Resource Protection (VERP) (National Park Service 1997), recently developed by the U. S. National Park Service.

Visitor Experience and Resource Protection (VERP)

The U.S. National Park Service has long recognized the need to apply the concept of carrying capacity to parks that have been experiencing dramatically increasing public use. In fact, the 1978 U.S. General Authorities Act requires each park's general management plan to include "identification of and implementation commitments for carrying capacities for all areas of the unit" (U.S. Congress, 1978). Although National Park Service management policies and planning guidelines acknowledge this responsibility, historically there has been little direction or agreement on an approach or methodology for setting or managing a park's carrying capacity. Park planners and managers have often been reluctant to state that parks, or areas within parks, are receiving inappropriate or excessive use because they have lacked the rationale and empirical data to make such determinations.

Element

Framework Foundation

1. Assemble an Interdisciplinary Project Team
2. Develop a Public Involvement Strategy
3. Develop Statements of Park Purpose, Significance, and Primary Interpretive Themes

Analysis

4. Analyze Park Resources and Existing Visitor Use

Prescriptions

5. Describe a Potential Range of Visitor Experiences and Resource Conditions (Potential Prescriptive Zones)
6. Allocate the Potential Zones to Specific Locations in the Park (Prescriptive Management Zoning)
7. Select Indicators and Specify Standards for Each Zone; Develop a Monitoring Plan

Monitoring and Management

8. Monitor Resource and Social Indicators
9. Take Management Action

Figure 2. Elements of the Visitor Experience and Resource Protection (VERP) Framework

In the early 1990s an interdisciplinary team of National Park Service planners, managers, and researchers began developing a framework to identify and manage carrying capacity in the national park system. Called Visitor Experience and Resource Protection (VERP), this framework includes nine steps or elements (outlined in Figure 2), and is described in a recently developed handbook (National Park Service 1997). In keeping with the theoretical and historical development of carrying capacity as described in the previous section, VERP focuses on formulating indicators and standards of quality for desired future conditions of park resources and visitor experiences. A program to monitor indicator variables is then designed, and management actions are undertaken to ensure that standards of quality are maintained.

APPLICATION OF VERP

The VERP framework described above was initially applied at Arches National Park, Utah, USA (Hof, et al., 1994; Manning, et al., 1995; Manning, et al., 1996a; Belnap, 1998; Manning, 2001). The purpose of this application was to refine the VERP framework and provide a model for the rest of the national park system. Planning and research aimed at formulating indicators and standards of quality for the visitor experience are described in this section. Complimentary research addressed indicators and standards of quality for natural resource conditions such as soil disturbance and compaction and destruction of vegetation (National Park Service, 1995; Belnap, 1998).

Arches National Park comprises 73,000 acres of high-elevation desert with outstanding slick rock formations, including nearly 2,000 sandstone arches. Many of the park's scenic attractions are readily accessible through a well-developed road and trail system. Visitation to Arches has been increasing rapidly, and the park now receives over three-quarters of a million visits annually.

Following the VERP framework, an interdisciplinary project team was created, comprised of planners from the National Park Service's Denver Service Center, Arches National Park staff, and NPS scientists and consultants (Element 1), and a public involvement strategy was developed (Element 2). Workshops were conducted to develop statements of park purposes, significance and primary interpretive themes (Element 3). Authorizing legislation and the current General Management Plan provided important reference sources. Park resources and existing visitor experiences were then mapped (Element 4) and a spectrum of desired resource and social conditions was constructed using a matrix format (Element 5). Based on this analysis, a system of nine zones ranging from developed to primitive was created and overlaid on the park (Element 6).

Element 7 requires selecting indicators of quality and specifying associated standards of quality for each zone. This required a research program that was conducted in two phases. Phase I was aimed at identifying potential indicators of quality (Manning, et al. 1992). Personal interviews were conducted with visitors throughout the park. In addition, focus group sessions were held with park visitors, park staff, and local community residents. Findings from Phase I research suggested several social and environmental indicators of quality for the park, including the number of people at frontcountry attraction sites and along trails, the

number of visitor groups encountered along backcountry trails and at campsites, the number of vehicles encountered along roads, the number of social trails and associated soil and vegetation impacts, the level of trail development, and visitor knowledge of regulations regarding off-trail hiking.

Phase II of the research program was designed to gather data to help set associated standards of quality (Lime, et al., 1994). A survey of park visitors was conducted, covering all nine park zones. The survey was administered to representative sample of over 1,500 park visitors by means of both personal interviews and mail-back questionnaires. Five indicator variables received special attention: 1) the number of people at one time at major frontcountry attraction sites, 2) the number of people at one time along frontcountry trails, 3) the amount of environmental impact caused to soil and vegetation by off-trail hiking, 4) the number of visitor groups encountered along backcountry trails and at campsites, and 5) the number of vehicles encountered along unpaved roads. The first three of these variables were addressed by a series of photographs that illustrated a range of impact conditions (Manning, et al., 1996b). Photographs were developed using a computer-based image capture technology (Chenoweth, 1990; Lime, 1990; Nassauer, 1990; Pitt, 1990). Base photographs of park sites were taken, and these images were then modified to present a range of impact conditions (e.g., number of visitors present, amount of environmental impact). A set of 16 photographs was developed for each major attraction site and trail, presenting a wide-ranging number of visitors present. Representative examples of photographs for Delicate Arch are shown in Figure 3. An analogous set of photographs was developed for a range of environmental impacts caused by off-trail hiking. Respondents rated the acceptability of each photograph on a scale of –4 (very unacceptable) to +4 (very acceptable). Questions regarding encounters in the backcountry and along unpaved roads were asked in a more conventional narrative and numeric format.

Earlier in this paper, it was noted that park visitors may have standards (or norms) for judging the appropriateness of park conditions. Methodological techniques have been developed and refined to measure such norms of park visitors (Manning, 1985; Heberlein, et al., 1986; Shelby & Heberlein, 1986; Vaske, et al., 1986; Whittaker & Shelby, 1988; Shelby, et al., 1992; Manning, et al., 1999a; Manning, et al., 1999b). The research program at Arches National Park was based on these techniques. Findings from Phase II research provided data to help formulate standards of quality for each of the nine park zones. Where appropriate, at least one resource and social indicator of quality was chosen for each zone and standards of quality were set for each indicator variable. For example, the "pedestrian" zone of the park contains several of the most prominent attraction sites in the park, including Delicate Arch. Visitors reported that the number of people at any one time at such attraction sites was important in determining the quality of their experiences. Thus, the number of people at one time (PAOT) at Delicate Arch was selected as an indicator of quality for that zone. Moreover, findings from the series of 16 photographs of Delicate Arch (as shown in Figure 4) suggested that visitors generally find up to 30 PAOT to be acceptable. (It can be seen from the figure that the line tracing visitor evaluations of the 16 photographs crosses from the acceptable range into the unacceptable range at about 30 PAOT). Based on these findings, 30 PAOT was selected as the standard of quality. Indicators and standards of quality were set for all zones in a similar manner. A companion set of resource-based indicators and standards of quality was formulated based on a program of ecological research (National Park Service, 1995; Belnap, 1998).

A monitoring program focused on indicators of quality has been designed and is now being implemented in the park. This will allow park staff to address Elements 8 and 9 of the VERP framework. This monitoring program will determine the extent to which standards of quality are maintained. The VERP framework requires management action if standards of quality have been, or are in danger of being, violated. Primary management actions being undertaken at Arches include adjusting the size of trailhead parking lots, issuing backcountry camping permits, and educating visitors about the impacts of off-trail hiking.

Computer simulation modeling of recreational use can be employed as a substitute or complement to monitoring. Such models can be developed to estimate PAOT at attraction sites, the number of encounters between recreational groups along trails, or other indicators of quality. Moreover, such models can estimate the maximum number of visitors that can be accommodated within a park or protected area without violating standards of quality. A computer simulation model of recreational use was developed for Arches National Park and was used to estimate the maximum number of vehicles per day that could enter the park without violating the standard of quality of 30 PAOT at Delicate Arch. Development and use of this model is described by Manning et al. in a companion paper in this proceedings.

Following its initial application at Arches, VERP has been applied at a number and variety of areas contained in the national park system. A concerted effort has been made to address the diversity of environments and issues within the national park system. For example, indicators and

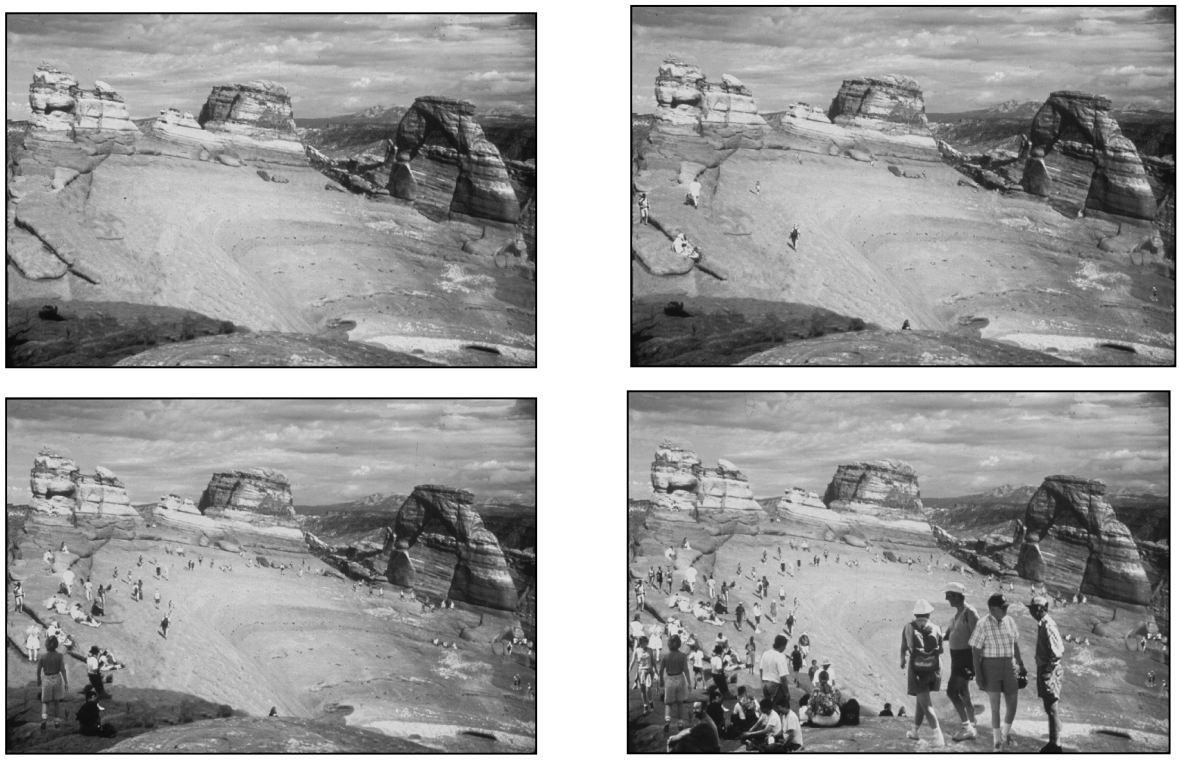

Figure 3. Representative Photographs of Delicate Arch Showing a Range of Visitor Use Levels

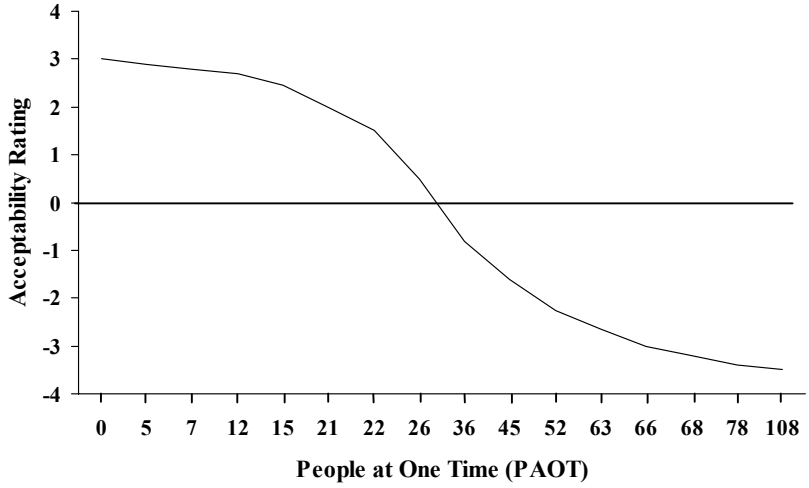

Figure 4. Visitor Evaluations of 16 Photographs of Delicate Arch Showing Alternative Levels of Visitor Use

standards of quality have been established for both crowding and conflict on the carriage roads of Acadia National Park (Jacobi, et al., 1996; Manning, et al., 1997; Manning, et al., 1998; Jacobi & Manning, 1999; Manning, et al., 1999b). These indicators and standards of quality address both the number of visitors using the carriage roads and visitor behavior. The carrying capacity of this system of multi-use trails has been estimated using a computer simulation model of carriage road use (Wang & Manning, 1998).

Application of VERP to Alcatraz Island, a unit of Gloden Gate National Recreation Area, found the number of people at one time in the prison cellhouse to be an important indicator of quality, and research findings provided a basis for setting an appropriate standard of quality at this key site. Other applications of VERP have addressed maximum waiting times at Statue of Liberty National Monument, persons per viewscape on trails at Grand Canyon National Park, the number of boats seen on the Colorado and Green River in Canyonlands National Park, the number of snowmobiles encountered in Yellowstone National Park, and the number of people at one time along trails and at attraction sites in Yosemite National Park.

CONCLUSION

Over 30 years of research and experience has led to development of several frameworks for

analyzing and managing the carrying capacity of parks and related areas. All of these carrying capacity frameworks rely on a similar series of steps or elements. VERP is specifically designed to identify and manage carrying capacity in the U.S. national park system. Carrying capacity is managed by defining desired resource and social conditions by means of a series of indicators and standards of quality. Indicator variables are monitored over time to ensure that standards of quality are maintained. If standards of quality are violated, the VERP process requires that management action be taken.

VERP provides a theoretically sound and rational process for determining and managing carrying capacity in national parks and related areas. It provides a structured framework within which to conduct a systematic, thoughtful, traceable, and defensible carrying capacity analysis. An associated research program can provide a strong empirical foundation for applying the VERP framework.

VERP has been applied in a number of units of the U.S. national park system. These applications have resulted in development and implementation of carrying capacity plans for these areas, the first such carrying capacity plans in the U.S. national park system (e.g., National Park Service, 1995; Jacobi & Manning, 1997). A VERP handbook has been developed (National Park Service, 1997) along with a workbook of management actions designed to support the VERP framework (Anderson, et al., 1998). Additional applications of VERP in the national park system are on-going or planned.

Despite development, testing and refinement of VERP and related carrying capacity frameworks, application across the U.S. national park system and related areas will be challenging. The number and diversity of parks suggests that a wide variety of indicators and standards of quality will have to be formulated. This will require a substantial investment in park planning and related natural and social science research. It will also require a long-term program of park monitoring and a commitment to implementing management actions designed to maintain standards of quality.

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LITERATURE CITED

Anderson, D., Lime, D., & Wang, T. (1998). Maintaining the quality of park resources and visitor
experiences: A handbook for managers. St. Paul, MN: University of Minnesota Cooperative Park Studies Unit.
Belnap, J. (1998). Choosing Indicators of Natural Resource Condition: A Case Study in Arches National
Park, Utah, USA. Environmental Management, 22(4), 635-642.
Chenoweth, R.E. (1990). Image-Capture Computer Technology and Aes-thetic Regulation of Landscapes
Adjacent to Public Lands. Managing America's Enduring Wilderness Resource. St. Paul, Minnesota: University of Minnesota, pp. 563-568.
Chilman, K., Foster, D., & Everson, A. (1990). Updating the Recreational Carrying Capacity Process:
Recent Refinements. Managing America's Enduring Wilderness Resource. St. Paul: Minnesota Agricultural Experiment Station, pp. 234-238.
Dasmann, R.F. (1964). Wildlife biology. New York: John Wiley and Sons.
Frissell, S.S., & Stankey, G.H. (1972). Wilderness Environmental Quality: Search for Social and
Ecological Harmony. Proceedings of the Society of American Foresters Annual Conference, Washington, D.C.
Graefe, A.R., Vaske, J.J., & Kuss, F.R. (1984). Social Carrying Capacity: An Integration and Synthesis of
Twenty Years of Research. Leisure Sciences, 6(4), 395-431.

Graefe, A.R., Kuss, F.R., & Vaske, J.J. (1990). Visitor impact management: The planning framework.
Washington, D.C.: National Parks and Conservation Association.
Hammitt, W. & Cole, D. (1998). Wildland Recreation: Ecology and Management. New York: John
Wiley and Sons, Inc.
Heberlein, T.A., Alfano, G.E., & Ervin, L.H. (1986). Using a Social Carrying Capacity Model to Estimate
the Effects of Marina Development at the Apostle Islands National Lakeshore. Leisure Sciences, 8(3), 257-274.
Hof, M., Hammett, J., Rees, M., Belnap, J., Poe, N., Lime, D., & Manning, R. (1994). Getting a Handle on
Carrying Capacity: A Pilot Project at Arches National Park. Park Science, 14(1), 11-13.
Jacobi, C., Manning, R., & Valliere, W. (1996). Visitor Use and Conflict on the Carriage Roads of Acadia
National Park. Proceedings of the 1995 Northeastern Recreation Research Symposium. USDA Forest Service General Technical Report NE-218, pp. 109-112.
Jacobi, C., & Manning, R. (1997). Applying the Visitor Experience and Resource Protection Process to

Acadia National Park Carriage Roads: A Summary of Research and Decision-Making. U.S. National Park Service Technical Report NPS/NESO-RNR/NRTR/98-5.
Jacobi, C., & Manning, R. (1999). Crowding and Conflict on the Carriage Roads of Acadia National Park:
An Application of the Visitor Experience and Resource Protection Framework. Park Science, 19(2), 22-26.
Kuss, F.R., Graefe, A.R., & Vaske, J.J. (1990). Visitor impact management: A review of research.
Washington, D.C. National Parks and Conservation Association.
Lime, D.W. (1970). Research for Determining Use Capacities of the Boundary Waters Canoe Area.
Naturalist, 21(4), 9-13.
Lime, D.W., & Stankey, G.H. (1971). Carrying Capacity: Maintaining Outdoor Recreation Quality.
Recreation Symposium Proceedings, USDA Forest Service, pp. 174-184.
Lime, D.W. (1990). Image Capture Technology: An Exciting New Tool for Wilderness Managers!
Managing America's Enduring Wilderness Resource. St. Paul, Minnesota: University of Minnesota, pp. 549-552.
Lime, D.W., Manning, R.E., Lewis, M.E., & Freimund, W.A. (1994). Indicators and standards of quality
for the visitor experience at Arches National Park: Phase II research. University of Minnesota Cooperative Park Studies Unit, 351 pages.
Manning, R.E. (1985). Crowding Norms in Backcountry Settings. Journal of Leisure Research, 17(2), 75-
89.
Manning, R.E., Lime, D.W., McMonagle, R.F., & Nordin, P. (1992). Indicators and standards of quality for
the visitor experience at Arches National Park: Phase I research. University of Minnesota Cooperative Park Studies Unit, 54 pages
Manning, R., Lime, D., Hof, M., & Freimund, W. (1995). The Visitor Experience and Resource Protection
(VERP) Process: The Application of Carrying Capacity to Arches National Park. The George Wright Forum, 12(3), 41-55.
Manning, R., Lime, D., Freimund, W., & Pitt, D. (1996b). Crowding Norms at Frontcountry Sites: A
Visual Approach to Setting Standards of Quality. Leisure Sciences, 18(1), 39-59.
Manning, R., Lime, D., & Hof, M. (1996a). Social Carrying Capacity of natural Areas: Theory and
Application in the U.S. National Parks. Natural Areas Journal, 16(2), 118-127.
Manning, R. (1997). Social Carrying Capacity of Parks and Outdoor Recreation Areas. Parks and
Recreation, 32(10), 32-38.
Manning, R., Valliere, W., & Jacobi, C. (1997). Crowding Norms for the Carriage Roads of Acadia
National Park: Alternative Measurement Approaches. Proceedings of the 1996 Northeastern Recreation Research Symposium. USDA Forest Service General Technical Report NE-232, pp. 139-145.
Manning, R. (1998). "To Provide for the Enjoyment": Recreation Management in the National Parks. The
George Wright Forum, 15(1), 6-20.
Manning, R., Jacobi, C., Valliere, W., & Wang, B. (1998). Standards of Quality in Parks and Recreation.
Parks and Recreation, 33(7), 88-94.
Manning, R., Lawson, S., & Frymier, L. (1999a). Navigating the Confluence of Two Streams of Social
Research: Contingent Valuation and Normative Standards. Human Ecology Review, 6(1), 35-48.
Manning, R., Valliere, W., Wang, B., & Jacobi, C. (1999b). Crowding Norms: Alternative Measurement
Approaches. Leisure Sciences, 21(2), 97-115.
Manning, R.E. (1999). Studies in Outdoor Recreation. Corvallis: Oregon State University Press.
Manning, R. (2000). Crowding in Parks and Outdoor Recreation: A Theoretical, Empirical, and
Managerial Analysis. Journal of Park and Recreation Administration, 18(4), 57-72.
Manning, R. (2001). Visitor Experience and Resource Protection: A Framework for Managing the
carrying Capacity of National Parks. Journal of Park and Recreation Administration, 19(1), 93-108.
Mitchell, J.G. (1995). Our National Parks. National Geographic, 186(4), 1-55.
Nassauer, J.I. (1990). Using Image Capture Technology to Generate Wilderness Management Solutions.
Managing America's Enduring Wilderness Resource. St. Paul, Minnesota: University of Minnesota, pp. 553-562.
National Park Service. (1995). The visitor experience and resource protection implementation plan: Arches
National Park. Denver: Denver Service Center.
National Park Service. (1997). Visitor experience and resource protection (VERP) framework: A handbook
for planners and managers. Denver: Denver Service Center.
Pitt, D.G. (1990). Developing an Image Capture System to See Wilderness Management Solutions.
Managing America's Enduring Wilderness Resource. St. Paul, Minnesota: University of Minnesota, pp. 541-548.
Roggenbuck, J.W., Williams, D.R., Bange, S.P., & Dean D.J. (1991). River Float Trip Encounter Norms:
Questioning the Use of the Social Norms Concept. Journal of Leisure Research, 23(2), 133-152.
Shelby, B., & Heberlein, T. (1984). A Conceptual Framework for Carrying Capacity Determination.
Leisure Sciences, 6, 433-451.
Shelby, B., & Heberlein, T.A. (1986). Carrying capacity in recreation settings. Corvallis, Oregon: Oregon
State University Press.
Shelby, B., & Vaske, J. (1991). Using Normative Data to Develop Evaluative Standards for Resource
Management: A Comment on Three Papers. Journal of Leisure Research, 23, 173-187.
Shelby, B., Stankey, G., and Shindler, B. (eds.). (1992). Defining wilderness quality: The role of standards
in wilderness management-A workshop proceedings. USDA Forest Service General Technical Report PMW-GTR-305, 114 pages.
Stankey, G.H., & Lime, D.W. (1973). Recreational carrying capacity: An annotated biography. USDA
Forest Service General Technical Report INT-3.
Stankey, G.H., & Manning, R.E. (1986). Carrying Capacity of Recreation Settings. A Literature Review.
The President's Commission on Americans Out-doors, pp. 47-58.
Stankey, G.H., Cole, D.N., Lucas, R.C., Peterson, M.E., Frissell, S.S., & Washburne, R.F. (1985). The
limits of acceptable change (LAC) system for wilderness planning. USDA Forest Service General Technical Report INT-176.
Sumner, E.L. (1936). Special Report on a Wildlife Study in the High Sierra in Sequoia and Yosemite
National Parks and Adjacent Territories. Unpublished Report, U.S. National Park Service, National Archives, Washington, D.C.
U.S. Congress. (1978). General Authorities Act, 95th Congress, Document Number 95-625.
Vaske, J.J., Shelby, B., Graefe, A.R., & Heberlein, T.A. (1986). Backcountry Encounter Norms: Theory,
Method and Empirical Evidence. Journal of Leisure Research, 18(3), 137-153.
Wagar, J.S. (1964). The carrying capacity of wild lands for recreation. Forest Science Monograph 7,
Society of American Foresters, Washington, D.C.
Wang, B., & Manning, R. (1999). Computer Simulation Modeling for Recreation Management: A Study on
Carriage Road Use in Acadia National Park, Maine, USA. Environmental Management, 23(2), 193-203.
Whittaker, D., & Shelby, B. (1988). Types of Norms for Recreation Impacts: Extending the Social Norms
Concept. Journal of Leisure Research, 20(4), 261-273.
Wilkinson, T. (1995). Crowd Control. National Parks, 69(7-8), 36-41.

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Managing Commercial Recreation on Crown Land: The Commercial Recreation Transition Plan for the Sea to Sky Corridor, BC

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Abstract: Monitoring and management of visitor flows in parks and recreational areas has traditionally focused on public recreation. However, there is a growing need to find management tools to address commercial operations as well as public recreation, and to manage activities outside of protected areas as well as within them. The implementation of a program to manage previously unregulated commercial recreation operations in the Sea to Sky Corridor, north of Whistler, British Columbia is described. It is argued that commercial recreation (CR) is not only different in kind from public recreation, but also offers significantly different challenges and opportunities with respect to visitor management.

INTRODUCTION

While a great deal of work has been devoted to developing management tools for public recreation in protected areas, rather less attention has been given to recreation that takes place outside of a formal protected or recreation area, or to recreation organised on a fee-for-service basis. In the case of the Sea to Sky area, north of Vancouver, British Columbia, a pressing need arose to develop a management framework for the rapidly developing commercial recreation industry.

However, as a result of a number of management challenges, the route taken to develop and apply a management framework was in many ways different from the standard models used for public recreation in protected areas. The focus of this paper on the implementation of a program to monitor and manage commercial recreation activities outside of a formal protected areas is therefore likely to form a contrast with many of the other case studies presented at the conference. It is hoped that this will prove valuable, for the following reasons:

- As networks of protected areas approach completion in many countries, there is a growing need to find ways to manage recreation outside of those networks, to better protect both environmental and experiential values.
- Commercial recreation outside of a protected area can nonetheless have considerable impacts on an adjacent protected areas, so management activities outside the park will likely also have an impact on the park.
- Commercial recreation inside protected areas is also increasing in many countries, reflecting both trends towards finding non-tax revenues to support park management, as well as demands from business and local communities for economic benefits from protected areas. Lessons learned from management programs outside of protected areas may prove useful for similar programs implemented inside protected areas.
- The demand for economic diversification in remote areas is increasing the need for models for the development and support of resource-based tourism, along with the need for management tools to protect the resource base it ultimately depends on.

LOCATION

The Sea to Sky Corridor in its strictest definition refers to a transport corridor running north from Vancouver through Squamish, Whistler and Pemberton in BC's Coast Mountains, a distance of approximately 120 kilometres. In the initial stages of planning for commercial recreation, this definition was expanded to include terrain extending some 50 kilometres west of the railroad and highway, and a narrower strip to the east of the valley bottom abutting the 200,000 hectare Garibaldi Provincial Park.

In later stages of CR planning, however, the area was further extended to include all Crown (public) land except parks in 100,000,000 hectare Squamish Forest District. In a practical sense, therefore, the Sea to Sky area has simply become an alternative term for the Squamish Forest District.

CONFLICT IN THE CORRIDOR

Tourism and recreation have developed rapidly in the Sea to Sky area, as a result of three main pressures. First is Whistler's continued growth as a ski resort and more recently as a four-season resort. Second is the continuing growth of tourism to the city of Vancouver, which includes its role a major

hub for the Northwest Coast's cruise ship industry. Finally is the growing pressure from residents of the Lower Mainland, and increasingly also from north-western Washington State, for wilderness recreation opportunities.

As defined by the Commercial Recreation on Crown Land policy from which the Commercial Recreation Strategy was developed, commercial recreation includes 'all forms of outdoor recreation activities ... on provincial Crown land ... on a fee-for-service basis'. The policy implies that water-based activities on both tidal and freshwater should be included in the definition[1], and also spells out that commercial hunting and fishing should be included. In practise, the most useful element of the definition was 'guided services', which helped distinguish the types of operation that need and need not apply for tenure under the policy.

The commercial recreation industry in the Squamish Forest District is very diverse, and this diversity was naturally reflected in the mix of operators applying for tenure under the program. However, since many operators offer a range of different recreational activities, it is not possible to simply list the number of operations in each category. Instead, table 1 is intended to give a flavour of the range of activities offered.

Finally with respect to defining the nature and scope of the commercial recreation industry in the study area, it should be noted that while commercial alpine ('downhill') skiing is in many ways the basis for the area's international popularity as a recreation area, it is not itself covered by the CR on Crown Land policy. Instead, that sector is covered by the Commercial Alpine Ski Policy, once again administered by the Land Management division of BC Assets and Land Corporation.

Table 2 summarizes some of the main conflicts apparent in the Sea to Sky Corridor prior to the implementation of the Transition Plan. These include the frequently reported conflicts between conservation and recreation goals, and conflicts between different user groups.

CR Conflicts in the Sea to Sky area
Conservation goals (environmental carrying capacity)
'Wilderness' versus mechanized users, and commercial versus public users
Degradation of the 'Whistler experience' (social carrying capacity)
Impacts on adjacent protected areas, including helicopter overflights and increased access
Overlapping operations, both for existing tenures and for new applicants
Protecting First Nations interests in the absence of treaty agreements

Table 2: Commercial recreation conflicts in the Sea to Sky Corridor

Conflicts more particular to the Sea to Sky Corridor include commercial pressures for increased development and the need to protect the resource base ultimately behind Whistler's exceptional success as an international destination, and the different land-use values for the Crown land inside and outside of Garibaldi Provincial Park, which lies to the east of the transport routes along most of the corridor. Conflicts between unresolved First Nations claims to the land base and provincial development strategies also continue to be a feature of most backcountry developments in British Columbia.

MANAGEMENT CHALLENGES

In developing a management approach to the conflicts outlined above, a number of challenges were apparent. Many of these are particular to British Columbia, but the lessons learnt in implementing the program may nonetheless prove useful in other areas.

Absence of a planning framework

The Commercial Recreation on Crown Land policy covers only with lands outside of protected areas. Therefore, the integration of commercial recreation planning into broader parks management plans was not an option. Furthermore, while many areas of British Columbia have been the subject of Land and Resources Management Plan (LRMP) processes, providing a master plan for subsequent development, the LRMP for the Squamish Forest District is only now starting and may take several years to complete.

Jurisdictional complexity

While the land in the study area is almost entirely Crown (public) land, it is not exclusively administered by any one agency. Table 3 shows

Previous CR policies

Further complications arose due to the fact that several attempts had been made in the past to implement management regimes.

Pre-existing CR operations

Finally, a fundamental challenge for the Sea to Sky Commercial Recreation Strategy was the pre-existing base of CR operations. Land managers were not working from a 'clean slate', and it was not politically acceptable to close operations and ask them to apply over again.

[1] The term 'Crown land covered by saltwater and freshwater' is used in the policy. However, it has proved difficult for provincial agencies to manage water-based activities due to jurisdictional divisions with federal agencies.

Non-motorized	Water-based	Animal-based	Winter motorized	Summer motorized	Helicopter-based
• Nordic ski • Backcountry ski • Nature tours • Hiking • Rock climbing • Mountain-eering • Paragliding • Snowboard camp	• Kayak tours • Canoe tours • Raft/float tours • Jetboat tours	• Dogsled tours • Horseback tours	• Snow-mobile tours • Snowcat skiing	• ATV tours • 4x4 tours	• Heli-ski • Heli-bike • Heli-picnic

Table 1: Summary of commercial recreation activities in the Sea to Sky area

some of the main provincial and federal agencies relative to commercial recreation.

Area of responsibility	Government agency
Commercial recreation	BC Assets and Lands Corporation
Public recreation	BC Ministry of Forests
Commercial forestry	BC Ministry of Forests
Tourism policy[2]	BC Ministry of Small Business, Tourism and Culture
Tourism planning[3]	BC Ministry of Small Business, Tourism and Culture
Whitewater raft safety licensing[4]	BC Parks – BC Ministry of Environment, Lands and Parks
Wildlife protection[5]	BC Ministry of Environment, Lands and Parks
Air and water navigation	Transport Canada

Table 3: Jurisdictional responsibilities relating to commercial recreation on Crown land in British Columbia

THE TRANSITION PLAN

To tackle the conflicts outlined above within the confines of these management challenges, a Transition Plan was developed requiring all commercial operations in the Sea to Sky area to hold a permit to use Crown land for business. The plan was to be implemented over a 14-month time period.

Prior to the launching of the Transition Plan, however, two important management and policy developments took place. First was the announcement of the new Commercial Recreation on Crown Land policy by BC's Ministry of Environment, Lands and Parks[6]. This policy was developed from the previous interim Commercial Backcountry Recreation (CBR) policy that had met with only limited success in implementation.

The second development was the formation of British Columbia Assets and Land Corporation as a Crown corporation to administer BC Land Act tenures and sales in the province. BCAL replaced the functions of BC Lands, a ministry department that had been significantly downsized in 1995, leading to the curtailment of efforts to implement the CBR policy across the province. In the Sea to Sky area in particular, hopes were high that the new organization and the new policy would prove effective in finally tackling the growing conflicts in the area.

A consultant was hired to develop Strategic Planning for Commercial Recreation (Leavers 1999, 2000) for BCAL's Lower Mainland Region office. Through a two-phase process of literature review and stakeholder involvement, a proposed zonation for commercial recreation was developed.

A new BCAL field office was established in Whistler and a staff compliance and enforcement officer was hired to increase BCAL's profile in the area. A further consultant was hired to develop a communications plan, and a series of community media briefings was initiated.

The key terms of the Transition Plan were set out in an announcement circulated in October 2000:

- Existing commercial recreation operations without a permit to use Crown land were given a deadline of December 29 to submit an application.
- Applications already received (for existing as well as proposed operations) would also be considered under the plan.
- Decisions on applications for summer activities would be made by spring 2001, and for winter activities by fall 2001.
- No new applications would be considered until the end of the Transition Plan in November 2001.

Preparing for the applications

Meetings were held between BCAL land managers and key stakeholders and government agencies to explain the initiative, and to set deadlines to meet objectives. At the same time, contact with the media was initiated, and letters were distributed to all commercial recreation

[2] Now BC Ministry of Competition, Science and Enterprise
[3] Now BC Ministry of Sustainable Resource Management
[4] Now BC Ministry of Water, Land and Air Protection
[5] Now BC Ministry of Water, Land and Air Protection
[6] Now split into two ministries, the BC Ministry for Sustainable Resource Management and the BC Ministry for Water, Land and Air Protection.

operators identified in an inventory-building exercise. The standard BCAL application package was refined to explain what was required of the applicants, including a management plan outlining the nature of their activities, and mapping to illustrate the extent of those activities.

Some of the key issues to emerge at this stage are outlined below:

- GIS and data management capabilities of the management agency are crucial from the outset. The nature of commercial recreation activities is so diverse that techniques that may be appropriate for other program areas are stretched to their limit.
- Applicants were unclear exactly what was required of them, reflecting the difficulty of communicating with unpermitted operators, the diversity of operations, and the fact that CR operators may be drawn to the industry for lifestyle rather than business reasons.
- Many of the applications were of a lower standard than for other program areas administered by BCAL. In part, this reflects the issues outlined above. However, it is also likely that the fact that most applicants were already existing operators had a significant impact on their willingness to participate in the process, particularly given the background of uneven implementation of previous policy initiatives.

Initial review of the applications

A total of 53 applications were received by BCAL in advance of the first deadline. A first review of applications was intended to filter out inappropriate or incomplete applications prior to review by other agencies. An enormous amount of work was required to check all applications were complete, and to follow up with operators to provide missing information. A further logistical issue was the need to provide multiple copies of all management plans and mapping, which was greatly complicated by multiple revisions to plans during the process. After initial review, 7 applications were either cancelled, transferred to other regions or considered under alternative policies.

Some of the issues arising at this stage are outlined below:

- Already at this stage, human resource issues were becoming apparent. Administration of the Transition Plan involved almost every staff member of the regional office, and meant that other management priorities had to take a back seat for a while.
- Given the tight timelines and the political imperative to accommodate existing businesses as far as possible, not all applications that progressed to the next stage were entirely complete. This created management problems later on in the process.
- Provision for electronic submission of plans is being considered, including a proposal for BCAL to develop suitable base mapping to be provided to applicants free of charge.

Evaluating the applications

At this stage, responses from provincial agencies, local governments, First Nations and other organisations were assessed. Main participants in the referral process are listed in table 4.

Provincial agencies

- Ministry of Forests
- BC Parks
- Fish & Wildlife

Local government

- Squamish District
- Resort Municipality of Whistler
- Village of Pemberton
- Squamish and Lillooet Regional District

First Nations

- Squamish
- Mount Currie
- In-Shuck-ch / N'Qatqua

Table 4: Main participants in the Transition Plan for commercial recreation.

Broader public consultation was provided through advertisements in four community newspapers, and the placing of copies of management plans and mapping in community libraries. Finally, the status of the land covered by the application was checked for ownership and possibly conflicting tenures, before the application was progressed to a decision.

Issues arising at this stage are once again summarized below:

- Human resources challenges within BCAL were mirrored in similar challenges for referral agencies and other organizations.
- Incomplete applications continued to plague the process, and the fact that operators were already in existence meant that the option to simply reject the application was not available.
- Response times and the level of detail provided in responses varied greatly between different organisations. Additional complexity was introduced by the requirement for some operators to substantially modify their proposals, and the need to process these changes through the referral process again.
- Genuine involvement of First Nations in the process was limited. Engagement above and beyond formal ministerial and provincial guidelines, particularly face-to-face

negotiations, was necessary to provide any level of meaningful input.
- Jurisdictional issues were particularly important with respect to applications using Forest Service Roads (the management responsibility of the provincial Ministry of Forests) and those involving water-based activities (water transport being the responsibility of the federal Transport Canada).

Decision on the applications

After the information collected at the evaluation stage was collated, a decision on the application was made by BCAL, and the applicants were notified in writing. 32 applications were approved at the first phase, for those operations including summer activities in their proposals. A formal tenure offer was then prepared, taking into account the comments made at the referral stage in the form of conditions to the permits. While the Commercial Recreation on Crown Land policy allows for tenures to be granted for up 20 years, the majority of the tenures offered were limited to three and five-year periods due to the concerns of participating agencies, and the upcoming sub-regional Land and Resource Management Plan process for the Squamish Forest District.

Responses to the offers were varied, and while some were accepted quickly, other operators expressed surprise at the conditions, at the pricing method, and at the need to make payments for a year in advance. Some offers required renegotiation to more closely meet the needs of the operator. The terms of the offers proved most challenging for water-based and heli-based activities, reflecting jurisdictional issues with the federal government.

Other key issues becoming apparent at this stage included:
- Greater outreach may be necessary to educate potential applicants about the program if it is to be extended to other areas of British Columbia.
- Greater efforts may also be required to communicate with applicants during the application process.

Monitoring and enforcement

The final stage in the Transition Plan consists of ongoing monitoring of both tenured and untenured operations, and enforcement efforts to counteract non-compliance. As mentioned above, a dedicated compliance and enforcement officer was hired as part of the plan, and this move has undoubtedly had a major impact on the program's effectiveness. An interesting development has been the strengthening of field-level linkages with enforcement officers of other agencies, particularly the conservation officers of the provincial Ministry of Forests and fisheries officers of the federal Department of Fisheries and Oceans.

Other issues of importance at this stage include the following:
- The definition of commercial recreation adopted in the Commercial Recreation on Crown Land policy appears not to apply to rental operations (for example, snowmobile rentals). Lack of compliance efforts against these operators has led to a perception in the community that BCAL efforts are not as comprehensive as they might be.
- The role of the compliance officer should, however, be seen as one of liaison and outreach as to one simply of policing.

NEXT STEPS

In terms of it narrowest aim, to ensure all commercial recreation operators using Crown land, the Transition Plan has proved broadly successful. While negotiations are continuing at the time of writing, the majority of operators who have been made tenure offers have accepted them, and monitoring efforts indicate that there are very few operators still outside of the Transition Plan.

However, a number of key issues remain outstanding, some of which are being tackled at present, and some of which remain as challenges for the future.

Evaluation of the Transition Plan

An evaluation of the Transition Plan is currently in progress, based on stakeholder responses to a questionnaire structured to reflect the objectives of the Commercial Recreation on Crown Land policy. Among these objectives are environmental stewardship, public access and First Nations considerations.

Outstanding policy issues

Several areas of the new policy require some clarification, probably in the form of policy directives. Some of the main issues include BCAL's ability to tenure Forest Service Roads (currently administered by the Ministry of Forests under the Forest Practices Code Act), and sector-specific guidelines on how to interpret the policy, particularly with respect to rental operations and water-based and airborne activities.

Resolving conflict between commercial and public users

A 'Backcountry Forum' is currently in progress to attempt to reach consensus on how to allocate Crown lands between conflicting recreational uses. This multi-stakeholder negotiation process was initiated by BCAL, with the prime intention of resolving winter conflict between skiers and snowmobile users. Interestingly, the key focus of the forum has become the tensions between mechanized and non-mechanized recreation, rather than simply between commercial and public recreation.

Extension of the program to other recreation sectors

The original intention of the policy was to convert pre-existing hunting and fishing tenure agreements to commercial recreation tenures. This was not attempted in the Sea to Sky area, due to the complexity of dealing with the non-tenured operators, and it is not clear whether attempts will be made in the future to incorporate those tenures into the CR program. The policy also makes a provision for activities on 'Crown land submerged by water' to be incorporated. However, extension of the reach of the transition plan to the growing 'eco-tour' operations on tidal waters may be limited by jurisdictional issues between the federal and provincial governments.

Carrying capacity

While a broad framework for initiating a carrying capacity study and a pilot application were developed as in the period immediately prior to the Transition Plan (Leavers 2000b, 2000c), work on implementing these plans has not progressed. One factor may be the change in government during the Transition Plan, and a guidance that BCAL is not a planning agency. Planning functions from a number of ministries have been relocated into the new Ministry of Sustainable Resource Management, although the shape of future planning initiatives remains to be seen.

LRMP for the Squamish Forest District

One of the challenges of implementing the Transition Plan was the absence of a district-wide plan within which to assess commercial recreation applications. The Sea to Sky LRMP process has since been launched, and it remains to be seen how well CR tenures issued through the Transition Plan can be integrated into that initiative.

Extension of the CR program across the province

A final issue with respect to the Transition Plan is its possible extension into other Forest Districts in the Lower Mainland Region, as well as across British Columbia. While it is expected that the majority of districts will not present the complexity of issues found in the Sea to Sky, thanks to its proximity to both Whistler and Vancouver, it is hoped that many of the lessons learned in the Transition Plan will be applicable to land managers in those areas.

REFERENCES

Leavers, D . (1999): Strategic Planning for Commercial Recreation. Sea to Sky Corridor: Squamish to Pemberton. Phase I: Background and Analysis. Prepared for BC Assets and Land Corporation, Surrey, BC.

Leavers, D. (2000a): Strategic Planning for Commercial Recreation. Squamish Forest District including the Sea to Sky Corridor. Phase II: CR Management Plan. Prepared for BC Assets and Land Corporation, Surrey, BC.

Leavers, D. (2000b): Determining a Capacity for Recreation and Monitoring Effects from Commercial Recreation Operations on Crown Land. Phase I: Literature Review / Research and Report. DLC Recreational Series Occasional Paper #1

Leavers, D. (2000c): Evaluating Recreation Capacity on Crown Land in BC: Pilot Application, Cougar Mountain (16 Mile Creek) Capacity Management Area. Prepared for BC Assets and Land Corporation, Surrey, BC.

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Developing a Visitor Management Framework for WWF's PAN Parks Project – Case Study of a National Park in France

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Abstract: The purpose of this presentation is to discuss the visitor management planning process in progress at the *Parc National du Mercantour* in France. Park administration wishes to achieve World Wildlife Fund for Nature's (WWF) designation as a PAN Park. Details concerning the development of a visitor management framework for WWF's PAN Parks project will be given. Results will reflect practical aspects of Visitor Management Planning and monitoring in protected areas.

INTRODUCTION

WWF is the world's largest and most respected independent conservation organisation. Since 1985, they have invested over US$ 1,165 million in more than 11,000 projects in 130 countries. Consequently, tourism has been noted as one of the largest and fastest growing industries and has significant environmental, cultural, social and economic impacts, which significantly effect WWF locations. WWF aims on optimisation of the positive impacts whilst minimising, and wherever possible, eliminating the negative impacts. Thus, in 1997 WWF and the Molecaten Group developed the Protected Area Network (PAN Parks) concept as a means to encourage synergy between nature conservation and tourism in Europe's protected areas. The aim of the PAN Parks project is to change tourism from a threat (attracting visitors could lead to negative impacts on nature) into an opportunity by building relationships with nature conservation organisations, travel agencies, the business community and other groups on a local, national and international level (WWF 1999).

In order to become a PAN Park, a park must meet PAN Parks principles (Table 1) and criteria. Mercantour National Park does not yet meet all the criteria, namely a visitor management plan.

PAN Parks principles	
Principle 1:	Protected areas with rich natural heritage
Principle 2:	Nature Management
Principle 3:	***Visitor Management Plan***
Principle 4:	Sustainable Tourism Development Strategy
Principle 5:	Business Partners
Principle 6:	Sponsors

Table 1: Principles PAN Parks

This presentation will allude to the researcher process of synthesising the literature pertinent to visitor management frameworks to further clarify a framework for PAN Parks. Secondly, an overview of the visitor management planning process at Mercantour National Park is given. Results of this research will assist park managers in Europe in understanding and applying the concepts of WWF PAN Parks principles and criteria in developing Visitor Management

METHODS

Methods reported here are part of the those conducted as part of an MSc thesis sponsored by WWF to further develop visitor management criteria. The combination of related literature, PAN Parks criteria and structure of the thesis report serve as a form of self-assessment for both WWF and the park setting in France. The literature provides concepts of visitor management along with management recommendations. The PAN Parks criterion provides the organisational guidelines from which to relate and assess the visitor management/framework literature to further clarify the PAN Parks criteria. Results of the comparative analysis, can then be used within a practical setting to identify problems and alternative solutions to deal with visitor management problems

A literature study/content analysis on subjects related to visitor management resulted in a theoretical background for the PAN Parks visitor management principles. Four forms of literature were examined:

1. The visitor management philosophy supported by literature (Borrie et al., 1998; Hall & McArthur; 1993; McCool, 1996).
2. Visitor management frameworks available online, namely The Tioram Castle Conservation Project Scottish Highland, The Nut State Reserve Tasmania, the Norfolk Coast AONB

UK and the Waitakere City Council Visitor Strategy for the West Coast UK.

3. Visitor management subjects, explained, supported and complemented in the literature (Cole, 1987; Ceballos-Lascurain, 1996; Black, 1998; McArthur, 1998; Giongo et al., 1993, Wight, 1998; Schouten, 1999).
4. Visitor management strategies including frequently used systems like LAC (Limits of Acceptable Change), CC (Carrying Capacity), VIM (Visitor Impact Management), VERP (Visitor Experience and Resource Protection Programme), ROS (Recreation Opportunity Spectrum), VAMP (Visitor Activity Management Programme) TOMM (Tourism Optimisation Management Model) and VRM (Visitor Risk Management)

Figure 1 depicts graphically the steps involved in this research process.

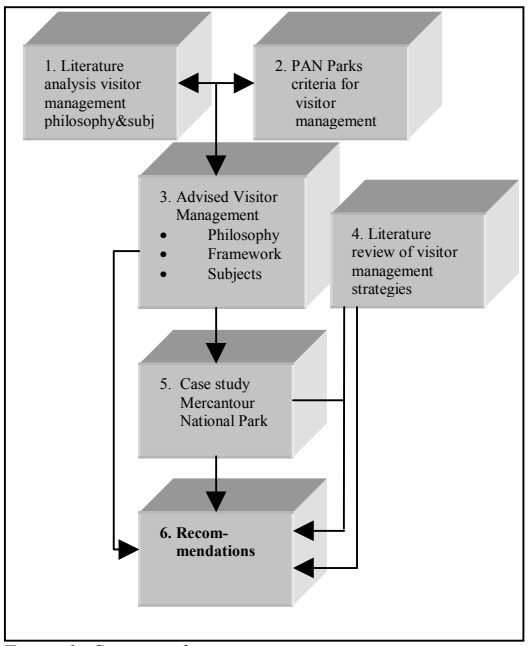

Figure 1: Conceptual map

Based on the analysis of the first three elements (number 1 in figure) eleven-visitor management subjects were identified. For each subject goals and objectives must be formulated in the visitor management plan. The PAN Parks principle about visitor management comprises criteria and indicators for eight of these subjects. Together with the literature background this step provides an overview of the desired situation (number 3 in figure). The PAN Parks' criteria and indicators is the evaluation tool while the literature review serves an explanatory, support and complementary role.

In the analysis of the fourth element (number 4 in figure) the different strategies were compared. Apart from the VRM strategy all systems were compared on basis of applicability, satisfaction of users, and on improvements made from one strategy to another. The VRM system is not included in the comparison because it deals with different visitor management subjects (different subjects appointed in the analysis of element 1-3). After this analysis only those systems that integrate both the nature oriented and the visitor oriented approach were evaluated against the PAN Parks criteria. The results of this analysis were positive indicating that these systems can be recommended by the PAN Parks organisation to be used for managing the visitor management subjects that PAN Parks sites deal with.

The case study (number 5 in figure) conducted in Mercantour National Park, France, consisted of an evaluation of the visitor management philosophy and visitor management subjects of the park. This step was based on secondary data analysis, informal interviews and personal observations conducted summer 2001. Results provided an overview of the points needed for further VM development and where the park meets the PAN Parks principles and criteria. For recommendations, results from the literature review are used (number 6 in figure).

CONCLUSIONS

The PAN Parks criteria and indicators are not formulated in a uniform or consistent format. Sometimes, a criterion is posed as a question or as an inventory task. How each should be interpreted is not explained and the level to which it should be implemented is not clear (see Appendix A for an overview of the PAN Parks criteria and indicators for visitor management). Literature and case study examples clarify the different visitor management elements (Figure 2) necessary in the present context of visitor management; thus, should be considered as elements of the PAN Parks criteria and indicators as well. In this paper only the suggested additions to the existing PAN Park criteria will be given. The structure of the conclusions is based on the relationship between the elements.

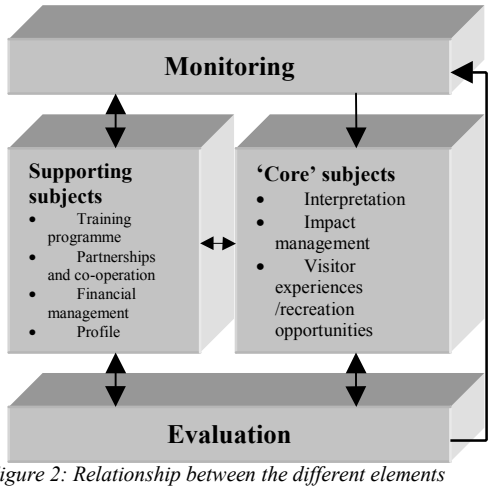

Figure 2: Relationship between the different elements

The ten visitor management elements depicted in Figure 2 (nine bulleted items and 'Monitoring

and Evaluation') are placed in a philosophical context. This context refers to the visitor management philosophy of a park which influences the decision making process. The principles and criteria of WWF are restructured so that these reflect the requirements for the different subjects identified in the literature. Key words that reflect the contents of the criteria and indicators are listed for each subject [Criteria (CR); Indicator (I)].

Visitor management philosophy

The PAN Parks criteria and indicators indirectly refer to WWF's visitor management philosophy. The criteria and indicators are grouped in two: 'Structure and strategy criteria and indicators' and 'indicators for sustainability'.

Cr. 3.1 Implementation, monitoring and evaluation of effectiveness of visitor management plan
I. 3.1.2 Long and short term goals
I. 3.1.4 Systematic monitoring and revision
I. 3.2.2 Describe measures to avoid negative impact (provide description and map of zoning)
I. 3.3.1 Different target groups

I. 3.3.7 Partnerships on use, improvement and widening the offer
I. 3.3.8 Active role in development sustainable tourism strategy?
I. 3.4.1 Segmentation

The literature research clarified the concept of a visitor management philosophy. Secondly, another group of indicators was identified: managerial principles. The research by McCool (1996) on visitor management principles was a valuable addition and support for the PAN Parks philosophy.

Category	Criteria
Managerial	Recognise the considerations of visitor use (eleven principles McCool 1996)
	Ease of implementation; • Time consuming • Desired education
	Integration possibilities with other strategies
Structure and strategy	Process oriented structure • Analysing and documenting; Identification of problem conditions • Goals and objectives setting • Strategic plan • Financial resources • Monitoring and evaluation of management actions
	Differentiated approach; • Different zones • Different target groups
Sustainable approach	Pro-active approach vs. re-active approach; Future oriented
	Cause solving vs. problem solving; Cause solving
	Local involvement integrated in process
	Beyond nature orientation: Social, economic, cultural, environmental, and visitor oriented

Table 2: Overview of visitor management philosophy indicators

Interpretation

Different PAN Parks criteria and indicators are defined for interpretation summarised as follows:

I. 3.3.2 Interpretation programmes for different target groups
Cr 3.4 (3.4.1) Create understanding and support for conservation goals
3.4.2 Different messages and techniques for target groups
3.4.3 Communication of code of conduct
Cr 3.5 , (I 3.5.1, 3.5.2, 3.5.3, 3.5.4) Visitor centres
- Availability and accessibility of information
- All year
- Visitor centre target groups
- In English and relevant languages

The analysis on this subject resulted a clear distinction that interpretation is more than information provision but reveals concepts, meanings and the interrelationship between natural phenomena. Interpretation educates visitors about the environment and adds to what we hope is a positive experience for visitors in nature (Ceballos-Lascurain,1996). The need for interpretation increases, as visitors demand more environmentally responsive services, products and information. They want to learn and understand their own connections with a broader environment (Black 1998). Hall & McArthur (1998) indicate that objectives of good interpretation are multiple but often fail to reach its full potential (Hall & McArthur (1998); therefore indicating that this subject area needs further clarification and development in protected areas.

Minimising Impacts

For this subject element, PAN Parks principles and criteria are not very descriptive or clear.

Cr. 3.2 Visitor management safeguards the natural values
I. 3.2.1 Carrying Capacity is assessed
I. 3.2.2 Measures to avoid negative impact: Zoning: access, allowed activities, time period

The literature review for this subject resulted in additional advisable requirements:

1. Structured analysis of impacts by categorisation (Giongo et al., 1993)
2. Different measures to avoid negative impacts (Cole, 1987; Hall & McArthur, 1993)
3. Decide whether change is a real damage or an inevitable consequence of human use (Wight, 1998; McCool, 1989)
4. Recognise principles of visitor management defined by McCool (1989)
5. Carrying Capacity as an initial concept is somewhat limited in guiding VM planning. Strategy frameworks such LAC, VIM, etc. should be considered as well.

Visitor experience/recreation opportunities; facilities-services-activities

PAN Parks requires high quality nature based experiences to assure visitor satisfaction. In order to realise this visitors should be offered an experience that contains the UNIQUE elements: *U*ncommon, *N*ovelty, *I*nspiring, *Q*uality, *U*nderstanding and *E*motions (Schouten 1995). These experiences

should be specified on different target groups (Mill & Morrison, 1992) because not all visitors need the same type of experience.

Mazursky's model of experience explains that visitor satisfaction is dependent on the expectations of the visitor (Mazursky in Beunders and Boers 1996). This concept underlies the strong relationship with the visitor management subject 'Profiling'.

Cr. 3.3	Wide spectrum of experiences
I. 3.3.1-3.3.2-3.3.3	Activity services and facilities for different target groups
I. 3.3.4	ortunities to observe natural features
I. 3.3.5	Monitoring visitor behaviour and satisfaction
I. 3.3.6	Visitor oriented facilities (quality)

Risk management

Accidents can happen but some accidents can be prevented. Communication is an important aspect of this element. What are the responsibilities of managers for risk management? This subject needs to be considered further by many parks. In some countries managing risks is a legislative obligation (Parks Canada). Parks Canada has developed a Visitor Risk Management handbook intended to help managers develop a consistent set of guidelines to manage visitor risks (Parks Canada). For parks willing to obtain the PAN Parks certification only one indicator has been defined resulting in two key elements: safety regulations and monitoring.

I. 3.3.9	Safety regulations concerning activities and the use of facilities Monitoring and updating

Monitoring

For all decisions taken in the visitor management process background information is necessary. This type of information is described as the basic input information necessary for developing a visitor management strategy. Information about visitors and the environment form the basis for all different subjects for which goals and objectives must be set for management. Effects of management actions must be monitored as well. A third element is that of monitoring and evaluation of the overall management plan. This is were questions such as "Have the right decisions been taken?"

PAN Parks recognises the importance of monitoring and has included many criteria and indicators about this subject.

Cr. 3.1 I3.1.4, I3.3.5, I3.3.6, I3.3.9, I3.6.4	Regular monitoring and updating of all elements of the visitor management plan explicitly mentioned are: • Effects of visitor management actions • Number of visitors • Type of visitors • Use of facilities services and activities • Visitor satisfaction • Visitor safety regulation • Training programme • Trends and developments Take actions based on obtained information and evaluate progress

Partnerships and co-operation

The definition of the WTO (1998) makes clear that partnerships and co-operation are essential elements of sustainable development. This subject is part of the visitor management philosophy. Partnerships can be established for different subjects of the visitor management elements.

I3.3.7	*Co-operation with local actors* Establishment of relationships
I3.3.8	Proactive attitude towards sustainable tourism strategy

Training programmes

The need for training programmes varies from park to park. Important is the knowledge managers and/or rangers have on the various subjects of visitor management. For the visitor experience a visitor oriented attitude from personnel, the way in which facilities, services and activities are offered are important to visitor satisfaction. Knowledge of park personnel must be assessed through monitoring/assessment, then training programmes can be developed accordingly.

Cr. 3.6	Training programme is element of visitor management
I 3.6.1	Available
I 3.6.2	Goals, target groups, methods and time schedule
I 3.6.3	Training need assessment
I 3.6.4	Monitoring and revision

Financial management

Expenditures and revenues must balance. Visitor management is an ongoing process; thus a line item should be included in the annual budget. Obviously, visitor management subjects vary in priority and importance, therefore, annual budget funds should be allocated accordingly. The sole PAN Parks indicator referring to budget/financial related as an aspect is the availability of resources.

I3.1.3	Adequate resources for implementation of visitor management plan available

Profile and infrastructure

These two subjects are not included in the PAN Parks criteria. However, these elements appeared in visitor management plans from other national parks

(The Tioram Castle Conservation Project Scottish Highland, The Nut State Reserve Tasmania, the Norfolk Coast AONB UK and the Waitakere City Council Visitor Strategy for the West Coast UK).

Profiling an area is about presenting the park in visitor information; it is about creating an image and expectations. By doing this visitor flows can be controlled (Cole, 1987; Hall & McArthur, 1993, 1998) and appropriate expectations can be created in the minds of the visitor leading to an increase in visitor satisfaction.

The possibilities to increase visitor satisfaction and minimise negative impacts are multiple. Infrastructure can be used as a means to differentiate in service provision which leads to the desired outcomes. For example, making access to problem areas more difficult and/or improve access to alternative locations (Cole 1987) or by encouraging/discouraging use by selective service provision (many signs or the opposite: no signs). Site design, reinforcing areas of known impact, coupled with zoning of experience opportunities are other means as well.

Different strategies have been developed that deal with visitor management subjects described briefly in this paper. Table 3 summarises the various strategies we discussed.

Abbreviation	Strategies
VRM	Visitor Risk Management
CC	Carrying Capacity
LAC	Limits of Acceptable Change
ROS	Recreation Opportunity Spectrum
VIM	Visitor Impact Management (National Parks and Conservation Association)
VERP	Visitor Experience and Resource Protection (National Parks Service)
VAMP	Visitor Activity Management (Parks Canada)
TOMM	Tourism Optimisation Management Model

Table 3: Strategies analysed

In conclusion, we determined that the latest strategies focused on in the literature are all integrated systems that combine ecological and visitor oriented approaches (namely VIM, VAMP, VERP, TOMM). These integrated systems all deal with and/or include some aspects of the PAN Parks criteria that have been formulated for the subjects they deal with (e.g. VRM- criteria about risk management). We conclude that the systems are very similar to each other and any one of them could be suitable for a park to use. Results imply that PAN Parks criteria are not specific enough and by adopting one or a combination of the aforementioned strategy frameworks, a park setting would not only meet the PAN Parks criteria, but develop a more complete visitor management plan as well. Therefore, we advise park management to select any one of the strategies if it needs to improve (or develop) their strategy on the subjects that the strategy deals with specifically.

MERCANTOUR NATIONAL PARK CASE STUDY

Study setting

Mercantour National Park is situated in the department *Alpes Maritimes* in the south of France. The park borders on the east with the *Italian Parco Regional d'Argentera* with which they are co-operating (see map). Different management policies are jointly executed. The vicinity of the Atlantic Ocean creates a unique climate in an area that has an altitude difference from 490m to 3143m. Because of these characteristics a wide diversity in plant and animal species can be found. Many of these species have a protected status. Apart from natural features a valley in the park possesses the richest ensemble of open-air engravings in Europe.

The park is divided in two different zones: the core zone and the buffer zone. In the core zone activities and behaviour are restricted, the regulations of the park have to be obeyed. In the buffer zone a wide offer of tourist facilities and services can be found. The core zone covers an area of 68.500ha and the buffer zone and area of 136.500ha. In the buffer zone 28 communities can be found (fact sheet 2000). The park is divided in six sectors. These sectors have their own management team located in the area. This research is carried out in core zone of the sector La Vésubie, situated 65km from Nice.

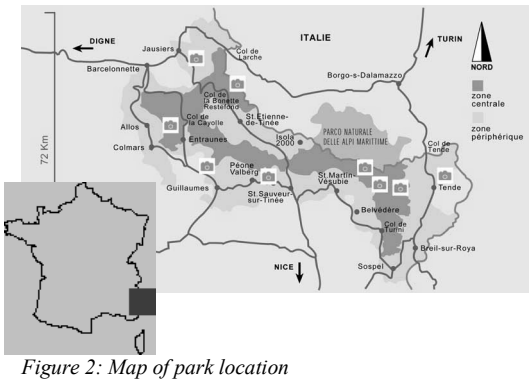

Figure 2: Map of park location

Results

The visitor management practices from the management in La Vésubie have been analysed based on the PAN Parks criteria. Table 4 shows the results. Table 5, presents an overview of the evaluation of the PAN Parks criteria and indicator assessment for the core zone of La Vesubie, sector of Mercantour National Park.

Results of analysis in core zone La Vésubie- Mercantour National Park
Interpretation: Information, education • The possibilities and opportunities interpretation makes possible are not used optimally. In the visitor centres, in the brochures, and in the park and its entrances this could be further developed. • No visitor segmentation is used to differentiate services, facilities and activities. • Interpretation does not increase understanding and support • Visitor centre is only open in high season which makes information difficult to access (apart from interpretation panels and trails in the park)
Impact management • no impact assessment or strategy that deals with managing impacts • few different measures are used to minimise impacts • No limits of acceptable change have been defined (nor Carrying capacity levels), no indicators have been identified
Visitor experience/recreation opportunities • In core zone visitor experiences are nature based • No zoning system is applied • Good opportunities to experience wildlife
Risk management • Mercantour has a non-communicating attitude towards visitor risks
Monitoring • The input of visitor management is being monitored: Visitor surveys have been conducted this year. These deal with various subjects. National and departmental organisations monitor the existing situation. Rangers monitor while on duty and special research is conducted on specific subjects. • No systematic monitoring programme is available for visitor management subjects
Partnerships and co-operation • The park has an active approach towards co-operation • Different partnerships exist
Training programmes • Training programmes are available for all employees on yearly basis • A wide range of topics is offered • Training needs are not assessed
Financial management • The park has different financial resources • A yearly budget line item should be allocated for visitor management
Profile • External-happens from headquarters in Nice, France • Has to be communicated with the sector to utilise the opportunities
Infrastructure • The current situation offers possibilities which need further analysis • Infrastructure in the park is very well developed

Table 4: Results analysis La Vésubie- Mercantour National Park

Visitor management subject	Meets PAN Parks criteria	Needs further development
Interpretation		x
Minimising impacts		x
Visitor experience/ recreation opportunities		x
Training Programmes	x	
Monitoring		x
Partnerships	x	
Safety		x
Financial management	x	
Profile	x	
Infrastructure		x

Table 5: Analysis results of core zone La Vesubie-Mercantour

The literature that describes the visitor management philosophy, the structure and the different subjects also provides recommendations for managers to consider. When the PAN Parks criteria and the literature study are used to analyse the situation, it pinpoints problem areas and gives examples on how these can be dealt with in the situation. In essence, this thesis project combining a literature review in accord with PAN Parks criteria and the structure of the thesis itself provides an assessment tool as a form of monitoring. An integration of literature study and the onsite analysis is shown in Table 6.

Visitor management subject that need further development to meet PAN Parks criteria	Strategies that can be used:		Other sources used for visitor management subjects
	VIM VERP VAMP TOMM	VRM	
Interpretation	X		McArthur 1998 Hall, & McArthur 1998 Ceballos-Lascurain 1996 Black 1998
Minimising impacts	X		McCool 1989 Wight 1998 Berle 1990 Giongo et al., 1993 Hall Mc Arthur, 1998
Visitor experience/ recreation opportunities	X		Schouten 1995 Cole 1987 McCool 1996
Monitoring	X		McCool 1996
Safety		X	VRM plan Parks Canada

Table 6: Integration of literature and self assessment

REFERENCES

Beunders N, Boers H, (1996). De andere kant van de vrije tijd. Toerboek BV, Amsterdam.

Black, R.S. (1998). Ecotourism and Education, http://lorenz.csu.edu/ecotour/rosy.html.

Borrie, W.T., McCool, S.F. and George H. Stankey, (1998). Protected Area Planning Principles and Strategies. In Lindberg, K., Wood, M.E., and Engeldrum, D. (Eds.) (1998). Ecotourism : A guide for Planners and Managers. Volume 2, pp. 133-154. (The Ecotourism Society, North Bennignton, VT).

Ceballos-Lascurain H, (1996). Tourism, ecotourism and protected areas. IUCN The World Conservation Union, Gland.

Cole D.N. (1987). *Research on soil and Vegetation in Wilderness: A state of knowledge review,* proceedings at the National Wilderness Research Conference, 1985. July 23-26 Fort Collins Colorado. USDA Forest Service, General Technical Report INT-220 Intermount Research Station.

Giongo F, Bosco-Nizeye J. & Wallace, G. (1993). *A study of visitor management in the world's National Parks and protected areas*, Department of Recreation Resources, Colorado State University: Ft. Collins, CO 80523, CO, USA.

Graefe, A.R. (1992). Visitor Impacts Management: *An Approach for Assessing Recreational Capacities in Natural Areas*. Paper presented at the International Workshop on Visitor Carrying Capacity Measurement at Historic Sites and Cities and Wilderness Protected Areas in Developing Countries, Belize City, Central America, April 26-27,

Graefe, A.R., Kuss, F.R. and Vake, J.J. (1991). *Visitor Impact Management*, 2 Vols., National Parks and Conservation Association, Washington.

Hall C.M. and McArthur S. (1993). *Heritage management in new Zealand and Australia, visitor management, Interpretation and Marketing*. Oxford University Press Auckland.

Hall C.M. and McArthur S. (1998). Integrated Heritage Management. The Stationary Office, British Library Cataloguing.

Hall, C.M.. and Lew, A.A. (1998). *Sustainable Tourism; A geographical perspective* Addison Wesley Longman, New York.

Hammit WE, Cole DN, (1987). *Wildland recreation, Ecology and management*.John Wiley &sons inc. United States.

McArthur, S., (1998). *Introducing the Undercapitalised World of Interpretation* in Lindberg, Eplerwood, Engeldrum, *Ecotourism, A guide for planners and managers* Volume 2, p 63, The Ecotourism Society Vermont.

McCool, S. F. (1989). Limits of acceptable change: Some principles in Toward Serving Visitors and Managing Our Resources: Proceedings of the Visitor Management Strategies Symposium,/. University of Waterloo, Ontario, CANADA. Pp. 195-200.

McCool, S.F. and Stankey, G.H. (1992). *Managing for the sustainable use of protected wildlands: The limits of acceptable change framework*. Paper presented at the IVth World Congress on National Parks and Protected Areas, Caracas, Venezuela February 10-21.

McCool, S.F. (1996). *Limits of Acceptable Change: A framework for managing National protected areas:experiences from the united states*. Paper presented at the Workshop on Impact Management in marine Parks, Kuala Lumpur Malaysia.

Mill & Morrison, (1992). The tourism system, an introductory text. Prentice Hall International Editions, New Yersey.

Moccochain, L. (1999). *Les sentiers du secteur Vesubie, Etude sur l'etat general des sentiers du secteur du Vesubie*. Aix-en-Provence.

Schouten F (1999). Reader with the workshop Management of Heritage Based Tourism Resources, NHTV Breda.

Shelby, B and Herbelein, T.A. (1984). *A conceptual framework for carrying capacity detremination*. Leisure sciences 6(4), 433-451.

Vaske, J.J., Donnelly, M.P., Doctor, R.M. and Petruzzi, J.P. (1994). Social Carrying Capacity at the Columbia Icefield: Applying the Visitor Impact Management Framework, Canadian Heritage Parks Canada, Calgary.

Wight, P.A. (1998). *Tools for sustainability analysis in planning and managing tourism and recreation in the destination*. In: Hall, C.M.. and Lew, A.A. *Sustainable Tourism; Ageographical perspective* Addison Wesley Longman, New York.

WTO (1998). Guide for local authorities on developing sustainable tourism.

APPENDIX A. OVERVIEW OF PAN PARKS PRINCIPLE VISITOR MANAGEMENT; CRITERIA AND INDICATORS

Principle 3: Visitor Management

PAN Parks visitor management safeguards the natural values of the area and aims at offering the visitors a high quality nature-based experience.

3.1. Protected area must have a visitor management plan. Implementation, regular monitoring and assessing its effectiveness should be secured. Based on the assessment the management will be adapted and the plan updated.

3.1.1 Do you have a visitor management plan? Provide an English summary and a copy (if available).

3.1.2 Provide information of the plans long- and short-term goals.

3.1.3 Are there adequate resources for the implementation of the visitor management plan?

3.1.4 Are the effects of the visitor management plan's actions being monitored systematically? Can the plan be revised accordingly?

3.2 Visitor management safeguards the natural values of the protected area.

3.2.1 The protected area's ecological carrying capacity is properly assessed/ estimated, making use of the best available method.

3.2.2 Based on ecological carrying capacity, describe the measures to avoid negative impacts by visitors on the protected area. Add description and map of zoning system (or similar system), specifying visitor access, allowed activities and time period of each zone.

3.3 Visitors are offered with a wide spectrum of high quality nature-oriented experiences based on the visitor management plan.

3.3.1 List and specify activities (such as hiking, canoeing, cross-country skiing) for different target groups.

3.3.2 List and specify services (such as education and interpretation programmes) for different target groups.

3.3.3 List and specify facilities (such as observation towers and nature trails) for different target groups.

3.3.4 List opportunities offered to visitors to observe and experience wildlife and other natural features of the protected area.

3.3.5 Indicate how number and type of visitors, their use of activities, facilities and services and the visitor satisfaction are being monitored. Indicate estimations on future trends on development of number and type of visitors.

3.3.6 Based on visitor satisfaction, describe how the quality of the activities, services and facilities are monitored and improved.

3.3.7 Describe existing and planned partnerships with communities and other partners on the use, improvement and widening the offer of nature-oriented expediencies.

3.3.8 Does the protected area management play proactive role in setting up and implementing sustainable tourism development strategy (as defined in principle 4)?

3.3.9. Indicate safety regulations concerning activities and the use of facilities and specify how these regulations are monitored and updated.

3.4 Visitor management creates understanding and support for the conservation goals of the protected area.

3.4.1 List target groups that need to understand and support conservation goals of the protected area.

3.4.2 Specify messages and different techniques used for the target groups.

3.4.3 Do you have a code of conduct? Indicate how it is communicated.

3.5 The protected area has a visitor centre, for which clear goals and a policy are being defined within the visitor management plan.

3.5.1 List visitor centres target groups that need to understand and support conservation goals of the protected area.

3.5.2 Specify messages and different techniques used for the target groups.

3.5.3 Is the availability and accessibility of information guaranteed during all periods of the year that visitors can be expected? Indicate opening dates and hours of visitor centre and other places where information is available and specify which information is available.

3.5.4 Are information, education, interpretation and communication in the visitor centre available in English and, in case that monitoring of visitor flows shows many visitors from other countries come to the area, other relevant languages?

3.6 The visitor management plan includes training programme for staff and others involved in offering activities, services and facilities to visitors.

3.6.1 Do you have a training programme for the staff and others involved in offering activities, services and facilities to visitors?

3.6.2 Specify goals, target groups, methods and time schedule of the training programme.

3.6.3 Are training needs of staff and other people involved assessed on a regular base?

3.6.4 Is the training programme monitored systematically? Can the plan be revised accordingly?

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The Effectiveness of Wayfinding Systems with Forest Users

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Abstract: Forest wayfinding systems include the sources of information, content and presentation, that potential visitors use to find forest sites and maximise their experience of forest recreation. This paper presents original research from an on-going user-led study of signage at forest recreational sites across the UK, and is part-funded by the Forestry Commission. Research methods used in the study included structured interviews with forest users, a signage audit, observation-based behavioural studies and exploratory work with space syntax. The starting point for the study was an apparent low rating of satisfaction with road signs by visitors to Forestry Commission sites in annual visitor surveys. Signs are "…the most visible manifestation of corporate face" and function to "…provide reliable and accessible information to encourage and welcome visitors" (Forest Enterprise Signs Manual, 1997). Good signs also form part of a positive perception of woodlands (Burgess, 1995) and may be considered within the context of removing barriers to the use of the countryside by disabled people and socially excluded groups.
The research found evidence that there were some problems with forest wayfinding, but that these problems are related more to the context, content and location of signs, rather than the materials and details of sign design. More consideration needs to be given to identifying the minimum but key information needs of users at key locations within the forest site. Signs are costly to design, construct, install and maintain, and a crucial concern must be to provide the minimum information for maximum benefit, based on what the user needs to know at each stage of the journey and forest experience. The study also highlighted the role of signage in site promotion, visitor expectations, conflicts between different user groups and accessibility of information. A model for signage to satisfy visitor information needs was developed. The results presented here cover phase 1 of the project and it is anticipated that the methodology developed during the research will have practical applications in evaluating and developing new signage systems, and the training of forest and other recreational site managers.

INTRODUCTION

The starting point for the study was an apparent low rating of satisfaction with road signs and information boards by visitors to Forestry Commission sites. Against this background, a research project was commissioned by the Forestry Commission to consider issues of forest wayfinding and to develop methodologies for assessing wayfinding systems. The first phase of the study, which is presented here, was a scoping study to consider whether:

1. users (who want to) were finding their way to Forestry Commission recreational sites,
2. the information provided on site enabled visitors to use the site effectively once they were there.

A key aim of the study was the development of a pilot methodology for FC and public participation in the evaluation of signage procedures.

Wayfinding is '…the ability to identify one's location and arrive at destinations in the environment, both cognitively and behaviourally' (Prestopnik & Roskos-Ewaldson, 2000), or, more simply 'spatial problem solving' (Passini, 1992). Wayfinding ability appears to differ between individuals depending on gender, sense of direction, familiarity with environment and wayfinding strategy (Prestopnik & Roskos-Ewaldson, 2000; Lawton, 1996). In the context of the present study of forest recreation, wayfinding was defined as the search processes and sources of information used by visitors to locate, arrive at and maximise their experience of recreational sites. Signs are a key source of wayfinding information, often supplemented by leaflets, maps, personal contacts and word of mouth.

Signs are a visual means of conveying information or messages from site managers to potential users of that site. Beazley (1969)identified the function of signs, the first to "…provide a visual target that is quickly seen; the second, to convey a message. An additional objective… is that it should impinge as little as possible on its surroundings while fulfilling the first two requirements." Various types of signage messages and information are suggested in the literature (Brown, 1974; US National Parks Service, 1988;

Burgess, 1995; Forest Authority, 1996; Forest Enterprise, 1997; Winter, 1998). These include site promotion and directions, visitor welcome, information about the site and its facilities, visitor orientation, education and interpretation, advisory and warning signs, and corporate image and promotion.

Visitor information needs can be perceived as arising out of a series of actions and decisions that occur in sequence according to what the user wants to know at each point. Accordingly a hierarchy of sign types has been developed by (See Table 1).

Sign type	Definition
Pre-arrival	Advance roadside warning
Threshold	Marking the main entrance to the area of management or ownership
Orientation	Helping people to locate themselves, before deciding where to go and what to do
Direction	Guiding traffic and pedestrian navigation
Identification	Labelling a feature of object
Information	Displaying details of opening hours, events, facilities
Interpretation	Revealing the significance of the landscape or an aspect of it
Regulation	Displaying rules and warnings.

Table 1.Signage hierarchy for outdoor recreational sites (Scottish Natural Heritage, cited in Bell, 1997).

The significance of pre-arrival signs was recently highlighted in a report to the Countryside Agency (1998) which suggested that a lack of signs and directions was a significant barrier to potential users of the countryside. Pre-arrival signs take the form of roadside warnings such as tourism brown signs and other highway signs. In the UK, standard white-on-brown tourism signs function to: "...guide visitors along the most appropriate route at the latter stages of their journeys [to places they were already intending to visit], particularly where destinations are difficult to find…or to generate impromptu visits by supplementing marketing initiatives" (County Surveyors Society, 1996). Tourism brown signs are administered by the Traffic Authorities, who seek to balance tourism development with road safety, traffic management and environmental objectives. Destinations must meet the basic quality standards of the Tourist Board Visitors Charter to qualify for Tourism brown signs. Alternative signing systems are offered by commercial organisations such as the Automobile Association (AA) and the Royal Automobile Club (RAC).

Visitor surveys carried out by the Forestry Commission indicate that most people arrive by car. However, the National Trust (2000) identified the needs of the 'transport poor' and stated that it was: "…not acceptable [for major developments] to be designed and located on the assumption that the car will represent the only realistic means of access to the site for the majority of people." At present most wayfinding signs to recreational sites are aimed at car users.

Threshold signs announce that a special area has been arrived at, welcome visitors, and also raise awareness of the organisation or landowner responsible for managing the site (Bell, 1997; Forest Enterprise, 1998; Winter, 1998). Threshold signs, are often "…the most visible manifestation of corporate face" (Forest Enterprise, 1997) and suggest the type of experience to be found on the site, as well as the standard of facilities on offer. Burgess (1995) studied the perceived fears and risks of various ethnic and social groups about visiting urban fringe woodlands. She considered that good signs formed part of a positive perception of woodlands, and that by encouraging more people into woodlands, a wider and more varied mix of users might be attracted, thus in itself helping vulnerable users to feel safer. She also suggested that by identifying and highlighting woodland character (such as open, middle or wild-woods) users might be able to assess whether they would feel comfortable using a particular site.

Once on site, visitors require additional wayfinding information in order to "…find their way around the site without getting lost, straying into danger or missing the best features" (Bell, 1997). Burgess (1995) observed that although men tended to be afraid of becoming lost or trespassing, women were more fearful of attack, and felt vulnerable when lost. Good maps and signage were important to let people know where they are and also where to go in times of anxiety.

Interpretation and education about the site is another vital area of visitor information which should provoke, relate and reveal as well as be accessible (Bell, 1997). A recent study by Gibb (2000) concluded that although 31% of the sites surveyed had wheelchair access, less than 3% of interpretation had facilities such as large print, Braille or an induction loop, for people with disabilities. The Disability Discrimination Act of 1995 has given added incentive to improving the inclusiveness of wayfinding systems in order that disabled people, particularly those with visual impairment do not experience 'information deficit' (Barker & Fraser, 2001).

METHOD

The approach chosen for the study was user-led and multi-disciplined. It comprised a series of site-based case studies, consisting of semi-structured interviews with visitors, a signage audit of the site and its environs, and route analysis using a combination of spatial and behavioural analysis techniques. The sites chosen for the case studies were: Queen Elizabeth Forest Park (OS map reference NN520014); Glencoe Lochan (NN104596); Cannock Chase (SJ 019171); Dalby (SE875874) and Hafren (SN 857869), which

encompassed a range of geographic locations, size, and foret experiences, as well as different levels of visitor satisfaction with road signs (see Table 2).

The first time user experience.

Researchers set off for each site with the minimum of information to hand, normally no more than the AA 2000 road map and an FC leaflet, and approached the site using only visual prompts, whether signage or symbols on the road map, and written directional instructions on the relevant FC leaflet.

Interviews with forest users

Structured interviews were carried out with visitors at the sites. The interviews were divided into sections, designed to follow the sequence of arriving and spending time on the site:

- About your visit here today
- About your journey here today
- About your arrival at the forest
- About the information and directions provided

Route Analysis

The nature and complexity of potential routes into each of the forest site was examined from the nearest population centres or holiday locations. Techniques included a signage audit, behaviour-environment analysis and a brief exploration of Space Syntax.

A, Signage audit

Actual signs locations as *experienced* by the user on their journey to the site were then catalogued and mapped using the following categories:

- Environs: the route to the site, up to the entrance, including significant major/minor road junctions, tourist brown signs, FC advance, threshold, and entrance signs.

- Local*:* the entrance up to the main information point, whether visitor centre or information board, including traffic flow directional signage, car park, signs to VC/information board, directions to start of trails or other facilities.

- Signs were recorded and assessed for:
- Location and appropriateness
- Visibility, legibility, accuracy
- Understanding/comprehension
- physical condition, confusion and clutter.
- Conformity to best practice guidelines.

B, Environment-behaviour analysis

This was carried out on an informal basis to assess signage effectiveness, and also to help put visitor comments into context. Two approaches were combined: observation records and spatial analysis. Observation points were selected in locations previously identified by the researchers as information 'trouble spots.' Visitor behaviour and interactions with the environment were recorded in the form of movement maps and annotated sketches. Spatial analysis encompasses a range of techniques frequently employed by Landscape Architects to evaluate the spatial experience of a route or landscape, by breaking it down into a sequence of visual images such as photos and sketches. These two approaches were used to analyse the 'goodness of fit' between user information needs and the information provided by the environmental setting.

C, Space Syntax

Space syntax is an exploratory technique used in spatial analysis (Hillier & Hansen, 1984). Its basic model is a transformation of the total spatial system of an urban situation in axial lines, which are defined as the fewest and longest set of lines of accessibility and visibility that can be drawn. The model is then analysed according to the connectivity of each axial line to all others in the system. In wayfinding, these intersections may be interpreted as locations where decisions are required. Lines are then analysed for global and local integration. Global integration - a measure of accessibility from all other parts of the spatial system – can then be used to identify suitable routes. Local integration – a measure of the accessibility of an axial line from its neighbouring lines – reflects the number of choices at junctions and the potential points of confusion. Due to time limitations and the exploratory nature of applying the technique in an open landscape context, it was only possible to use Space Syntax on one of the sites used in the present study (Hafren). Axial lines of accessibility were derived from roads on Ordinance Survey (OS) maps.

RESULTS

Full results from all the case studies which amalgamate all the techniques mentioned in the above methodology, are available in the final project report (Findlay et al., 2001). In this short paper it is only possible to present a selection of the data obtained.

Route analysis

The key approach routes used by visitors were identified from interviews with Forestry Commission personnel, forest users, Tourist Information, maps and 'scouting' by the researchers (see Table 3.). At Hafren route identification was reinforced by space syntax, which highlighted a local town which spatially dominated the area, a natural route to the forest through this town, and intersections which might cause confusion.

Site	Road sign rating	Size (ha)	Annual visitors (000's)	Main Visitor type	Use	Transport	Other considerations
Queen Elizabeth Forest	74.5% (1998)	20,000	1,000	Tourist	Walk Cycle	Car Coach	Proposed National Park. Major tourist route.
Glencoe Lochan	44 .0% (1999)	137	30	Local Tourist	Walk Fish Disabled access	Car Walk	Emphasis on disabled people. Local amenity within a major tourist destination area
Cannock Chase	62.0% (1999)	2428	106	Local	Walk Cycle	Car Walk	Close to large population of people from ethnic minorities. Forest in a country park
Dalby Forest	81.3% (1997)	3642	300	Tourist	Walk Cycle	Car	Within National Park. A forest drive
Hafren Forest	38.3% (1998)	3000	20	Tourist Local	Walk	Car	Bilingual issues

Table 2. Matrix of site factors for sites used in study.

Site	Possible routes	Road type
Queen Elizabeth Forest	2	'A' class roads
Glencoe	2	'B' class or minor roads
Cannock Chase	5	Minor roads
Dalby	2	Minor country lanes / 'B' Class roads
Hafren	4	Narrow country lanes

Table 3. Site approach routes

Three of the sites (Hafren, Glencoe and Cannock Chase) had no road signs; the only signage was that provided by the Forestry Commission at the forest threshold. Queen Elizabeth was signed using generic tourism brown signs as part of the 'Trossachs Trail'; Dalby had tourist brown signs, 'repeater' signs (a brown-on white pictogram) and highway signs. On-site Forestry Commission signage was recorded onto site plans and matched with comments from the visitor interviews.

Examples of environment-behavioural analysis included a comment that there was no information at the entrance to Queen Elizabeth, with the observation that, in reality, however, most information was obtained by talking to the man responsible for collecting parking fees. At Glencoe, visitors treated the car park and information board like a drive-through, travelling in circles while deciding whether to stop and park. At Cannock Chase, the technique was used to identify potential information needs around the entrance.

Visitor interviews

In all 68 structured interviews were carried out with users across the five sites. User groups were predominantly couples (n = 29) or families (n = 20), with fewer miscellaneous small groups (n = 11), lone males (n = 5) or females (n = 1). There were also 2 accompanied parties of users with learning disability. All visitors were White Caucasian; no visitors from other ethnic groups were encountered. Most visitors travelled to the sites by car (n = 60); very few cycled (n = 3), walked (n = 3), or came by coach or minibus (n = 2). Nearly half of the visitor were making their first visit to the sites (n = 33), while some made regular (n = 17) or occasional visits (n = 18).

Awareness of site

At Cannock Chase the site itself is called Birches Valley Forest Centre, however local visitors referred to the site variously as Birches Valley, Beeches Valley, the Deer Centre, Brindley Heath and Cannock Chase. The latter two references suggested confusion with a nearby visitor centre run by the local council, and which had more dominant road signs. This example gives some indication of the difficulty in finding information about a site when there are problems of site identity. Across all sites, most visitors first heard of the sites through word of mouth (n = 14), had 'always known' (n = 13), or from guidebooks (n = 12). Few had found information from Ordinance Survey maps (n = 7), Tourist Information offices or leaflets (n = 6), or 'by accident' while driving past (n = 5). Only 4 visitors mentioned signs; the remainder of reasons for first finding out about sites included looking for a café, by prior research or from a magazine.

Finding the site.

Visitors cited a number of wayfinding strategies including the use of maps, verbal directions and landmarks. Some were not able to explain: 'I just followed my nose' or used 'instinct'. On signage, one visitor claimed to have followed signs to Glencoe, when in fact there were not any. At Cannock Chase a visitor remarked that '..you don't stand a chance of finding it as there are no signs', and at Dalby '..it's well-signed – you can't miss it'. At Hafren, visitors identified particularly difficult junctions where signage would have been helpful. Problem junctions were often reinforced by Space Syntax analysis.

Arrival and finding out what to do

There were criticisms of the information boards on several of the sites, particularly the map representations and details of trails. At both Hafren and Glencoe, the car parks were small and laid out in a way that visitors could see at a glance that they had arrived at the right location, and any information boards were immediately obvious. At Glencoe, visitors commented on a lack of information e.g. about the fishing. This information was available on the site but not immediately obvious.

At both sites the map representations on the information boards were criticised. Several visitors remarked that details of the difficulty and duration of trails given on the information boards was over-estimated. One visitor was also confused by the site motif used on all the trailheads[7]. At Cannock, the site entrance was obvious, but there was no formal information board to indicate what was on offer at the site. Visitors were also confused by the pictograms on some of the directional signs at this site. At Dalby, information was available from the toll booths, but only when they were manned, and the road layout indicating car parking was not immediately clear to visitors. Queen Elizabeth Forest Park had long-standing problems with signage and design of the site entrance. where the requirement to remove traffic quickly from a busy 'A' road did not allow visitors time to absorb entrance information and directions. Once parked visitors were then unsure where to go for further information about the site. Site information was centralised at the Visitor centre, however this was neither visible nor clearly signed from the car parks.

Visitor conflicts

The intention to attract visitors to the site by signage and promotion was not always matched by site carrying capacity, ability to cope with diverse user needs, and possible conflicts between user groups. Although the actual forests can absorb large visitor numbers, this was not always the case with visitor facilities such as car parking and toilets.

None of the sites visited were accessible by public transport, and no visitors from ethnic minority communities were encountered at any of the sites, even though one site (Cannock) was within commuting distance of Birmingham with its large and mixed ethnic population. Visitors with some disabilities such as people who use wheelchairs were catered for with a specially designed boardwalk at Hafren, and boat for disabled people at Glencoe. However people with a visual impairment, limited mobility or learning disability were not catered for. Conflicts between visitor groups were particularly apparent at Cannock, where there was obvious tension between cyclists and pedestrians using the same trails. However at Dalby, cyclists and walkers were segregated and so this was not an issue.

[7] All forestry Commission sites have a motif which evokes the sense of place e.g. red feathers at Glencoe to suggest the connection with British Columbia.

DISCUSSION

The first phase of this scoping study highlighted a number of general issues, which will help determine key areas for future work. It was also useful in the development of a methodology to be used in future phases of the study, as well as in training packages to those responsible for sign design and assessment. The general issues were site promotion and encouraging more visitors to the site, site location and context, visitor wayfinding strategies, visitor expectations and accessibility of information.

Site Promotion

Road signs were generally located within a 5 mile radius of the site and, although they may to some extent attract visitors passing through the area, wider promotion of the site appeared to be necessary to inform potential visitors about the site. Site promotion included Tourist Information Offices, leaflets, local radio and newspaper, other published references to the site, and word of mouth. The last often revealed special and long-term attachments to particular sites.

Encouraging more visitors to the site.

The study began by asking whether visitors *who wanted to* were managing to find the sites. This entailed some consideration of whether both *quantitatively* and *qualitatively* more diverse categories of visitors might wish to use the site. It was noticeable that certain user groups were under-represented in the visitor samples, including non-car users, disabled people, people from ethnic minority groups or areas of social deprivation. These groups are currently the focus of government policy on social inclusion. Such policies raise questions such as: if more visitors are attracted to the site – can the site cope given the limitations of its present facilities e.g. car park capacity, toilets, size of visitor centre, as well as potential user conflicts?

Site location and context

The visitor survey highlighted widely differing ratings of satisfaction with road signs, which to some extent may be related to intrinsic - and therefore difficult to alter - site factors such as road hierarchy and layout, as well as site topography.

Visitor wayfinding strategies

Visitors cited a range of wayfinding strategies which included following road signs, using road maps, OS maps, verbal directions from friends and family, landmarks and the less conventional. Awareness of the diversity of wayfinding strategies can be used both to evaluate and inform wayfinding systems.

Visitor expectations

Arrival signage sets the scene for visitor expectations of the site and should be designed to give some indication of the kind of forest experience and standard of facilities that visitors are likely to encounter. With few exceptions, visitors were pleasantly surprised by the range of forest experiences on offer, and associated the Forestry Commission brand with a high standard of car-parks, toilets and other recreational facilities. This suggests that good provision is not matched by good information prior to arrival.

Accessibility of information

Despite the limitations of visitor sampling in this first phase of the project, some observations and comments may be made about the accessibility of information, particularly when viewed within the broader issue of social inclusion. Information boards did not appear to cater for the needs of the full spectra of disabled people's needs, for example those with restricted mobility or visual impairment. The issue of language accessibility was also highlighted. Dual language signing in Welsh or Gaelic appeared to be a policy issue, even though this doubled up the quantity of visitor information. Some visitors queried the increasing use of symbols and pictograms, many of which were poorly comprehended, suggesting this is not a straightforward answer to language accessibility.

Development of methodology

The development of a pilot methodology comprised

A, The FC perspective

Exploratory interviews with FC personnel – Forest District Managers, recreation officers, rangers and others such as toll collectors, shop staff and car park attendants – were useful in building a 'picture' of the wider social, historical and political context of the site, and potential problems. FC experience was a valuable source of information about the sites, and the recreation officers in particular had considerable insight into site issues and user profiles. However, it was sometimes appropriate for the researchers to experience the site themselves before consulting with FC personnel, in order to contribute a fresh perspective.

B, The user perspective

An early determinant of the study was that it should be user-led, and so a key element of the study was that user perspectives and behaviour were considered first and foremost. In-depth qualitative interviews, loosely based on a Personal Construct Theory approach (Kelly, 1955) were used. This involved probing the responses of interviewees on their experiences of wayfinding to and within forest sites. By continually probing " how?…in what way…?" considerable insight could be gained into the user perspective of issues that might be overlooked by forest managers and FC personnel. In addition, by using the interviewees' own words, rather than constraining their responses to the fixed vocabulary of questionnaires, a deeper rapport was possible.

C, Observation

It was also useful to observe visitors' behaviour – how they responded to signage and how their behaviour appeared at times to contradict their responses. At QEFP, drivers were clearly observed hesitating at the main entrance from the road. At Dalby, a woman complained that there was no information in the shop, although she did not actually ask shop personnel for assistance. FC personnel at Dalby remarked that by observing visitor behaviour at 'problem' areas they were able to fine tune signage and experiment by moving or subtly changing the existing signage.

D, Route Analysis.

Using an OS map, camera, sketch book and the landscape architect's training in spatial analysis, a visual map of all the signs and the context in which they occur, was built up. This necessitated an assessment of the experience of signage at driving speed in the specific landscape setting, whether urban or countryside. Signs that appear obvious at walking speed, may not be assimilated at driving speed. A helpful approach was to study signage as a series of questions:

- at a given time what is the most important thing people need to know?
- is the sign at the right place? – visibility and legibility?
- is a sign appropriate? – content and style.

Eventually this approach led to the creation of a number of illustrative plates which analysed the experience of signage in a visual way.

E, The first-time user approach

The sites were investigated by the researchers using a 'detective-style, under-cover' approach. The researchers were provided with the same level of initial site information as the first time visitor – an AA Road Atlas and an FC leaflet (where available). This deliberately naïve approach enabled the researchers to experience sites from a user perspective.

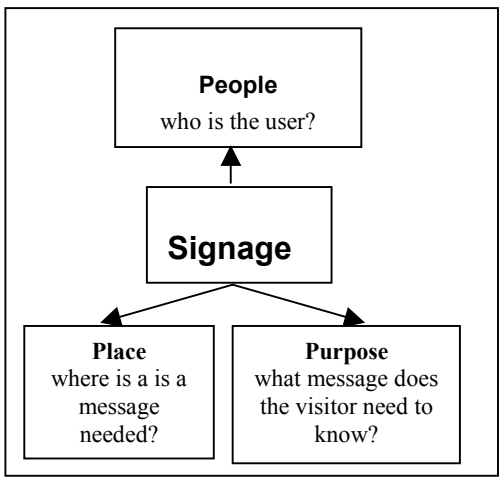

Figure 1. A signage model

Towards a signage model

A signage model (see Figure 1) was proposed to demonstrate the inter-relatedness of the various aspects of signage and wayfinding:

Recommendations for future work.

At the start of the present study it was acknowledged that this was the first phase of a larger project on forest wayfinding systems. The key issues in need of more in-depth investigation have been identified and a methodology developed that can be refined and applied to a wider range of sites. These key issues would appear to be :

- People - identifying existing, potential and 'missing' users of forest wayfinding systems within the context of social inclusion
- Purpose - identifying user information needs
- Place - identifying key locations where information is needed or can have maximum effect.

It is anticipated that the next phase of the study will comprise an 'experimental approach' and be the main data-gathering stage of the investigation seeking to address the challenge of :

i) Delivering minimum visitor information at key locations to maximum effect, in a cost-effective and appropriate manner

ii) Developing guidelines and training packages based on a refined, user-led methodology, for Forestry Commission personnel responsible for designing, implementing and evaluating wayfinding signage systems

iii) Identifying discrepancies in perception between users and providers of signage – i.e. 'goodness of fit' between the perceived information needs of forest users and FC personnel

iv) On-site signage experiments to investigate user responses to changes in signage, such as removing, moving or simplifying existing signs.

REFERENCES

Barker, P. and Fraser, J. (2001). *Sign Design Guide – a guide to inclusive signage*. Joint Mobility Unit and Sign Design Society.

Beazley, E. (1969). *Designed for Recreation*. Faber and Faber, London

Bell, S. (1997). *Design for Outdoor Recreation*. E & FN Spon, London.

Brown, ACH (1974). *The construction and design of signs in the countryside*. The Countryside Commission for Scotland, Battleby, Perth.

Burgess, J. (1995). *Growing in Confidence. Understanding people's perceptions of urban fringe woodlands.* Countryside Commission.

Countryside Agency. (1998). *Barriers to enjoying the Countryside*. Research Notes Issue CCRN 11.

County Surveyors Society (1996). *Traffic signs to tourist attractions in England – Guidance for Traffic Authorities.* ENV/2-96.

Forest Enterprise. (1998). *Forest Signs*. Forest Management Memorandum 27. Forestry Commission, Edinburgh.

Forestry Authority (1996*). Woodland Signs – Good Practice*. Forestry, Commission, Edinburgh.

Gibb, R. (2000). So, is it any good*? Interpret Scotland.* Issue 2, August 2000.

Hillier, B. and Hanson, J. (1984). The social logic of space. Cambridge University Press.

Kelly, G. (1955). The Psychology of Personal Constructs, Norton & Co., New York.

Lawton, C.A. (1996). Strategies for indoor wayfinding: the role of orientation. *J. Environmental Psychology* 16:137-145.

National Park Service Sign Manual (1988). *http://www.nps.gov/npsigns/*

National Trust: *Revision of Planning Policy Guidance Note (PPG) 13: Transport* (Jan, 2000).

Passini, R (1992). *Wayfinding in Architecture*. Van Nostrum Reinhold, New York.

Prestopnik, J.L. and Roskos-Ewaldson, B. (2000). The relations among wayfinding strategy use, sense of direction, sex, familiarity, and wayfinding ability. *Journal of Environmental Psychology* 20:177-191.

Winter, P. (1998). Getting out the message…an examination of signs in recreational settings. *US Forest Service – Recreation Research Update*. October 1998, No 28. Caring for the land and serving the people.

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
Conference Proceedings ed by A. Arnberger, C. Brandenburg, A. Muhar 2002, pages 335-339

Willingness to Pay for Rural Landscape Preservation

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Abstract: In this paper we present welfare estimates from a contingent valuation (CV) study, which investigates the potential benefits derived by tourists from the implementation of a programme aimed at preserving the traditional agricultural landscape in the Protected Landscape Area Bílé Karpaty. This area belongs to the most species-rich of the Central Europe. Since 1996 Bílé Karpary has been a biosphere reserve. Our hypothesis is that the agricultural working landscape is a visual resource that is an important attraction to tourists. Here due to the current market conditions arises a danger, that farming activities will be gradually abandoned. The supply of traditional agricultural landscape, which is characteristic for this area, generates economic benefits for which farmers receive little if any remuneration. Any policy aimed at correcting this market failure and providing a socially optimal level of landscape supply needs to be informed about the social demand for this peculiar public good. In this study we estimate the value of rural landscape in the area of Bílé Karpaty for tourism. The magnitude of this form of social benefits turns out to be sizeable and would probably justify – at least in part – a conservation policy aimed at correcting current market tendencies which cause the abandonment of traditional farming practices.

INTRODUCTION

In the recent years, there has been a steady and marked growth of interest in the contribution of farming to the supply of positive externalities. In this category of agricultural outputs the provision of valuable landscapes appear to assume a particular connotation, especially when these are representing values linked to cultural heritage and regional identities that are threatened to disappear under current market conditions. In the OECD countries one of the main sources of interest in rural landscape preservation has certainly been the deep and relatively quick transformation of the countryside that took place in the post war period. As a consequence the agricultural landscape was also under transformation in this period. In the Czech Republic traditional shape of rural countryside was changed drastically due to collectivisation of agriculture. After market liberalisation in the 1990s, as a consequence of decrease of profitability of agriculture, arises danger of progressive abandonment of agricultural land in economically marginal areas, most of which are characteristic by their high value of landscape. In the recent years the attention of the general public toward the issue of rural landscape preservation has increased and generated an intense policy debate. In Europe it has been fuelled by the reform of CAP that recognised the importance of the European agriculture as a producer of positive externalities (environmental, cultural, historical and scenic). In the Czech Republic the conservation of nature is governed by the Nature and Landscape Conservation Act (No. 114/1992).

This creates the need for rural landscape studies aimed at deriving estimates of social benefits from selected agricultural landscapes in various countries. In a cost-benefit analysis should be compared with the estimated cost of supporting preservation by means of public programmes to inform public decision-making with regard to the issue of economic efficiency.

Our study presented in this paper contributes to this discussion by supplying some results from a contingent valuation (CV) survey, which investigates tourists' willingness to pay (WTP) for landscape preservation in the typical extensive rural area of the Landscape Protected Area Bílé Karpaty. In the CV scenario respondents were proposed to contribute to the special fund – exclusively destined to support those agricultural activities contributing to landscape preservation. As an alternative to this scenario respondents were proposed the landscape resulting from abandonment of the traditional agricultural activity in the Landscape Protected Area. Analysing the observed sample responses derives estimates of expected willingness to pay (WTP). From these estimates we infer the magnitude of benefits to the population of tourists in the Landscape Protected Area produced by the existing level of provision of agricultural landscape.

CHARACTERISTICS AND THE ROLE OF AGRICULTURE IN STUDY AREA

Protected Landscape Areas (PLA) are extensive areas with harmonically formed landscapes. There are 23 PLAs in the Czech Republic. Altogether they cover 13% of the territory. The conservation of nature and landscape is governed by the Nature and Landscape Conservation Act. It is implemented:

- by performing special state administration in combination with assessment activities (this gives the opportunity to make decisions in the spheres that involve landscape and nature of the area);
- by dividing the area into zones of differentiated conservation (this makes it possible to distinguish between the regime of each zone);
- by the management plan of the PLA, which formulates the actual conservation strategy and is a basis for land planning, forest management plans and other planning documents;
- programmes funded by the state (Programme for Landscape Management, River System Revitalisation Programme).

International Importance of the study area is given by the fact, that Bílé Karpaty is one of five PLA included in the world network of biosphere reserves of the MAB Programme of UNESCO. It is also included in the concept European Ecological Network as one of core areas in this network (Administration of the Protected Landscape Areas of the Czech Republic).

LPA Bílé Karpaty covers area of 715 km^2 (forest 42%, grassland 21%, arable land 28%, water land 1,2%).

The most beautiful and characteristic elements of Bílé Karpaty are flower meadows with orchids, solitary oaks and shrubs. It belongs to the most species-rich of central Europe. The picturesque landscape of Kopanice with sparse settlements in a patchwork of fields, meadows, orchards and woods is unique.

Although from the private viewpoint farming is at the margin of economic performance, it still has an important role from the social viewpoint in terms of ration of actively farmed area over the total territory of the LPA. Environmental activities of farmers considered essential for the prosperity of tourism include mowing grassland (important for protection of orchids), care for rural trail along rivers and brooks, care for pastures, preservation of species through diversified arrangement of groups of trees, hedgerows and brushwood and maintaining of typical settlements surrounded by fields and orchards. Through these activities the agricultural sector provides intermediate goods for the tourism sector, for which they are not always being compensated (Hackl and Pruckner, 1997).

HYPOTHESIS AND OBJECTIVES

Our hypothesis is that the agricultural landscape is a visual resource that is important attraction to tourists. For the purposes of this study, ”agricultural landscape” is defined as a land that is currently in use for farming. This is landscape that has been shaped by agricultural activities and includes the pattern of cultivated fields and pastures, interspersed with farmsteads and woodlands that is typical for the area of Bílé Karpaty.

Our objectives are to

- assess the importance to tourists of the landscape scenery in this area;
- identify the elements of the agricultural landscape and their importance for tourists;
- tourist willingness to pay (WTP) for the conservation of agricultural landscape;
- comparison of CVM results with TCM study conducted for assessment of validity of results.

METHODOLOGY

A variety of methods have been employed in the assessment of the recreational or user benefits derived from protected rural environments. In this paper we apply two of these – the contingent valuation method (CVM) and the travel cost method (TCM). As the CVM and TCM estimates reported are the pilot systematic evaluation of this particular site, they are important for the further study.

The logic of CV studies is that of inferring the distribution of economic benefits in a target population form statements of willingness to pay elicited from a random sample of respondents. These are asked to compare and choose hypothetical landscape scenarios described in the survey instrument. In the CV scenarios respondents were proposed to choose from two alternatives:

- to contribute to the special fund – exclusively destined to support those agricultural activities contributing to landscape preservation as to ensure the conservation of the current cultivated landscape;
- the alternative scenario is associated with the inevitably degraded landscape that will ensue from the abandonment of the agricultural activity.

As conducted study is a pilot study for further broader study of amenity benefits of agriculture in LPA Bílé Karpaty, open-ended format of WTP question was employed. Although the most popular referendum format is recommended, there has been a revival of open-ended CV studies (Bohara et al., 1998).

For the purposes of a comparison, the parallel TCM based study was conducted. As a part of the survey respondents were asked:

- - the distance they have been travel in order to access the LPA;

- - their perception of travel cost to LPA Bíle Karpaty;
- - number of visits per year and purpose of their visit.

By converting these into monetary equivalents we are able to derive alternative measures of consumer surplus.

SURVEY DESIGN, DATA COLLECTION AND ANALYSIS

The collection of primary data through surveys of Bílé Karpaty tourists and data analysis using Contingent Valuation Method (CVM) and Travel Cost Method is used for the purpose of comparison.

Survey was designed to collect these types of information:

A trip characteristics (residence, number of visits, primary purpose and estimation of cost of this trip) – Apendix – Table 2;

B value and perception information (importance of agricultural landscape elements Appendix – Table 4 and willingness to pay to conserve agricultural landscape Table 1);

C socio-demographic information (such as age, education, household income, farm background and type and place of residence) – Appendix – Table 3.

In the summer 2001 a random sample of 120 tourists was randomly selected and survey was administered in person while visiting the LPA, producing 92 useful responses. The questionnaire employed as the survey instrument was designed on the basis of information from discussion with administrators of LPA. As this was a pilot survey, other purposes were employed (improving survey draft in terms of scenario perception and communication, ascertaining the credibility of payment vehicle), to be used in the subsequent full-scale survey.

After entering the data and running initial analysis we removed cases that were from residents and business travellers Table 1 provides summary of results for the final 92 responses in our pilot sample.

CONCLUSIONS

We confirmed that landscape scenery of Bílé Karpaty is an important reason for the visits of tourists to the area: 71,74% indicated it as their main purpose of the visit. When assessing characteristics of landscape scenery, each identified landscape element was indicated to have high importance for visitors. The most valued are all types of forests (scored more then 8 point from 10) and special elements of landscape of Bílé Karpaty, which tourists cannot easy substitute. Agricultural working landscape elements were evaluated also very highly (over 7 points from 10). Estimated visitor benefit derived from this pilot CVM study is 267,99 CZK (8,11 EURO) per year. If we compare user benefit estimated from TCM study 249,10CZK (7,54 EURO) per visitor per year, this supports credibility of our estimate.

However we identified a number of problems – conceptual and practical:

- Stated travel cost should include the appropriate treating of time cost. Here we assumed time spend by travelling as a part of recreation so we did not count for it.
- The dependence between number of visit per person per year and travel cost was not significant. One of possible reasons for it is location of spa in this area, which is not that easy substitutable. This needs further study.
- Need to redesign the perception travel cost value question, as respondents included in their estimates also the cost of stay in this area.

The main problem is that we are not aggregating our results to the population of tourists to this area at this pilot stage of our study. The reason is, that we identified the lack of information about number of visitors to area of LPA Bílé Karpaty. This indicates the need to monitor tourists flow.

FURTHER STUDY

Visitors are only one group of beneficiaries from visual attractiveness of agricultural working landscape in the area of PLA Bílé Karpaty. This pilot study provides us with basic information, which we will use in our full-scale study. Here we will measure the benefits to three groups: visitors, local residents and the general public. As the benefit measurement technique we will use the Contingent Valuation Method, which allows the estimation of both use and non-use values. In addition, a small experimental Stated Preference study will be undertaken, in order to measure the relative importance to people of the different attributes of the landscape.

Variables	Mean	Standard deviation	Median
Travel cost	249,10 CZK (7,54 EURO)	167,64	189
Distance	149,83 km	100,76	105
WTP	267,99 CZK (8,11 EURO)	173,88	200

1 EURO = 33,025 CZK

Table 1: Value of agricultural landscape for 1 visitor per year, N = 92

However provision of landscape is only one of many unremunerated activities provided by farmers so more research should be aimed at valuing public goods produced by farming in recreationally valuable areas and elsewhere.

REFERENCES

Bohara, A.K., McKee, M., Berrens, R.P., Jenkins-Smith, H., Silva, J.C. and Brookshire, D.S. (1998). Effects of total cost and grouped size information on willingness to pay responses: open ended vs. dichotomous choice. *Journal of Environmental Economic and Management*, 35: 142-163.

Hackl, F.,Pruckner, G.J, (1997). Towards More Efficient Compensation Programmes for Tourists´ Benefits from Agriculture in Europe. *Environmental and Resource Economics*, Vol 10, 1997, pp. 189-205.

Administration of the Protected Landscape Areas of the Czech Republic web pages.

Cummings, R., Brookshire, D. a Schulze, W. (1986). Valuing Environmental Goods: An Assessment of the Contingent Valuation Method. Totowa, NJ: Rowman a Allanheld, 1986.

Diamond, P., Hausman, J., Leonard, G. a Denning, M. (1992). Does contingent valuation measure preferences? Experimental evidence. v Contingent Valuation: A Critical Assessment, Cambridge, Mass,: Cambridge Economics,1992.

Hanley, N., Shogren, JF. a White, B. (1993). Environmental Economics in Theory and Practice: Macmillan Press, London,1993.

Thayer, M. (1981). Contingent valuation techniques for assessing environmental impacts: further evidence. *Journal of Environmental Economics and Management*, 1981, 8, str. 27-44.

Hutchinson, WG. (1997). Environmental benefits of Agriculture. Issues and policies, OECD, 1997.

APPENDIX

N = 92

Residence	Percent
Uherské Hradiště	11,96
Olomouc	9,78
Prostějov	9,78
Praha	7,61
Zlín	6,52
Kroměříž	5,43
Brno	4,35
Vsetín	4,35
Přerov	4,35
Others	43,48
Travel distance	
< 50 km	23,91
51 - 100	23,91
101 - 150	23,91
> 150	28,27
Means of transport	
Car	81,52
Bus	3,26
Train	14,13
Trip characteristics	
One-purpose trip to BK	73,91
Multi-purpose trip	26,09
Primary purpose of visit	
Landscape	71,74
Spa	11,96
Other purposes	16,30
Number of visits per year	
One	22,83
Two	6,52
three	9,78
Five	5,43
Six or more	3,27
No answer or less then one per a year	52,17

Table 2: Statistics of Trip characteristics

Average Annual household income	18030 CZK (546 EURO)
Average Age	38,3 years
Number of persons in household	Percent
One	10,87
Two	21,74
Three	25,00
Four	32,61
Five and more	9,78
No answer	0,50
Countryside background	47,83
Gender	
male	57,61
female	42,39
Education	
Basic	7,61
Secondary	60,92
Universities	26,72
Unanswered	4,45
Place of residence Number of inhabitants	
< 2 000	7,61
2 001 – 7 000	36,96
7 001 – 20 000	23,96
20 001 – 25 000	10,42
> 25 001	16,30
Type of residence	
Family house	44,57
Flat	51,09
No answer	4,34

Table 3: Socio-demographic characteristics

Landscape element evaluation	Average assessment (points from scale 1-10)	Standard deviation
Mixed forest	8,49	1,67
Conifer forest	8,29	2,00
Green vegetation next to water	8,23	2,10
Log wall of hayloft	8,16	1,88
Broadleaves forest	8,04	2,10
Sparse settlements in a patchwork of fields	7,82	2,38
Flower meadows	7,80	2,12
Solitary oaks and shrubs	7,64	2,28
Country roads	7,62	2,36
Lines and colours of fields	7,62	2,41
Pastures with livestock	7,6	2,34
Orchards	7,07	2,52

Table 4: The importance of agricultural landscape elements

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Customer Satisfaction as an Indicator of Social Carrying Capacity – Case Heritage Centre Ukko in Koli National Park, Finland

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Abstract: The systematic and spontaneous customer feedback from nature tourism customers is studied in the context of social capital created by social welfare services within the national park, especially the visitor centre services. The feedback is considered as an indicator of social carrying capacity. A model has been developed for assessing the impact of different options for developing services in the visitor centre or giving priority to them. The reliability of the model is studied in relation to different customer profiles. As a special case we study on site the customer's reactions and attitudes about a key responsibility issue in nature tourism development– responsibility of resources. A "Partnership in Management" experiment was created in Koli National Park, in Finland, where a local supporting association (NGO) produced 18 months visitor services in visitor centre in co-operation with the official park management organisation. According to the customer feedback the majority of visitors considered this arrangement as a very positive idea. They were also willing to pay the marginal costs, which they have caused, when using the services of the association.

INTRODUCTION

Customer feedback survey is a method for monitoring the experiences, objectives and preferences of customers (Feigenbaum 1983, Juran 1988). The feedback helps the manager of the park to develop the services and environment in a direction, which the customers appreciate. If the objectives of customers conflict with the conservation of the park, the feedback helps the manager to inform and guide the customer in the correct ways.

There are good reasons to call the visitor of the national park a customer (Powers 1988). Altogether this means that a national park is today more a centre of different services than a geographic territory:

- Parks provide today many man-made services, public and private, to visitors.
- Visitors can order these services before they visit.
- Services produce environmental impacts.
- Services compete with other similar services outside the park.
- Services are produced with labour and infrastructure.

We are now developing new concepts, theories, models and applications for monitoring the economical, ecological and social development in the context of sustainable park management (Shipp & Kreisel 2001). The question is not only the carrying capacity of the nature or in the local economy, but also the carrying capacity of social welfare of customers and local people.

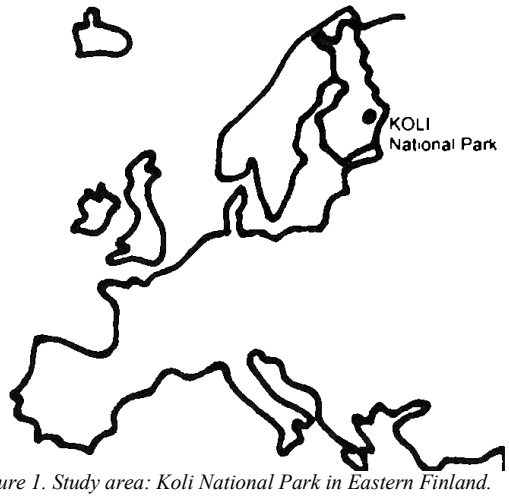

Figure 1. Study area: Koli National Park in Eastern Finland.

We try to develop and test such indicators and scales for sustainable social development of nature and culture tourism, which support the management of the park and are comparable also on similar cases in other parks. The aim is to produce a pilot model for a customer feedback system and analyse the data gathered with it as a case study. As a special case we study the impact of change and the impact of a new concept in providing services. Special attention is paid on a new approach of partnership in management and customers responsibility of resources, which is tested in the profile of a new visitor centre.

Koli National Park in Eastern Finland, with an area of 30km² including a modern visitor centre, is a site for developing methods and models for customer satisfaction monitoring. With 120 000

customers annually, it is one of the most intensively used nature tourism areas in Finland (Lovén 2000).

MAIN CONCEPTS

Customer satisfaction in the national park reflects social values created by park nature and services. These values can be seen as a part of so-called *social capital* or the collective welfare of society. Social capital is an important form of capital, which produces and indicates benefits for private persons (Burt 1992), groups of people (Coleman 1961, Coleman 1990) as well as the whole society (Putnam 1993). The maintenance and sustainable development of this capital is an important part of the strategy of a national park.

The description of a concept for the social capital produced by a national park and modelling the process is very necessary for successful planning and management for sustainable development. The feedback from customers reflects this process. Customers are in a way a group of partners within a park in the network of park management. The confidence of customers on the motives and methods of park management is an important indicator of the balance in social capital (Anttiroiko 1996, Fukuyama 1995).

The indicators used in the feedback collection can produce information at least from the following items:

- Customer satisfaction about some services produced in the park.
- Customers confidence on the values controlling the management.
- Customers willingness to act as a responsible partner in park management.
- Conflicting interests among subgroups of customers.
- Conflicting interests among visitors and locals.

The key role in developing sustainable tourism lies on the customer; how he recognises his *responsibility* as a member of society to maintain the attractions of park (Lucas 1993, Harrison & Husbands 1996, Ireland 1997). The ecological carrying capacity is higher if the customer makes efforts to save the soil on trails when hiking over eroding landscape. The responsibility or the lag of it can be seen in actions and attitudes of customers. A special case under the budget constraints, which parks are today facing all over the world, is the possible actions and feelings, which the customers have about resources. Do they consider parks as all free public goods or do they accept the idea of users responsibility of resources?

METHODS

Customer Feedback Monitoring System (CFMS) produces systematic information for monitoring the development of social capital. In Koli National Park the CFMS includes the following parts:

- Spontaneous stratified and open feedback on a questionnaire in visitor centre.
- Systematic stratified and open feedback on a questionnaire in visitor centre.
- Spontaneous open feedback received orally in visitor centre or via email through internet pages.

The frame of reference consists of a dynamic situation, where a nature tourist visits a park and uses and evaluates environments, services and information. These interactions reflect themselves in the global welfare of the customer. This state of welfare is a part of visitor's personal social capital and it is applied by using the approach of measuring customer satisfaction. The social capital produced by the park is the cumulative level of all customer satisfactions. The global level of customer satisfaction is formed through partial satisfactions, which explain or predict the global satisfaction.

The subjective features of customers, his/her activities, details of the situation and many environmental factors naturally make their impact in the final level of personal customer satisfaction. However it would be practical if the indicators of satisfaction were not too sensitive for these highly varying factors. The function for the global customer satisfaction is as follows in model 1:

$$(1)\ GS = f(S_{1\text{-}n}, P_{1\text{-}n}, A_{1\text{-}n}, E_{1\text{-}n}) + e, \text{ where}$$

GS = global customer satisfaction,
S = partial customer satisfaction,
P = subjective features of a customer,
A = activities on site,
E = environment,
e = random error.

The global satisfaction of customers for the park services is a combination of different partial satisfactions to be gained through the different services, which the customer has used during their visit. All customers do not use the same combination of services. In Koli National Park these services are as follows:

- Guidance and information
- Programs
- Education
- Congress
- Accommodation
- Restaurant
- Nature-shop
- Outdoor equipment rental
- Downhill and cross-country skiing
- Transport
- Harbour
- Roads and trails
- Telecommunication

The partial satisfaction of customers can be analysed and then to be combined of smaller details. Like the service called ”guidance and information” we can find following subgroups:

- Signals and guideposts
- Oral information
- Exhibitions, (permanent)
- Exhibitions, (temporary)
- Digital databanks
- Library
- Interpretative slide programs

The indicators to be used are so called school-evaluation scores with 7 classes between 4 (minimum) and 10 (maximum). The scale is well known to visitors, who in this survey are all Finns. In psychological studies (Cliff 1966) the scale is considered as an interval scale, which supports calculations of means, variances, correlation and regressions under normal statistical prerequisites (Draper & Smith 1966).

Experiment of partnership and customer responsibility

The manager of a national park (Koli NP) makes a temporary contract for 1,5 years with an association (NGO) supporting the conservation and management of the park. The government provides funds for the technical maintenance of the visitor centre as an environment for guidance and information services. The NGO produces mainly the human services for customers. According to the contract the NGO has the right for funding the services via resources, which it may gain by collecting voluntary contributions from customers (Ukko´s Pass – passport to the Heritage Centre Ukko) or selling some services and goods (exhibition guidance, slide shows and nature-shop products) to customers. The needed resources are altogether about 200 000 €, where government takes the responsibility for 33 % and the NGO 67 %. The NGO activates voluntary work for the services, but to be able to fulfil the contract and do its part of the services, it has to pay salaries or commissions to the guides, who are local enterprises and their workers (altogether 6 people).

Information about the Ukko´s Pass focuses on the customer’s personal responsibility to support the NGO´s services as a private partner of the project. The owner of the Pass has special rights like free entrance to the centre as a partner of the network for one day up to one year. By buying the Pass the customer shows his/her moral contribution for the guidance service, which they see valuable as a partner of the process.

SOME SELECTED RESULTS

Altogether 367 spontaneous classified feedback questionnaires were received in the opening year 2000 being 1,3 % of the number of all customers (28 854), who visited the Heritage Centre Ukko, when it was running services from 15.7.2000-31.12.2000. The customers did not evaluate all the services in one time, mostly because they did not use them all during their visit. The most actively given feedback focused on the tidiness of the centre evaluated by 76 % of visitors. The library, which was under continuous development during the whole season, was evaluated by only 26 % of visitors.

The slideshow was evaluated by 62 % of feedback, but only 37 % of the customers actually watched the slide show. This means that active customers also responded actively and spontaneously.

Partial benefits

According to the feedback it is clear that customers are highly satisfied with the tidiness of the centre and the slideshow (Table 1). The library clearly satisfies less of the customers. The amount of deviation and rate of strong criticism (grades 4-5) gives us more information about the variation of customer satisfaction and the potential seriousness of conflicts to be handled in park management.

Service	Mean	Std. Dev.	Median	Grades	n
Tidiness	9,3	1,1	10	1,8	281
Slideshow	*9,0*	*1,4*	*9,5*	*4,4*	*229*
Oral guidance	*8,7*	*1,4*	*9*	*5,2*	*230*
Exhibitions	*8,6*	*1,3*	*9*	*3,5*	*259*
Internal signs	8,5	1,3	9	2,9	205
Nature Shop	*8,3*	*1,4*	*9*	*5,2*	*232*
Congress services	7,9	1,9	8	13,7	73
Library	*7,2*	*1,7*	*7*	*17,2*	*93*
Total evaluation of services	**8,8**	**0,9**	**9**	**1,3**	**230**

Table 1. Evaluation of services in Heritage Centre Ukko in 2000, school score (4-10).

SERVICE	COEFFICIENT	Std. error of coefficient	P	BETA
CONSTANT	2,853	,353	,000	
EXHIBITION	,296	,041	,000	,412
INTERNAL SIGNS	,249	,045	,000	,342
ORAL GUIDANCE	,144	,038	,000	,223
R2 = 0,647 F= 94,57, P=0,000				

Table 2. Model forecasting the total customer satisfaction for the services in the centre; stepwise regression model (n=105).

Total benefits

The total evaluation of all services is a function of partial services (benefits) and some other factors (see model 1). For better understanding of the partial benefits a stepwise regression model was calculated (table 2). Some of the services (like tidiness and the slide show) were evaluated to be of such a high quality that they did not provide any more potential for higher total satisfaction from the services. The most important partial benefits can be reached by developing the exhibition, guiding signals and oral guidance in the centre. With limited resources the investment into the quality of exhibition is the most promising potential for increasing the total satisfaction for the services in the centre. According to the beta-coefficient a small positive change in the customer satisfaction due to the exhibition produces 1,8 times stronger impact in the total satisfaction than a similar change in the satisfaction for the guiding signs.

Trends

The customer satisfaction upon some partial services developed positively from the summer to the end of the year. In midsummer several thunderstorms were attacking the area and electrical problems were disturbing the slide shows and exhibitions. These problems did not occurred in the late autumn and in the early winter. The library was under development during the whole season. These positive customer satisfaction trends were statistically significant (1-way variance analyse, F-test, p=0,013-0,035).

Customer qualities and satisfaction

The female customers evaluate the guiding services systematically higher than the men do. This can be recognised in the mean level of satisfaction and also as a smaller variance on evaluations. All the other tested customer qualities (educational background, quality of dwelling environment, earlier knowledge of the park) did not have any correlation with the evaluations.

Customer responsibility of resources; response in satisfaction

Customer feedback about the Ukko´s Pass is an expression of the suitability of the concept, but also it reflects his/hers opinion of the exchange ratio; does he/she get the right quantity and quality of benefit when supporting the guiding by the NGO association in the Heritage Centre. The question of the Pass was clearly considered an interesting issue to the customers; 86% of the customers who gave the feedback answered to this question, which is more than to any other feedback question.

The feedback about the Pass was predominately clear and positive (Figure 2). The Mean of evaluation rose to 8,3 in school grades and std. deviation was 1,78 (n=316). Median evaluation was 9. However 11 % of customers were not satisfied with the model (grades 4-5) although 58 % evaluated it as very good (grades 9-10).

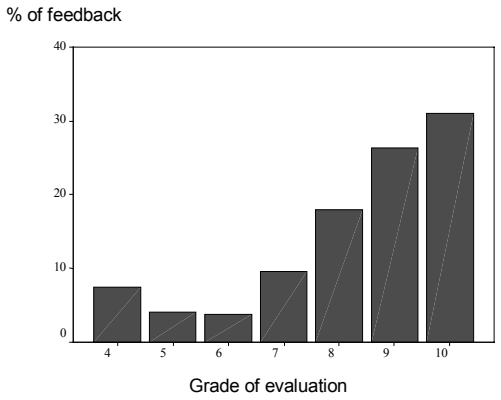

Figure 2. Feedback about Ukko´s Pass in 2000.

The trend in the Pass feedback was positive during the monitored season 2000. Also the rate of customers, who actually were willing to buy the Pass increased from 28 % in August up to 50 % in October-November. Feedback from women took the Pass concept in average more positively as the men customers (analysis of 1-way variance, F-test, p=0,015). The females accepted the idea in the very beginning and their feedback was very positive during the whole period. Feedback given by men changed during the period from slight criticism to equal positive evaluation like women (khii2-test, Pearson p=0,001, n=316). Only a few extreme customers expressed strong criticism still at the end of the year 2000.

CONCLUSIONS

When trying to make plans for socially sustainable tourism development in national parks, we need a lot of theoretical work to find the proper

context and models describing the phenomenon. The right indicators for qualifying and quantifying the social capital are the critical tools in the approach to developing models for sustainable tourism planning. The valid frame of reference is the key for finding them. When developing our model we noticed that the global benefit/partial benefit -model (Kangas 1992), which is commonly used in welfare economics, can produce a valid approach for evaluating total customer satisfaction as a function of partial customer satisfactions.

Spontaneous feedback monitoring includes possible problems for right conclusions, especially when using averages, because some small active group can ruin the representative sample. Therefore a systematic sample is needed for controlling the validity of data. In our data the share of female customers in the year 2000 was significantly higher than in the 3 years before the development project. However in the year 2001 the share of women was equal in both the spontaneous and systematic sample. The difference in the year 2000 can be explained by the higher curiosity quality of women; the female customers came to test the new services more actively than men did. Later on the women took the family with them and the rate of men customer rose slightly but significantly. According to the systematic sample the feedback activity was equal among men and women.

The level of benefits gained in using visitor centre services is different for female and male customers. The female customers seem to gain higher social capital than the male customers. Later on we shall analyse the dynamics of this relation. It may be difficult to conserve the very high social capital; a hypothetical threat is that a small change of the quality of services may cause a large loss in customer satisfaction.

Also interesting was the observation of other studied background factors like education, environment of home, motive for visit or former familiarity with the site. These did not have any impact on the customer satisfaction. All the studied subgroups of customers evaluate the quality of services with similar mean and variance pattern.

All the distributions of evaluations however were statistically non-normal (Kolmogorov-Smirnov-Lillefors test, p=0,000). Some of the services were evaluated with j-curve pattern with two tops and some had almost normal distribution. The j-curve pattern informs about a possible conflict, which can cause severe losses in the social capital if not controlled carefully. According to our practical experience it seems to be possible to control the conflict if the portion of the extremely negative feedback stays below the level of 10 %. This underlines the need to also monitor carefully the extreme feedback, because there can lie the option for open and warm conflict, which ruins a lot of carefully maintained social capital.

The school-evaluation score is a practical tool for measuring the customer satisfaction. It is familiar and illustrative, that the customer can easily find the verbal connection with numbers in his/her mind and the 7 step score is effective in short-time questionnaires. For planning of sustainable development of tourism we however to make need decisions about the acceptable level of customer satisfaction. It is not possible to produce all the services for the different groups of customers under the satisfaction grade 9. In park management we have to be able to set the target to a reasonable level. For instance, we can use a set where the total satisfaction is minimum on the grade 8 (good quality) and all the services are evaluated at least to be on grade 7 (satisfactory quality) and the group of grades 4-5 (extremely critical customers) is less than 10 %.

The case study in Koli National Park is suggesting that the visitor centre is a proper concept to create and maintain social capital. Almost all the partial services in the centre are evaluated on grade 9 or higher in median. The experiment to develop a partnership-oriented service model for the visitor centre including an approach for customer's responsibility of resources turned out to be a success.

REFERENCES

Anttiroiko, A.-V. (1996): Learning Economy. An Essay on Globalization and Learning Economy as a Challenge to Local Government. University of Tampere. Department of local Government Studies. Report series 34/1996.

Burt, R. A. (1992): The Constitution in Conflict. Cambridge: Belknap Press.

Cliff, N. (1966): Adverbs as multipliers. Psychological review 66; 27-44.

Coleman, J. S. (1961): The adolescent society. New York: Free Press.

Coleman, J. (1990): Foundations of Social Theory. Cambridge, MA: Harvard University Press.

Draper,, N. & Smith, H. (1966): Applied regression analysis. Chigago.

Feigenbaum, A.V. (1983): Total Quality Control. New York, McGraw-Hill Book Company.

Fukuyama, F. (1995): Trust. The Social Virtue and the Creation of Prosperity. London: Hamis Hamilton.

Harrison, L. C. & Husbands, W. (eds.) (1996): Practising Responsible Tourism. New York: John Willey & Sons Inc.

Ireland, M. (1997): Tourism and Social Responsibility: A Philosophical dream or achievable reality? In: Stabler, M. J. (ed.). 1997. Tourism and Sustainability: Principles to Practice. Wallingford: CABI.

Juran, J. M. (1988): Quality Control Handbook. Fourth Edition. New York, McGraw-Hill Book Company.

Kangas, J. (1992): Metsikön uudistamisketjun valinta - monitavoitteisen hyötyteoriaan perustuva päätösanalyysimalli. Summary: Choosing the regeneration chain in a forest stand: A decision analysis model based on multiattribute utility theory. Univ. Of Joensuu. Luonnonhistoriallisia julkaisuja 24 (thesis).

Lovén, L. (2000): Koli National Park – site of solitude and heritage. In: Lovén, L. (ed.) (2000): Responsible Nature Tourism. Finnish Forest Research Institute, Research Papers 792.

Lucas, J. R. (1993): Responsibility. Oxford: Oxford University Press.

Powers, T..L. (1988): Identify and fulfill customer Service Expectations. Industrial Marketing Management 17;4, 273-276.

Putnam, R. D. (1993): Making Democracy Work: Civic Traditions in Modern Italy. Princeton, NJ: Princeton University Press.

Shipp, D. & Kreisel, B. (eds) (2001): Loving them to death? EUROPARC Federation, Belgium.

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Objectives and Basis of Management of Visitor Flows in the Biosphere Reserve Vessertal/Thuringia Germany

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Abstract: The biosphere reserve Vessertal (Biosphärenreservat Vessertal) is one of the two oldest biosphere reserves in Germany and represents a characteristic part of the central European highlands. It is part of the Thuringian Forest (Thüringer Wald). In this region nature based tourism is very traditional. Since 1999 the increase of touristic offers in combination with the development of more touristic infrastructure caused a variety of activities in visitor management. A first step was the definition of the aims of visitor management. The discussion showed soon that visitor management in the Vessertal should include more aspects than the protection of species and biotops. Nevertheless the survey of sensitive habitats and species is an important basis for all further steps towards a concept of sustainable development. Finally, the first results of a project of reducing the present network of touristic trails are presented.

THE BIOSPHERE RESERVE VESSERTAL INTRODUCTION

The biosphere reserve (BR) Vessertal is located in the middle of Germany in the federal state of Thuringia. It represents a characteristic landscape of the Thuringian Forest. This densely wooded low mountain range is extending from west-northwest to east-southeast. It is part of a chain of central European highlands which are predominately covered from coniferous forests like Thüringer Schiefergebirge, Frankenwald, Fichtelgebirge, Erzgebirge and Oberpfälzer Wald to the Czech Böhmerwald. The biosphere reserve Vessertal is one of the two oldest among the 14 recognized biosphere reserves in Germany (first recognition 1979).

The BR Vessertal has a total area of 17000 hectares. To fulfill the different functions of a biosphere reserve, the BR is subdivided into a core area (279 hectares), a buffer zone (2175 hectares) and a transition area (14546 hectares).

The landscape is quite varied. It is characterized by predominately big woods, partially dominated by beech, mainly by spruce, mountain meadows in the narrow valleys and the surroundings of the villages, fens in the upper regions and a dense net of streams.

The main land use in the Vessertal region is forestry and tourism. Agriculture is on a very extensive level. Most of the greenland is subsidized by management agreement in combination with management restrictions.

Land use	**Area (hectare)**	**Area (%)**
Woods	14960	88
Grassland/Greenland	1530	9
Waters, dams	119	0.7
Fens	34	0.4
roads, settlements, tourism facilities	323	1.9
Complete	**17000**	**100.00**

Table1: Land use in the biosphere reserve Vessertal

The following table shows the main habitat-complexes in the BR Vessertal (Table 2).

Tourism has a one-hundred-year old tradition in the area. After World War II the Thuringian Forest became one of the most important vacation regions in the former GDR. A corresponding touristic infrastructure (hotels, vacation homes, hiking trails, cross-country ski trails, ski lifts) had been established at that time. The touristic accommodation in the 80´s were up to 500,000 days / year.

After the reunification (1989/1990), at first the overnight stay numbers declined significantly (ca. - 60%). Since then a specific increase can be measured.

Habitat complex	Indicator species
Intact fens, well-structured mountain greenland, woods with plenty of blueberries, cranberries, mountain ashes and birches	Black Grouse, Common Redpoll
Maturity and decline phases of woods with high share of dead wood, bright forest fringes inside the woods (e.g. along ways)	Gray-headed Woodpecker
Woods rich in structures with big old trees, cave trees, and complexes of dense undergrowth	Eurasian Nut-cracker, Black Woodpecker, European Sparrow Hawk, Teng-malm´s Owl, Pine Marten
Woods with rocks	Eagle-Owl
Large undisturbed wood-lands, wetlands and mountain creeks	Black Stork
Mountain sprucewoods rich in structures and with numerous species of birds	Eurasian Pygmy Owl
Layered beechwoods, rich in structures	Common Wood-Warbler, Salamander
Hedges rich in insects and hedgebanks in contact with open landscape	Yellowhammer, Red-backed Shrike
shores of little streams rich in insects, wetlands	Kleinäugige Wühlmaus (Microtus subterraneus) Große Wasserspitzmaus (Neomys fodiens)
Clean streams with pebble covered bottoms	Bullhead (Cottus gobio), Common Kingfisher, White-breasted Dipper

Table 2: Habitat complexes and Indicator species of the biosphere reserve Vessertal (Lange 1995; modified)

The reunification of Germany has basically changed the social framework conditions. Because of the extensive decline of workplaces in the industry (e.g. glass industry) tourism is considered to be the most important income source for the communities. At the beginning of the 90´s, the decline of tourists initiated numerous activities to improve the touristic infrastructure and to increase the number of tourists.

Numerous hiking trails were signposted. Many of these touristic activities were not coordinated adequately with each other. In many cases the required approvals were lacking. The activities also led increasingly to impairments of sensitive areas in the BR.

The protection of ecosystems, the development of sustainable land use, public relations, environmental formation, research and environmental observation, are the main tasks of the biosphere reserves. This conceptional approach of the biosphere reserves goes beyond the tasks of "classic" protected areas like landscape or nature protectorates (LSG, NSG). Therefore, different activities in tourism management had been started since 1999.

OBJECTIVES OF VISITOR MANAGEMENT

The objectives of visitor management have been discussed with communities, tourism-specialistes, local authorities, forest administration, farmers, hunters , water authorities and different NGO. The results of this discussion have been documented in a study (Kleine-Herzbruch, 2000). The extended approach of the biosphere reserves was taken into consideration.

Visitor management in the BR Vessertal should contribute to the support and further development of a sustainable tourism. This goal shall be accomplished by the following aims:

- Fixation of different types of areas, which are suitable in a different manner for the development of tourist infrastructure
  - Protection of attractive but very conflict laden and sensitive areas by rechannelling touristic flows in attractive but resilient areas
  - Disentangling and reducing of the dense network of touristic trails
- Support and creation of a traffic conducting system and an improved and well circulated public traffic system
- Development and arrangement of the tourist infrastructure and their supply on the target group of the nature and culture vacationists
- Support and creation of ecologically acceptable forms and possibilities of the education, information, and relaxation for vacationists and tourists.

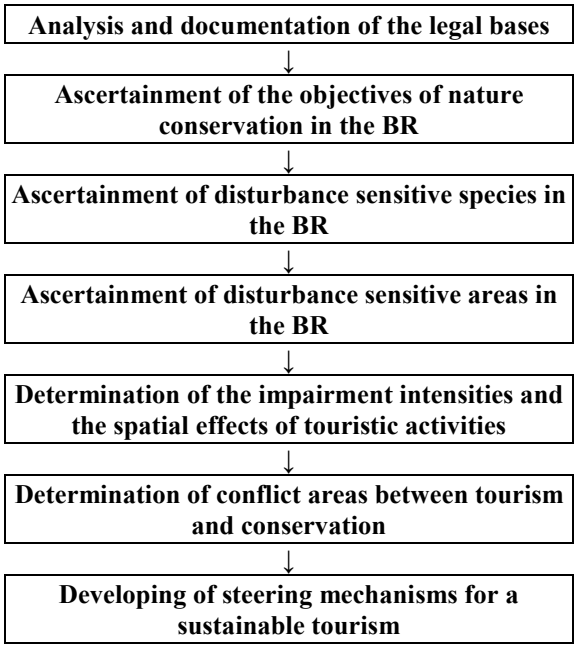
The main goal (the action frame) is the common planning or coordination of measures in the biosphere reserve among all involved. In future the aspects of the traffic and the education shall be included intensively into consideration besides the interests of the tourism and the nature conservation in the biosphere reserve Vessertal. Additionally the interests of agriculture and forestry, water-management and hunting also have to be especially taken into account. By the inclusion and the cooperation with all ones involved in the region the goals formulated jointly shall be accomplished.

BASICS OF NATURE CONSERVATION AND VISITOR MANAGEMENT

Methodic Procedure

For the ascertainment of the basics of nature conservation all available documents were compiled

and the newest surveys and studies have been analysed. The following method has been worked out:



Analysis and documentation of the legal bases

The legal bases for the complete biosphere reserve or for parts of it (BR-ordinance, FFH-areas, ordinances for nature protectorates (NSG), protected landscape parts (GLB) or protected natural monuments (FND)) deliver a first frame for the visitors' guidance. The aims formulated in these ordinances serve as orientation frames for the fixing of species and biotope protective measures. A listing of commandments and bans primarily in the core area and buffer zone but also in transition area III delivers first concrete restrictions (for e.g. there exists a way commandment in the zone II).

Ascertainment of the objectives of nature conservation in the BR

In the context of the ascertainment of the objectives of nature conservation in the BR existing reports and plannings were predominant evaluated besides the analysis of the legal bases.

The most important studies have been:

- the outlines of the species and biotope protection program (ABSP) for the administrative districts Hildburghausen and Ilmkreis (Büro für ökologische Studien, 2001, Büro Bettinger, 2001)
- the outline of the environmental quality aims for the BR (Büro für ökologische Studien, 2000)
- the outline of the subject report for the frame strategy for the BR Vessertal (Ringler, 1999)

Ascertainment of disturbance sensitive species

The ascertainment of disturbance sensitive species in the BR was carried out on the base of specialized Literatur. Furthermore new studies have been analysed:

- the Species- and biotop-protection-programm (ABSP) including all existing primary dates (species-survey-programm (AEP), biotop mapping-programms)
- the subject report for the frame strategy (Ringler, 1999)
- the botanic and faunistic publications at present available

An analysis of publications about the negative effects of tourism and outdoor-activities on disturbance-sensitive species and biotops was the basis of the fixation of sensitive areas (Ammer, U. & Pröbstl, U., 1991; Coch, T. & Hirnschal, J., 1998; Hölzinger, J. et al. 1987; Kuhn, J., 1984; Kuhn, J., 1987; Lerch, A., 1999; Mader, H.J. & Pauritsch, 1981; Münch, D., 1989; Münch, D., 1992). In a first step, all threatened species of the red data books of Thuringia and Germany had been focused. In a second step a selection of those species took place, which are threatened by tourism and outdoor-activities. The red data books hardly give answer to this kind of question, as the reasons for the endangerment of these species and biotopes aren't analyzed in detail. In many cases it is the interaction of different causes which lead to a decline of a species. Conservation experts generally assume that the current management of agriculture and forestry is the main reason for the threat of species in Germany. They also mention tourism and outdoor activities as the third important cause (Korneck and Sukopp, 1988). Since the procedure introduced here shall be practical oriented, only two grades of intensity were distinguished at the assessment of the disturbance sensitiveness.

The distribution of some selected disturbance sensitive bird species shows the difference between actual zones of the BR and sensitive sites (see fig. 1). In order to find out very sensitive sites, the selected species have been categorized relating to their disturbance sensitiveness (explanation of the categories see above):

Black grouse (2), kingfisher (1), black stork (2), sparrow screech owl (1), eagle-owl (1), water blackbird (1), salamander (1).

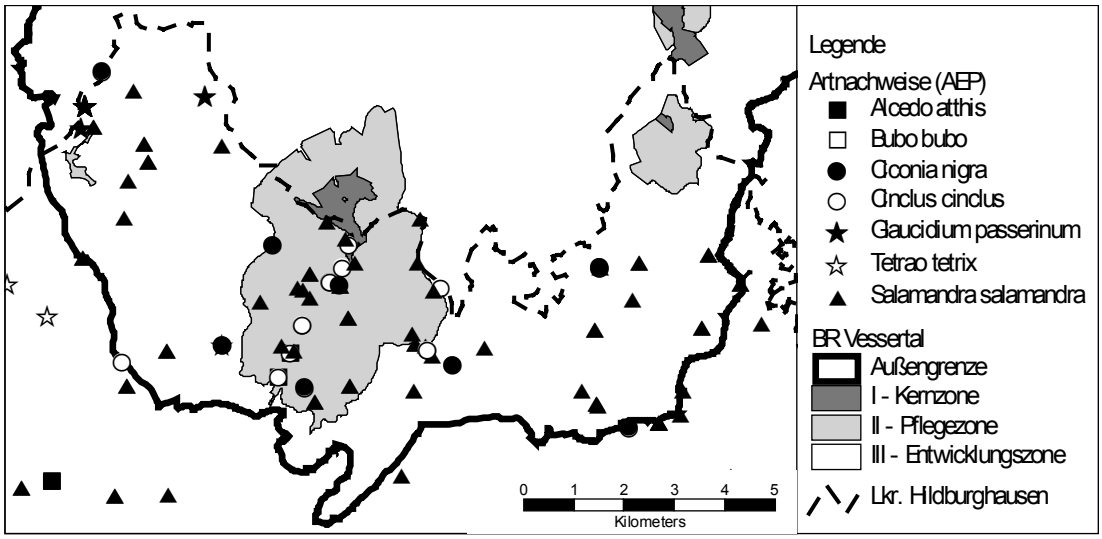


Fig. 1: Distribution of selected disturbance sensitive species in comparison to the zones of the BR in the county (Landkreis) Hildburghausen (Data basis: Thüringer Arten-Erfassungsprogramm (AEP))

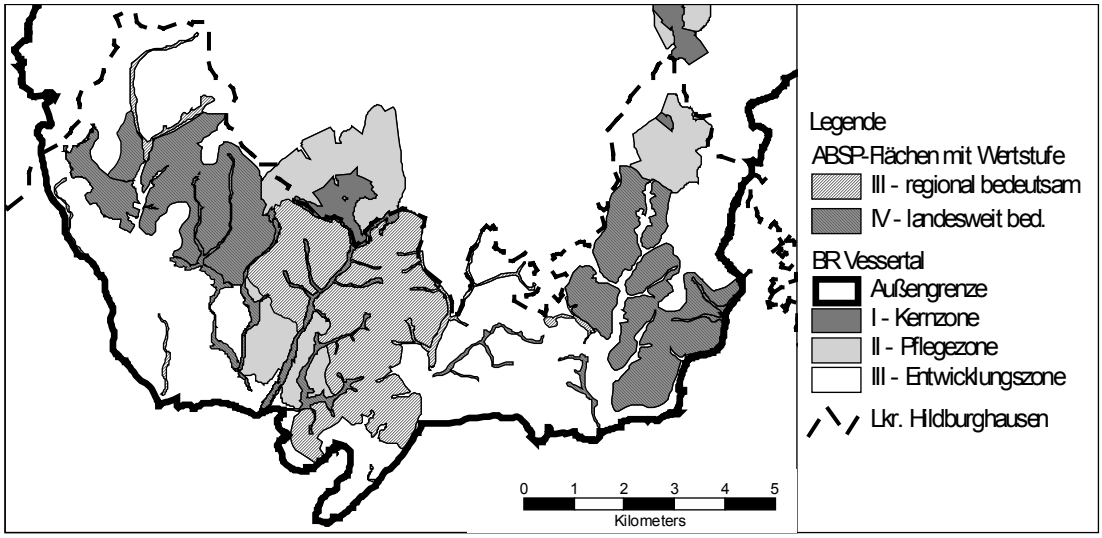


Fig. 2: Areas of nationwide or regional importance for the conservation of important species and biotops in comparison to the zones of the BR
(Data basis: Arten- und Biotopschutzprogramm (ABSP) Thüringen, Landkreis Hildburghausen)

Categorization of the disturbance sensitiveness of species

= (1) disturbance sensitive

(Attractive species like orchids, losses in the traffic e.g. mammals)

= (2) very sensitive to disturbances

(red list 1 species, extremely sensitive to disturbance, e.g. black grouse, black stork;)

Ascertainment of disturbance sensitive areas in the BR

The ascertainment of disturbance sensitive areas in the BR was carried out after an evaluation of the above-mentioned species and biotop protection program (ABSP) as well as the available specialized literature. This evaluation gave hints about the disturbance sensitiveness of single species from certain species groups like mamals including bats, amphibians, reptiles and fishes. Ecological function areas (ABSP areas) were derived on the base of the habitats from the point proofs of species. These areas were subdivided into four categories from "IV" (nationwide important) to "I" (locally important) till according to a certain assessment method (ABSP). Nationwide and supraregional areas are meaningful for the visitors' guidance.

Ascertainment of the impairment intensities and the spatial effects of tourist activities

The impairment intensities and spatial effects of tourist activities have been represented separately in tables. The information listed there serves as a basis for the assessment of the intensity of threatening for

species and habitats, sensitive to disturbance at present.

Determination of conflict areas between tourism and conservation

The ascertainment of conflict areas between tourism and conservation delivers decisive argumentation aids for the execution of visitors' guidance measures (see the following chapter).

REVISION AND COORDINATION OF THE NETWORK OF TOURISTIC TRAILS – FINDING SOLUTIONS BY PARTICIPATION

The basics of nature conservation could be used in a previous project, the "revision and coordination of the touristic trails." Conservation technical aspects were not the single aspect, focussed at this project. According to the aims of the visitors' guidance, the interests of municipalities, forestry, farming and others were taken into account. Due to the high percentage of public owned forests, the project has been carried out in close cooperation with the forestry commission. The involved parties emphasized different aspects in the processing: From the point of view of nature conservation there was too much disturbancein the nature protectorates (NSGs) and in other disturbance sensitive areas. The forestry commission considered the touristic trails as too dense. Municipalities complained that correspondence of signposts of trails and the description in the trail maps and leaflets was insufficient.

Based on the aims of the visitors' guidance the following objectives (see above) were coordinated for the project:

- Disentangling of the existing multiple use of pathways (hiking, skiing, riding, biking)
- Optimization of the touristic trails
- Coordination with the interests of forestry and hunting
- Consideration of conservation technically sensitive areas
- Defusing of conflicts primarily in the nature protectorates
- Improved correspondence between the touristic trails and trail maps and leaflets

The implementation of the project was carried out in five steps in 2000 and 2001:

- Information of the ones involved
- Analysis of the situation
- Discussion and coordination with administration of the municipalities
- Documentation and presentation of the results
- Putting into action

The information of the ones involved was carried out in writing. Furthermore there were meetings and discussions with the mayors of the municipalities. The public was informed through the press.

In a first step the network of touristic trails was analyzed and drawn into maps (scale 1:10,000). Important informations concerning forestry (woods tenure, forestry roads, game reserves) were investigated oder determined. The Thuringian forest authority assisted with plans of the forestry roads ("Waldwegefunktionsplanung"). The conservation technical interests were arranged according to the methodology (protectorates, species and habitats, sensitive to disturbance). Based on this (maps 1:10,000) conflict areas were defined.

In cooperation with the forestry commission and the biosphere reserve administration proposals for the solution of conflicts have been worked out.

The discussion took place separately in each community. In cooperation with tourist tourist information offices, farmers and game tenants, forestry authorities, the District Office, the conservation authorities, the association nature park Thuringian woods (Verband Naturpark Thüringer Wald) and with NGOs and private owners (e.g. restaurant operators) different suggestions were considered and coordinated. Proposals, which were not agreed on, were further revised till conjoint solutions could be found. Compromises partly were necessary. Altogether, ca. 80 advices took place with more than 70 representatives of the communities, institutions and NGOs. The project goals could be accomplished. A reduction and breakup of the tourist way net could be agreed conjointly.

In August 2001 the results were presented to the public under participation of the ones involved. All involved parties agreed on implementation of the proposal.

In fall 2001 implementation started. Implementation includes actualisation of the network of trails (predominately rebuilding, construction of a few new trails), signposting, the revision of the trail maps and leaflets and the update of the information panels in the area.

In 2002 an evaluation is scheduled, including all partners involved. Then we have to search for further solutions in case of obvious problems, occurring during implementation. If necessary, further measures of the visitors' guidance have to be discussed.

PRESENTATION OF THE RESULTS CONCERNING THE NATURE PROTECTORATE (NSG) "MARKTAL UND MORAST".

The nature protectorate "Marktal und Morast" has a size of 205 hectares including a core area of 100 hectares. This NSG is a characteristic part of the uplands and the northern slopes of the Thuringian woods with little plains and deep valleys, the slopes covered with mountain beech woods and mountain sprucewood in the edge area of a moorland area.

The analysis of the actual state showed the following aspects:

- most of the touristic trails are used in multiple ways (hiking, biking, skiing)
- at the edge of the nature protection area (Dreiherrenstein) there isn't any clear way due to numerous tracks
- in the Marktal there is a hiking and biking trail crossing through the core area
- in the leaflets this trail is indicated as a Mountain-Bike trail
- a second path through the core area (from the Dreiherrenstein to the Schortetal) is used as a forestry road (that can be used by trucks).

The analysis of the conservation technical bases led to the following statements:
Legal bases:

- in accordance with the biosphere reserve ordinance there is a way commandment in zone II (NSG);
- in the core area it is forbidden to carry out any economic activities as well as to impair the area in any way;
- the forestry road is granted by law.

Conservation technical aims and models:

- Support of a sustainable tourism

Disturbance sensitive species:

- The NSG is a breeding area of the Eurasian Pygmy Owl, the Teng-malm´s Owl and black woodpecker. It is a food habitat of the Black Grouse and the black stork

Disturbance sensitive area: the complete NSG
Intensity of the impairment:

- the path through the Marktal (core area) attracts only a few hikers and bikers
- the Marktal attracts only few tourists
- the second path through the core area (from Dreiherrenstein to the Schobsetal) is a forestry road of a certain importance for three forestry offices
- for tourists this trail is a main connection from the Rennsteig to the settlements at the mountains edge
- Tracks on the edge of the NSG (at the Dreiherrenstein) show a frequent use of this part of the Rennsteig.

Conflict areas:

- Pathway through the Marktal (core area)
- Pathway in the direction of the Schobsetal (core area)
- Pathway (at the Dreiherrenstein) in the area of the tracks (on the edge of the NSG)

The network of tourist trails was revised as follows:

- the multiple use has been reduced. At maximum two interested groups were put on a way
- the trail, traversing the core area through the Marktal was eliminated.)
- the pathway through the core area (Dreiherrenstein - Schobsetal) remains since it is an important way for the forestry and tourism.

LITERATURE

Ammer, U. & Pröbstl, U. (1991): Freizeit und Natur. Probleme und Lösungsmöglichkeiten einer ökologisch verträglichen Freizeitnutzung. Hamburg

Büro Bettinger (2001): Arten- und Biotopschutzprogramm (ABSP) für den Ilmkreis, Unveröff. Gutachten im Auftrag des Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt, Erfurt

Büro für Ökologische Studien (2001): Arten- und Biotopschutzprogramm (ABSP) für den Landkreis Hildburghausen, Unveröff. Gutachten im Auftrag des Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt, Erfurt

Büro für Ökologische Studien (2000): Aggregierte Umweltqualitätsziele für das Biosphärenreservat Vessertal, Unveröff. Gutachten im Auftrag der Verwaltung Biosphärenreservat Vessertal, Schmiedefeld

Coch, T. & Hirnschal, J. (1998): Besucherlenkungskonzepte in Schutzgebieten. Zeitschrift Naturschutz und Landschaftsplanung, Heft 12, S. 382-388

Hellmuth, E & Hörl, S. (2001): Ergebnisbericht zur Überarbeitung und Abstimmung des touristischen Wegenetzes im Bereich der Forstämter Oberhof, Schmiedefeld und Ilmenau, unveröff, Verwaltung Biosphärenreservat Vessertal, Schmiedefeld

Hölzinger, J. et al. (1987): Die Vögel Baden-Württembergs – Gefährdung und Schutz; Teil 2: Artenschutzprogramm Baden-Württemberg – Artenhilfsprogramme

Kleine-Herzbruch, N. (2000): Ziele der Besucherlenkung im Biosphärenreservat Vessertal - unter Berücksichtigung touristischer und naturschutzfachlicher Aspekte, Diplomarbeit, Universität Gesamthochschule Kassel

Korneck, D. & Sukopp, H. (1988): Rote Liste der in der Bundesrepublik Deutschland ausgestorbenen, verschollenen und gefährdeten Farn- und Blütenpflanzen und ihre Auswertung für den Arten- und Biotopschutz. Heft 19. In Schriftenreihe für Vegetationskunde. Bundesforschungsanstalt für Naturschutz und Landschaftsökologie

Kuhn, J. (1984): Eine Population der Erdkröte (Bufo bufo L.) auf der Ulmer Alb: Wanderungen, Straßentod und Überlebensaussichten 1981.-Jb. Ges. Naturkunde, Württ. 139: 123-159

Kuhn, J. (1987): Straßentod der Erdkröte (Bufo bufo): Verlustquoten und Verkehrsaufkommen, Verhalten auf der Straße-. Beih. Veröff. Naturschutz Landschaftspflege Bad.-Württ. 41: 175-186

Lange, H. (1995): Biosphärenreservat Vessertal-Thüringer Wald. In: Biosphärenreservate in Deutschland. Hrsg: Ständige Arbeitsgruppe der Biosphärenreservate in Deutschland.

Lerch, A. (1999): Naturschutz und Freizeitaktivitäten. - Ökonomische Betrachtungen zu einem Konfliktfeld am Beispiel des Motorradgeländesports. In: Naturschutz und Landschaftsplanung 31, (6), S. 176-180

Mader, H. J. & Pauritsch (1981): Nachweis des Barriereeffektes von verkehrsarmen Straßen und Forstwegen auf Kleinsäuger der Waldbiozönose durch Markierungs- und Umsetzungsversuche, in Natur und Landschaft, Nr. 12, 451

Münch, D. (1989): Jahresaktivität, Gefährdung und Schutz von Amphibien und Säugetieren an einer Waldstraße. Hrsg: Arbeitsgemeinschaft Amphibien- und Reptilienschutz in Dortmund.

Münch, Detlef (1992): Straßensperrungen – Neue Wege im Amphibienschutz. Aus: Beiträge zur Erforschung der Dortmunder Herpetofauna. Band 18

Ringler, A. et al. (1999): Fachgutachten zum Rahmenkonzept Biosphärenreservat Vessertal - Thüringer Wald. Unveröff. Gutachten im Auftrag des Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt, Erfurt

UNESCO (Hrsg.) (1996): Biosphärenreservate. Die Sevilla-Strategie und die Internationalen Leitlinien für das Weltnetz.- Bundesamt für Naturschutz, Bonn

Verordnung über die Festsetzung von Naturschutzgebieten und einem Landschaftsschutzgebiet von zentraler Bedeutung mit der Gesamtbezeichnung Biosphärenreservat Vessertal (Biosphärenreservatsverordnung Vessertal) vom 12. September 1990 (GBl. SDR NR. 1475); in der Fassung der Bekanntmachung vom 2. Oktober 1998 (GVBl. S. 379)

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
Conference Proceedings ed by A. Arnberger, C. Brandenburg, A. Muhar 2002, pages 353-358

NATURA 2000 - The Influence of the European Directives on the Development of Nature-based Sport in Mountain Areas

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Abstract: In the counties of the European Community the influence of European directives is increasing. Especially the directive on the conservation of natural habitats and of wild fauna and flora (European Council Directive 92/43 EEC from 1992) and the directive on the conservation of wild birds (European Council directive 79/409 EEC from 1979) are expected to have an influence on the development of nature-based sport. Most of the sport organizations in Germany are expecting negative consequences for their future development concerning nature-based sport in mountain areas. Based on a study of the German sport association possible consequences are analyzed and discussed.
This project gives guidelines for the application and interpretation of these directives, the practicable use and management. The study shows that concerning a possible deterioration three types of sport and recreational activities have to be differentiated. Further more sport events must be evaluated in the future. At least the role and task of the management plan for NATURA 2000 areas is discussed. The management plan helps to choose suitable measures, helps to solve conflicts and to rise the acceptance and transparency for the public. It is demonstrated that the consultation and participation of local people including members of sport and recreational organisations is necessary to reach the best result for the nature conservation and conservation of endangered habitats or species.

INTRODUCTION

In the countries of the European Community the influence of European directives is increasing. Different directives have to be integrated into national law, regulations and administrative provisions.

In the focus of interest are

- the European Council Directive 92/43/EEC of 21. May 1992 on the conservation of natural habitats and of wild fauna and flora
- and the European Council Directive 79/409/EEC of 2. April 1979 on the conservation of wild birds.

The Directives 92/43/EEC and 79/409/EEC will build up an European coherent ecological network called "Natura 2000". Even most member states still have to classify additional special protection areas, the obligations of the Directives have to be considered.

These directives are expected to have an influence on the development of nature-based sport. In the alpine area and other sensitive habitats which are attractive for sport and touristic activities as well as for nature conservation purposes conflicts are increasing.

So the nature park planning for the "Nature park southern black forest" (see fig. 1) shows that those areas, which are suitable for the winter sport, also are most valuable for nature conservation purposes.

An inquiry of different sport organisations in Germany showed that most of the Sport associations have had negative experiences with these directives. They are all expecting further restrictions and regulations for the nature based sport or outdoor recreation.

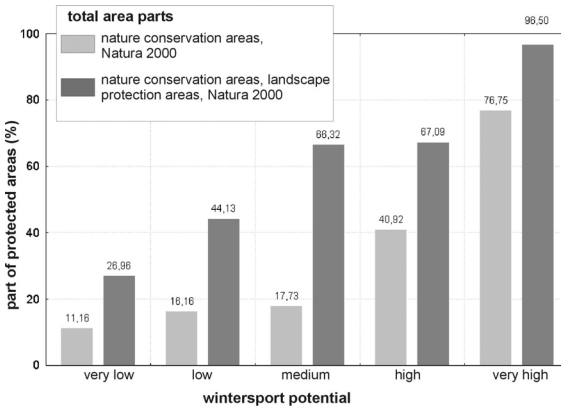

Fig. 1: In the Nature Park Southern Black Forest most of the suitable areas for winter sport are very valuable for nature conservation purposes (Roth et al .2000)

Therefore the German Sport Association commissioned together with the German Ministry for Environment a special study "Natura 2000 and Sport". Within the study, the possible consequences on the sport were analysed and recommendations for the practical use delivered.

Following we show some of the main results of this study concerning:

- the conception for the protection of biotopes and species
- the deterioration
- the FFH-assessment and
- the management plan.

CONCEPTION FOR THE PROTECTION OF NATURAL HABITATS AND SPECIES OF COMMUNITY INTEREST

For the sport associations and the general public it is mostly unknown, that the directive´s protection conception differs much from those in a traditional protected area. In a nature conservation area the decree is regulating all activities which are forbidden. Those restrictions are binding everywhere inside the frontiers of the protected area. For those regulations it is not important whether in each part of the protected area sensitive species or habitats can be found.

In the opposite the protection in Natura 2000-areas does not end automatically at the frontiers of the area. For the species and the natural habitat types protected by the European directive even a disturbance or an impact outside is not allowed, if the circumstances and the conservation status could get worse. But on the other hand not every impact – even inside the protected area Natura 2000 – is forbidden. It is possible if a favourable conservation status of the natural habitat types of the species of common interests can be preserved.

That means for the sport in sensitive mountain areas on one hand more freedom, on the other hand more responsibility if there are no traditional protected areas, but Natura 2000 areas.

DETERIORATION

In the Natura 2000-Gebiet a deterioration hais to avoid. The scope of the FFH-directive is not only concerning plans or projects. It is also applicable to the performance of activities like sport and recreation in the landscape which do not necessarily require prior authorization.

Concerning nature based sport and recreation activities it is therefore to define what are activities, impacts and disturbances that may cause such a deterioration.

In actual publications in the research field of recreation, sport and environment a very critical view is dominating (see Pröbstl 1998, Ammer et al. 1991, Seewald et al. 1998, Schemel et al. 2000). Furthermore it is criticized that sport and recreational activities get more and more separated.

Therefore and in this context we propose to divide the recreational activities into three different types:

- activities depending on infrastructures (Type 1) like downhill skiing or golf,
- activities depending on special attributes of the landscape (Type 2) like climbing, canyoning or rafting and
- activities without any special facilities (Type 3) like hiking, horse riding or biking.

Activities of **type 1** often are not expected to lead to conflicts. If the facilities in the Natura 2000-area had been installed before the ratification of the directives they can be used as before. The visitors or sportsmen depend on these facilities. Therefore they can easily be managed by information or by their license. The facilities are limiting the number of people and a possible increasing of burdens or disturbing effects. So for example the waiting time at winter sport facilities (skiing lifts) is limiting the number of skiers.

There´s an exception of this general positive evaluation, if impacts and disturbances are caused in the surrounding area. This effect may be caused for example by off-piste-skiers. Those developments may cause a deterioration or disturbance.

These disturbance and deterioration should be assessed against the objectives of the directive. If there could be a significant effect – a certain degree of disturbance is tolerated – measures to prevent those effects have to be established. These measures apply only to the species and habitats for which the sites have been designated and should also be implemented, if necessary, outside the sides.

Type 2 are those activities which do not need a special technical infrastructure but a special property of the landscape like rocks for climbing, wild water for canoeing. The suitable areas for these sports are often very close to nature. Therefore these activities often are expected to get in conflict with the aims of the European directives. Here in general a possible disturbance or deterioration has to be assessed on a case-by-case basis. Two aspects are to consider: the favourable conservation status of the natural habitat or species concerned and the contribution (and frequency) of the site to the coherence of the Natura 2000 network.

Even the present situation in different German secondary chain of mountains (for example the black forest, the upper Danube valley or the National park “Saxon Suisse” near by Dresden) and the alpine area shows that here measures to solve the conflicts are needed. The member state has to take measures which correspond to the ecological requirements of both the natural types and the species of community interest. For the touring-skiing and climbing different spatial or temporary regulations and models had been already established. It is still a task of research to prove the positive effects of these agreements. For those areas it will be necessary to develop a large-scale overall planning in relation to the recreation.

Type 3 contains all activities, which can be done without special facilities or special structures in the landscape. Most of these activities are using roads for the agricultural or forest use. In the opposite to type 2 mostly each kind of landscape can be used for these activities like hiking, biking or horse riding.

There could occur a deterioration or disturbance as well but it is less probable. Furthermore it is easier to find acceptable solutions and suitable measures because large areas of the landscape can be used.

Even when it is a moderate activity, a deterioration is possible. It may happen if the number of visitors or sportsman is increasing or the intensity is changing. Furthermore the combination of different visitor groups can lead to a deterioration. This slowly increasing effect is described as a "furtive" deterioration. In most cases an entire description including all forms of land use is necessary to solve those problems. A possible instrument for this is the management plan (see below) which is appropriate to integrate the different demands concerning any form of land use.

FFH-ASSESSMENT

It is the aim of the European community to keep the Natura 2000 areas without any negative effects. But if in the Natura 2000 area or in their surroundings modifications are planned than an appropriate assessment of its implications for the site and the conservation objectives. This new instrument cannot be compared with the environmental impact assessment (EIA), which has a long tradition in the planning process. In the FFH-Assessment all influences, which may cause impacts on the natural habitats and species of community interest in the Natura 2000 areas are to analyze. Only those projects and plans are permitted, which have likely no significant effect on the favourable conservation status and the ecological requirements of the protected species.

Not only projects like a golf course or a half-pipe for snowboarding are to access but also land use or sectoral plans so far as they are likely to have a significant effect on a Natura 2000 site.

This assessment is even then needed when plans or projects are located outside a protected side if they may lead to a likelihood of significant effects towards the natural habitat types and habitats species of community interest.

In a second level of the assessment it is to investigate whether other plans or projects are to take into account to measure a possible combination of those effects.

In mountain areas, which attract different recreational activities, such cumulative impacts must be expected.

A series of individually modest impacts by recreation may in combination produce a significant impact. The main contents of the FFH assessment are:

- definition of the project or plan
- the method and database
- the description of the plan or project
- the description of the Natura 2000-site and the conservation objectives
- the description and evaluation of the impact considering measures for optimising
- alternative solutions and mitigation measures
- cumulative impacts
- evaluation of the significance of the impact
- conclusions

The following example (see fig. 2) shows that the assessment should only focus on the implications for the site in view of the site's conservation objectives. In the first case in a habitat of bat a special riding-path is planned. This path will cross its summer habitat. This project has no influence on the favourable conservation status of its habitats during the seasons. Therefore the riding-path can be realized.

In the other case the riding-path is planned in the Natura 2000 site with very valuable vegetation, a Nardetum. Here we have to expect a significant reduction of this vegetation and a partition of the habitat. Because of these significant impacts this project cannot be realized.

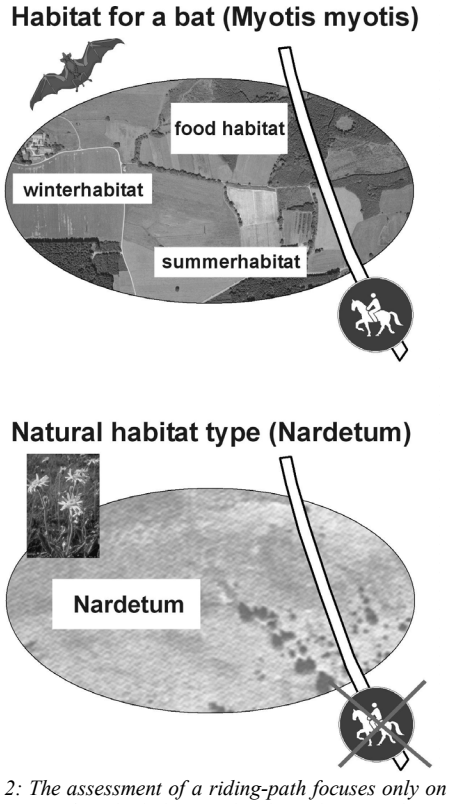

Fig. 2: The assessment of a riding-path focuses only on habitats and species for which the area has been designated.

Projects or plans with a negative assessment study can only be realized if there are no other alternatives and if there exists an imperative reason of overriding public interests, including those of a

social or economic nature. For the purposes of outdoor sports and recreation this exception is not to expect.

Looking at the sport and the recreation in mountain areas the FFH-assessment will be relevant for the future development of facilities for sport and recreation. The realization of new golf courses, a harbour for sailing boats, an airport for gliders and auxiliary sailplanes or facilities for downhill biking or inlinescating near or in a Natura 2000-area could get more and more difficult. It is to examine whether these facilities and their development could cause a significant disturbance or deterioration.

To simplify the screening process we propose to divide those projects into three groups:

- projects where the changements of the facilities are very close to the present situation
- projects where the present situation will be intensively changed
- new projects.

In each case the screening has to decide whether significant effects are plausible either individually or in combination with other projects or plans. It is to expect that in the first case an impact assessment is mostly not necessary.

In the second and third case the competent authority has to implement a screening in detail. It decides whether a significant effect is possible. A larger changement of a facility or the development of new infrastructures is considered as a significant negative effect, if they may cause

- a grave reduction of the natural habitat types or habitats of the species,
- a changement of the site conditions like the level of the groundwater, the water quality etc. and of the ecological requirements of species for which the area has been designated,
- disturbances,
- a partition of biotopes and habitats.

In the future especially in the mountain area with a high density of valuable natural habitat types and species of community interest it will be more difficult to develop new facilities. This is necessary to ensure a favourable conservation status there.

A deterioration can also be caused by events. Therefore an event can be seen as a project. Many mountain areas are an attractive locality for sport events. Larger events have to be approved by the authority. If here a deterioration is possible an FFH-assessment is (see above) necessary. In this case not only the possible impacts caused by the sport but also those by visitors, the catering service, accompanying persons or a supplement program for example with music and light show are to analyze. The impacts are only relevant if they are significant for the natural habitat types and species of common interest for which the areas have been designated. So a snowboard competition accompanied by loud music is no significant disturbance if a special vegetation like the Nardetum is to protect. Is this an event in a habitat of the black-cock than it is probably a significant disturbance. If the same event will be organized each year and there are positive results of the monitoring some German countries have the opinion that there is only once an assessment necessary.

MANAGEMENT PLAN

A lot of the Natura 2000 sites need a suitable management of its natural or seminatural habitat types and habitats of the protected species. In some sites conflicts between the interest of the nature conservation and the land use or recreational purposes are expected or already known. In those areas a management plan is needed.

The management plan helps to choose suitable measures (for example statutory, administrative or contractual measures), helps to solve conflicts and to rise the acceptance and transparency for the public.

This may contain restrictions for the recreational use and the sport. Therefore it is necessary to know that the European commission explicitly proposed that the management is to develop in cooperation with user groups in a bottom-up-approach. At the moment this aim is only insufficiently known and should be integrated in the now starting planning process. Therefore the management plan should be written in a popular way and – as far as possible – consider the interests of the other user groups. If they get involved into the planning process differentiated measures can be found which are accepted.

A cooperation and a transparent planning process will not only rise the acceptance towards the directives, it will support the realisation in many ways.

CONCLUSIONS

Even when the administration in Germany has the opinion that “normal” sport and recreational activities cause no problems in Natura 2000 areas, they are to expect.

Whether these activities may have a significant effect on natural habitat types and species of common interest depends on different factors:

- the type of the recreational activities
- the number of sportsmen or recreation-seekers
- the intensity of these activities
- the sensibility of the species or habitat types
- the compromised situation and
- the summarizing effect of different influences like land use, hunting or other recreational activities.

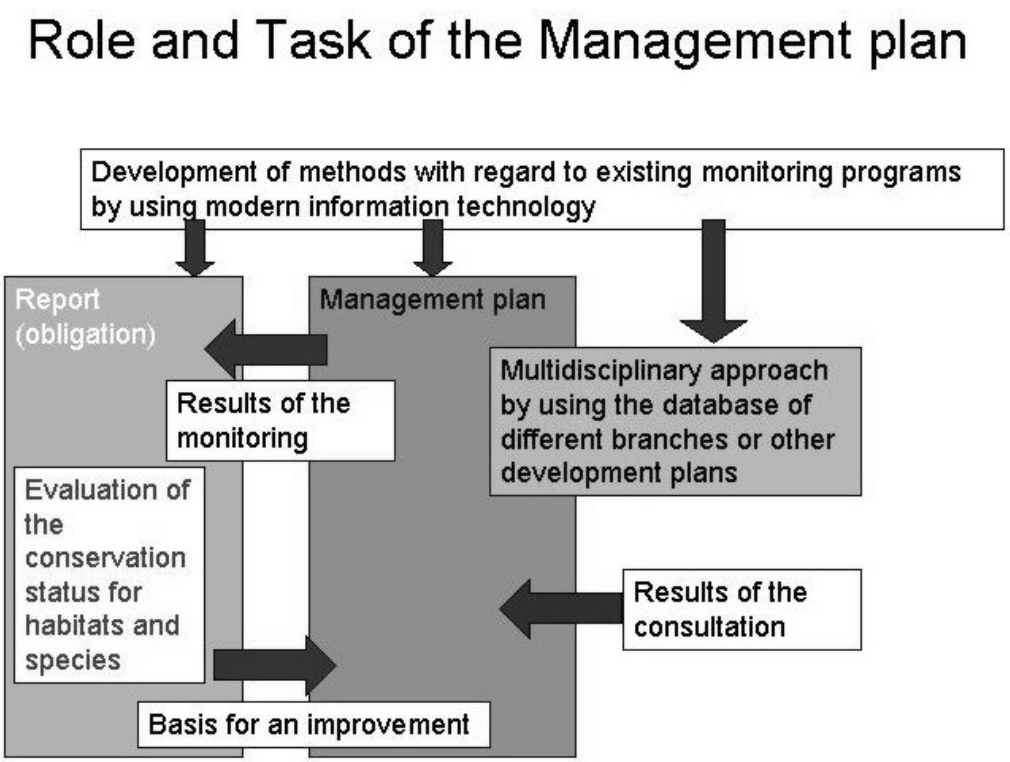

Fig. 3: It is an essential part of the process to establish the management plan using a multidisciplinary approach and to involve local actors and different kinds of land use including sport and recreation.

Therefore in attractive mountain areas there is a need for a differentiated management that brings together the requirement of nature-based sport and recreation and the interests of nature conservation with respect to the objectives of the European directives.

The appropriate instrument is the management plan. In the opposite to the present situation in most parts of Germany the local actors and members of sport associations should be involved in the planning process. Only a bottom-up approach can help to provide further conflicts and to guaranty the effectiveness of the protection.

Further more the actual discussion with landowners and representatives of the sport and recreational associations show that the acceptance of the idea of an European ecological network is very low. On one hand there is more information needed and – very important – a reasonable use of the new instrument, the FFH impact assessment for projects, events and plans for the touristic development.

REFERENCES

Ammer, U., Pröbstl, U.1991: Freizeit und Natur, Verlag Paul Parey, Hamburg, Berlin, 228 S.

Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaft (o.J.): Natura 2000 – Erhaltung unseres Naturerbes, Luxemburg, ISBN 92-828-0322-8.

Arbeitsgemeinschaft FFH-Verträglichkeitsprüfung 1999: Handlungsrahmen für die FFH-Verträglichkeitsprüfung in der Praxis, in: Natur und Landschaft 74 (1999) Nr. 2, S. 65-73, Stuttgart.

Baumann, W., Biedermann, U., Breuer, W., Herbert, M., Kallmann, J., Rudolf, E., Weihrich, D., Weyrath, U., Winkelbrandt, A. 1999: Naturschutzfachliche Anforderungen an die Prüfung von Projekten und Plänen nach § 19c und § 19d BNatSchG (Verträglichkeit, Unzulässigkeit und Ausnahmen), in: Natur und Landschaft 74 (1999) Nr. 11, S. 463-472, Stuttgart.

Bayerischen Staatsministerium des Innern, für Wirtschaft, Verkehr und Technologie, für Ernährung, Landwirtschaft und Forsten, für Arbeit und Sozialordnung, Familie, Frauen und Gesundheit sowie für Landesentwicklung und Umweltfragen 2000: Schutz des Europäischen Netzes „Natura 2000“, vom 4. August 2000 Nr.62-8645.4-2000/21. AllMBlNr.16/2000, München.

Beckmann, M., Lambrecht, H. 2000: Verträglichkeitsprüfung und Ausnahmeregelung nach § 19c BNatSchG. In: Zeitschrift für Umweltrecht. 01/00. S. 1-8.

Deutscher Sportbund (Hrsg.) 2001: Natura 2000 und Sport, Ein Leitfaden zum Umgang mit der Fauna-Flora-Habitat-Richtlinie und der Vogelschutz-Richtlinie, Frankfurt.

Deutscher Alpenverein e.V. (DAV) (Hrsg.) 1998: Europäische Umweltgesetze und Bergsteigen, München.

Europäische Kommission (Hrsg.) 2000: Natura 2000 – Gebietsmanagement. Die Vorgaben des Artikels 6 der Habitat-Richtlinie 92/43/EWG, 52.

Europäischer Gerichtshof 2000: Besondere Schutzgebiete nach FFH-Richtlinie. Urteil vom 06. April 2000 – C-256/98. In: Zeitschrift für Umweltrecht 05/00. S. 343-345.

Gellermann, M. 1998: Natura 2000: Europäisches Habitatschutzrecht und seine Durchführung in der Bundesrepublik Deutschland, Berlin.

Jarass, H.D. 2000: EG-rechtliche Folgen ausgewiesener und potentieller Vogelschutzgebiete. Zugleich ein Beitrag zum Schutzregime für FFH-Gebiete. In: Zeitschrift für Umweltrecht 03/00. S. 183-190.

Jessel, B. 1999: Die FFH-Verträglichkeitsprüfung, Unterschiede gegenüber der UVP und zusätzliche Anforderungen, in: Naturschutz und Landschaftsplanung 31, (3), 1999, S. 69-72.

Kaiser, T. 1998: Aufbau und Inhalt einer FFH-Verträglichkeitsstudie. Naturschutz und Landschaftsplanung 30 (6): 165-168.

Koch, T. 2000: Die Regulierung des Zielkonflikts zwischen Belangen des Naturschutzes und anderen öffentlichen

Interessen durch § 19c BNatSchG in der gerichtlichen Praxis. In: Natur und Recht 07/00. S. 374-378.

Land Brandenburg 2000: Verwaltungsvorschrift der Landesregierung zur Anwendung der §§ 19a-f BNatSchG in Brandenburg, insbesondere zur Verträglichkeitsprüfung nach der FFH-Richtlinie, Potsdam.

Marr-Klipfel, K. 1999: Umweltverträglichkeitsprüfung und Prüfung nach § 19c BNatSchG. In: UVP-Report. S. 251-254.

Meier, H. 1997: Die Verträglichkeitsprüfung der FFH-Richtlinie und ihr Verhältnis zu Eingriffsregelung und UVP. Informationen des Naturschutzes Niedersachsen 17 (4), S.184-186.

Ministerium für Umwelt, Raumordnung und Landwirtschaft Nordrhein-Westfalen 1999: Einführungserlass zu Anwendung der Richtlinien 92/43/EWG (FFH-RL) und 79/409/EWG (Vogelschutz-RL) vom 26.04.2000 (VV-FFH).

Ministerium für Umwelt, Raumordnung und Landwirtschaft Nordrhein-Westfalen 1999: Kriterien zur Auswahl der FFH-Gebiete und Vogelschutzgebiete für das europäische Schutzgebietssystem NATURA 2000, Düsseldorf.

Petersen, B., Ssymank, A., Hauke, U. 1998: NATURA 2000 – die nationale Gebietsbewertung gemäß der FFH-RL am Beispiel der alpinen biogeographischen Region in Deutschland. Natur und Landschaft 73 (9): 393-403.

Pröbstl, U. 1996: Naturschutz contra Natursportarten, in: Snow, Fachzeitschrift für den Skisport, Planegg, S. 24-30

Pröbstl, U.1998: Ist umweltgerechter Skisport möglich ?, in 1. Alpenreport: Daten – Fakten – Probleme – Lösungsansätze, Hrsg. Commission Internationale pour la Protection des Alpes (CIPRA), Vaduz, Verlag Haupt Bern, Stuttgart, Wien, S. 265-271

Pröbstl, U. 2000: Recreation and Landscape management impacts, in: Forests in Sustainable Mountain Development, State of Knowledge Report for 2000, IUFRO research series. CABI New York, Oxon S. 337-342

Pröbstl, U. 2001: Der Beitrag von GIS zum Management von FFH-Gebieten, in Strobl, Blaschke, Griesebner,(Hrsg): Angewandte Geographische Informationsverarbeitung XIII, Wichmann Verlag Heidelberg

Pröbstl, U., 2000, Recreation and Landscape management impacts, in: Forests in Sustainable Mountain Development, IUFRO research series. CABI New York, Oxon S. 337-342

Rödiger-Vorwerk, T. 1998: Die Fauna-Flora-Habitat-Richtlinie der Europäischen Union und ihre Umsetzung in nationales Recht: Analyse der Richtlinie und Anleitung zu ihrer Anwendung, Berlin.

Roth. R., Krämer, A. 2000: Entwicklungskonzeption Sporttourismus im Naturpark Südschwarzwald, Veröffentlichung der Deutschen Sporthochschule Köln, Institut für Natursport und Ökologie, Köln

Rückriem, C., Roscher, S. 1999: Empfehlungen zur Umsetzung der Berichtspflicht gemäß Artikel 17 der Fauna-Flora-Habitat-Richtlinie, Angewandte Landschaftsökologie, Heft 22, Bundesamt für Naturschutz, Bonn-Bad Godesberg.

Schemel, H.J., Erbguth, W. 2000: Handbuch Sport und Umwelt, Aachen.

Seewald, F. Kronbichler, E. Größing, S.1998, Sportökologie, UTB, Wiesbaden

Ssymank, A., Hauke, U., Rückriem, Ch., Schröder, E., Messer, D. 1998: Das europäische Schutzgebietssystem Natura 2000, BfN-Handbuch zur Umsetzung der Fauna-Flora-Habitat-Richtlinie (92/43/EWG) und der Vogelschutz-Richtlinie (79/409/EWG), Schriftenreihe für Landschaftspflege und Naturschutz, Heft 53, Bundesamt für Naturschutz, Bonn-Bad Godesberg.

Ssymank, A. 2001: Anforderungen an den Waldbau in Natura 2000-Gebieten, in: Tagungsband „Integration von Naturschutz in die Forsteinrichtung“ der Forstlichen Versuchs- und Forschungsanstalt Baden-Württemberg (im Druck).

Wirths, V. 2000: Gemeinschaftsrechtlicher Habitatschutz und deutsches Immissionsschutzrecht – Zu den Einwirkungen der FFH-Richtlinie auf das deutsche Recht. In: Zeitschrift für Umweltrecht 03/00. S. 190-197.

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
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Visitor Management and Ecological Monitoring in Austrian, Italian and Bavarian Skiing Resorts by Adapting the EU-Eco-Audit

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Abstract: The problems in skiing resorts caused by winter sports and agriculture and summer touristic land use are well known. They mostly found upon sensitive ecological conditions, building measures, deficiencies in visitor management and an overlapping land use during summer.
A new possibility to face and to decrease these problems will be presented within this article by the EU-Eco-Audit.
Examples from Italy, Germany and Austria show starting points for valuation, deduction of objects for environmental development and suggestions for an environmental management system. A future-development should be influenced by an auditing process which is supported by the enterprise and to environmental concerns set up in business, what should be further developed.

INTRODUCTION

Over the whole alpine arc, skiing is still a main attraction for tourism. Furthermore, it is one of the definite economic factors to ensure the livelihood of the resident alpine population. During the 80´s, skiing was frequently discussed contradictory with regard to the effect on nature condition. The opposition parties often showed their meanings in a biased way, what lead to a non-objective discussion.

Today, political and social representatives became aware of the effects of such land-use and of the full extent of leisure activities with sports concerning on all elements and aspects of landscape. The negative effects of this development in skiing resorts are obvious. Problems are arising with erosion, degradation of the natural vegetation and disturbance of animals.

To solve this conflict, three possibilities have been discussed:

- Labelling for skiing resorts in good condition,
- restrictions and regulations based on nature conservation law in insufficient conditions
- an auditing-system, a market-economy instrument which includes a permanent development and monitoring.

With adding attributes to a skiing resort's ecological quality by labelling, just such resorts with still natural conditions get rewards, whereas other ones with a lot of levelling measures are not attracted. Over and above, restrictions or legal regulations often are noticed as preventing from economic development.

The specified permanent monitoring system and the demand on the enterprise in the skiing resort to accept their responsibility were the reason to choose the Audit-System. With the EU-Eco-Audit, the EU has established a market-economy instrument which makes it possible for companies of different sectors to show awareness of responsibility for nature and, at the same time, optimise the operational procedure. In addition, the efforts may have effects on publicity and attract new target groups. This instrument has already been developed for industrial needs and administration, but the legislator also admits to adjust the proceeding for further needs. Further on, the EU-Eco-Audit is not a single measure, but has to be repeated and developed further at a period of three years.

It has to be underlined, that the EU-Eco-Audit is different from the so-called Environmental Audit, that has an reactive approach and is better known from American or Canadian management systems. This system only detects problems that already have happened and is a valuable diagnostic tool. In contrast to this, the EU-Eco-Audit represents a proactive environmental management system with a more preventative approach.

Therefore a transnational project was initiated and supported by the foundation „pro natura pro ski", Liechtenstein. Three representative areas in three alpine countries (Schladming, Austria; Adelboden, Switzerland; Malbun, Liechtenstein) were selected to develop an adaptation of the EU-Eco-Audit-directive to the needs in skiing resorts. The examination is supported by the experiences acquired with ecological research in the skiing area

of Garmisch-Partenkirchen (Germany). In order to reach out for a broadly applicable manual and to learn about the differing conditions and demands in one of the other alpine countries, Italy, and in protected areas, the University Munich-Weihenstephan supports the examination with an investigation in Orso-Pulpito in Solda, South Tyrol. This last examinated area asks much more for an environmentally sustainable management, because it is located in the Stelvio National Park with the legal mission to develop protected areas, which recently also engages with discussing IUCN-criteria. The EU-Eco-Audit may also point out to the National Park's administrative authorities new strategies of environmentally compatible management of skiing areas and intercede between the enterprise's aims and the demands of nature conservation.

As the research field of juridical, ecologistic and operational Audit already is well known, this study deals with the investigation of the whole area influenced by skiing, with special regard to the ecological revalorisation of the resort.

METHODS

From the methodological point of view, it had to be developed

- the adaptation of the Audit-directive to the needs of application in skiing areas,
- a standardised method for data-collection with suitable inquiry and the structure of a Landscape Information System (LIS) with corresponding database.

Figure 1 shows in the left row the main steps of the Audit process. The right row contains the steps for the application in a skiing resort.

Ski runs are mostly characterised by multiple land-using, such as winter tourism, summer tourism, agriculture, forestry or hunting which overlap each other. In combination with biotic and abiotic factors certain problems may result, which land-users often are not conscious of. Further on, the alpine ecosystem shows a particular sensibility with regard to impacts. In addition, an widespread investigation of skiing areas, which was enforced by order of the Deutsche Skiverband (DSV; German skiing association), delivers clues for the possible contents and focal points of the Audit as well as hints for the demands on the method of data-collection. The mapping out in the skiing areas embraced geology and soils, climatic issues, hydrology, vegetation, fauna, building measures, damages distinguished by causes and land use all the year round (method see PRÖBSTL et al. 1996 und PRÖBSTL 2000). In addition, visitor management and ecological information offers were evaluated.

Based on a geographic information system with different layers special maps can be deduced and intersections created. During the step of intersecting the land use and natural items by GIS, conflict ranges may be found out, which partly aren't apparent from the first. Depending on the question, in the GIS the kind of query can be adapted individually. Based on these data set, an effective operational management can be designed.

SOME SELECTED RESULTS

With the present article, some selected examples from the number of possibilities should show the facilities of the EU-Eco-Audit-process.
Examples demonstrating

- the influence on winter-active animals due to off-piste skiers,
- the information drawn from the GIS
- the touristic advent in summertime
- show the widespread application of the EU-Eco-Audit especially in view of the possible results for controlling visitor flows in skiing areas.

Subsequently, three examples from the Audit-process are offered.

Example 1

Apart from the on maintained ski slopes, areas which are passed by off-piste skiers are connected with the skiing resort's enterprise. Off-piste skiers are characterized as skiers who use existing cable railways for ascending, but prefer powdery snow descents in not prepared terrain. Negative effects on the environment can be the consequence when e.g.

- habitats of winter-active animals are disturbed
- trees and coppice, especially young one, are damaged.

If certain distances - crossing habitats - are exceeded, deer or e.g. chamois are put to flight, what leads to an excessive energy consumption. This reaction may cause death, especially when frightened up several times a day.

This seems to be more risky for *Tetraonidae* species, who stay in snowy caves rather the day long, not visible for the skier. Drawing up to much, the cocks are forced to take wing, seldom become victims of ski edges.

Within the scope of the Audit-proceeding, talking with local experts or institute specialist's investigations often brings up knowledge about habitats crossed by off-slope skiers, and such areas can be mapped in this way. The importance of mapping appears in outlines especially at Solda, where rather the whole terrain claimed by skiers is also potential habitat for black cock and white grouse.

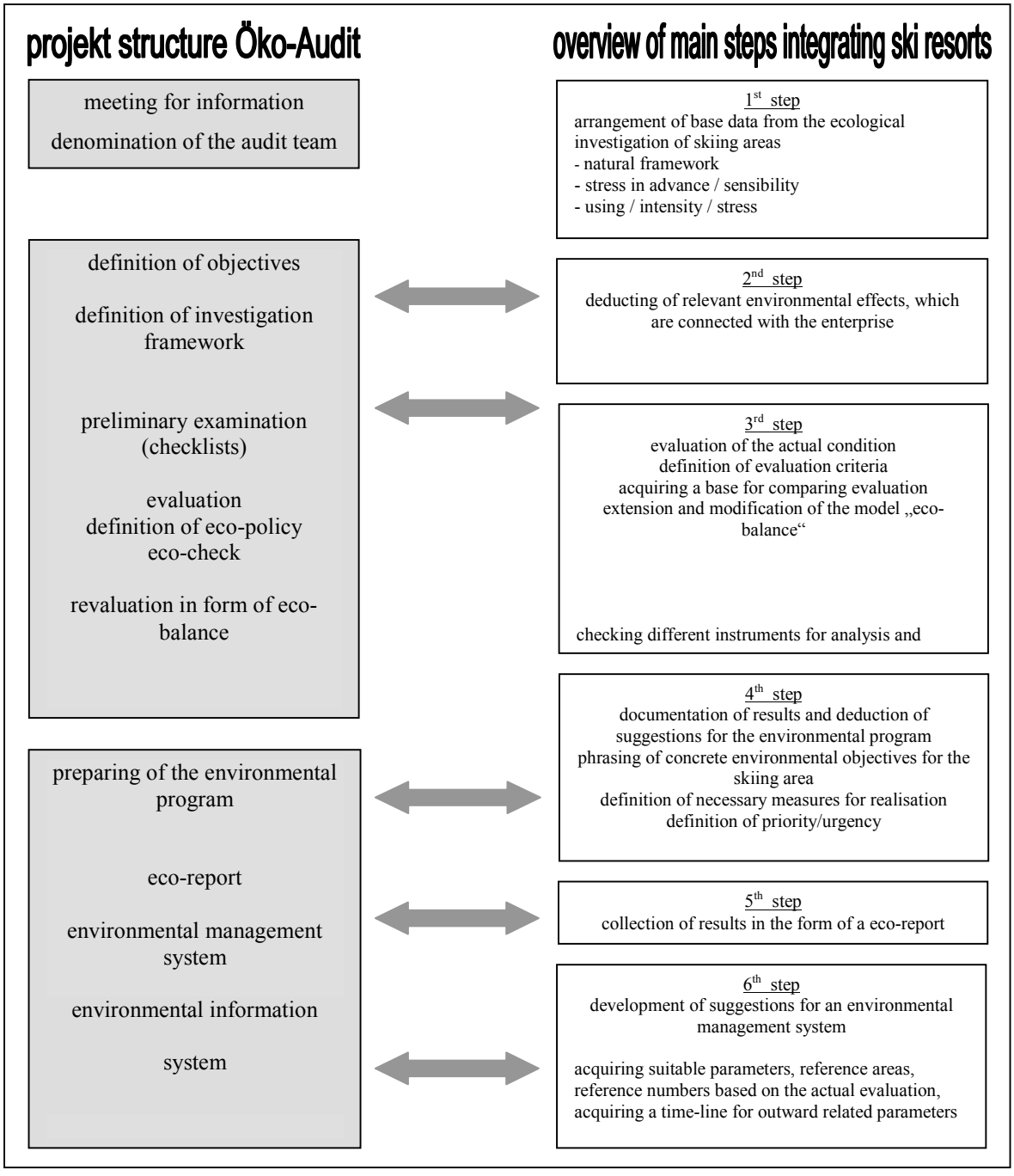

Figure 2: model for the EU-Eco-Audit in skiing resorts corresponding to the steps of the EU-Eco-Audit (see AMMER, PRÖBSTL 1995)

Even though located in the Stelvio National Park, habitats of *Tetraonidae* species were not yet officially registered. In addition, the area used by off-slope skiers in proportion to the maintained ski slopes is larger than in other skiing resorts. Beside, also during summer a high level of disturbance is noticed, what lead to a fluctuation of the population to neighbouring habitats. The National Park starts engaging with managing visitor flows in the lower valleys and at Solda could take into account in-depth managing for sensitive areas. By mapping off-slope routes used periodically as well as temporarily, it can be ascertained which - even potential - habitats are avoided caused by frequent disturbance. The GIS allows to intersect habitats with other disturbing sources like e.g. the application of technically produced snow.

What concerns the impairment of trees, it's especially up to higher mountain regions that stress-factors sum up: drainage by frost, chilling, lack of water above snow surface, endangering by fungus like Herpotrichia spec. or Chrysomyxa spec. under the snow, locally grazing. Furthermore, the young trees are burdened with mechanical thrust and injury by off-piste skiers. If forests fulfil tasks like avalanche- or soil-protection, a diminution of the resistance and the protecting tasks can not be excluded.

During the Audit-process, the data collected outside gets mapped to be shown to the enterprise's employees. Thus, the employees can realise and understand the concerns of animals and vegetation in high altitude mountain areas much easier. Based on this and discussing reasons and consequences for rare species, measures and responsibilities for realisation can be deducted. At Solda, this could be

- demarcation of particularly sensitive areas
- definite readable delimitation of ski runs
- offering marked off-piste routes in lesser sensitive areas (concentration of visitor flows)
- information and explanation of guests and staff
- cooperation with local ski-schools
- implementation of protected forest sides

The Audit-system offers the possibility to the enterprise to verify the success of these measures periodically and correct them if needed.

Example 2

A frequent conflict is, as already said, the multiple land-use in summer as well as in winter. This is characteristic for the Bavarian skiing resorts. For the cable railways car enterprises the summer season is economically important - much more than e.g. in many Austrian skiing resorts. If the Landscape Information System distinguishes between

- carriage-roads (for forestry and pasture)
- hiking paths (marked, not practicable, signed paths)
- beaten paths (wild stretches and short-cuts)

clues can be drawn from for aims of the environmental program. This can be shown guided by the example of the skiing area Hochgrat, a popular destination during summer. The registered values of 10,5 m/ha beaten paths and 11,2 m/ha officially signed hiking paths point out that there exist problems and deficits in summer. The determined level of development can be given per sector and altitude zones. Furthermore, the data allows to compare the determined level with other recreational areas. Values of 40-50 m/ha are good as average density of hiking paths (see AMMER, PRÖBSTL 1991). The interpretations in the skiing area Osterfelder-Kreuzeck-Hausberg confirm these values with 43 m/ha and can be seen as standard of comparison.

If deficits like landscape damages caused by summer tourism or missing visitor management are found out by the analysis done during the Eco-balance (see fig. 1), different measures can be developed:

- measures for visitor management
- concept for redevelopment of hiking paths
- suggestions for dismantling of hiking paths

and so on.

If these measures are integrated into management, the success can be controlled with the GIS-system. Because the Audit-directive explicitly includes the publication of the outcomes, the presentation of changing balances, supported by the Landscape Information System, is important.

Example 3

The possibilities of the enterprise to contribute to a discharge of the environment lay in the field of information. In coherence with the touristic offers, the Internet has gained in importance. In the skiing resort Schladming, the unanimous opinion of managers and employees was to show the improvements within the ecological management of ski slopes by the auditing system in the Internet. The skier should be able to take into consideration also ecological aspects when choosing a resort. Beside the improvements in the management sector, aspects of easily available environmental information or natural experiences also should be presented.

Further one the Planai cable railways in Schladming emphasize the importance for a credible candidature for large-scale events (e.g. world cup event), in addition to the improvement gained with ecological ski slope management and ecological information.

The „green image" should be noticeable in all departments of the enterprise.

CONCLUSIONS AND OUTLOOK

Combined with a differentiated Landscape Information System, the EU-Eco-Audit proves to be - like the examples show - a good possibility to realize visitor management and ecological revalorisation close to practice. In contrast to restrictions and regulations or Labelling by other organizations, the process lead off in the enterprise to get active in the own concern. It is an argument for further sustainable efforts. This fact can be emphasised by the means of an appropriate public information.

As can be seen in the investigated area of Solda, mapping in the framework of the EU-Eco-Audit can contribute to assess the demand for an expansion of the skiing area. This can happen by harmonizing the offered area of ski runs with the capacity of cable railways. The recent discussion of rearranging the National Park Plan by designing a zonal concept, the vocation of NATURA2000-areas directly neighbouring the ski slopes and even covering the skiing area openly asks for a discussion of the protective as well as enterprise's demands. This discussion can be held by application the EU-Eco-Audit to harmonize appearing problems to bilateral agreement (win/win-situation).

Despite this positive balance that can be drawn from working in different regions, a widespread realisation of this idea will depend on the question, if the immediate benefits of managing ski runs and marketing also will profitable to local tourism. Also the award of skiing contests under international competition will more and more be associated with

the existence of a credible ecological concept and a sustainable management. At the same time, the importance of the Audit for sport competition venues will gain in signification. This is especially valid because of the rating that competition venues grab with international sport contests, considerable for the weight and the touristic commercialisation within international comparison.

REFERENCES

AMMER, U., PRÖBSTL, U. 1991, Freizeit und Natur, Hamburg, Berlin.

AMMER, U., PRÖBSTL, U. 1995, Forschungsantrag an das Bayerische Staatsministerium für Landesentwicklung und Umweltfragen, unveröffentlichte Studie, Etting.

AMMER, U., PRÖBSTL, U. 1997, Ökologische Untersuchung von Skigebieten, Ergebnisse, in: Forum für Skisport und Umwelt. Hrsg. Umweltbeirat des Deutschen Skiverbandes und der Stiftung Sicherheit im Skisport, Band 1, Planegg

BAYERISCHES STAATSMINISTERIUM FÜR LANDESENTWICKLUNG UND UMWELTFRAGEN (HRSG.) 1997, Landschaftsökologische Untersuchungen in den bayerischen Skigebieten – Skipistenuntersuchung – Zwischenauswertung nach 24 Skigebieten, Materialien Umwelt & Entwicklung Bayern, Band 130

ENSTHALER, J., FÜSSELER, A., NUISSL, D., FUNK, M. 1996, Umweltauditgesetz/EG-Öko-Audit-Verordnung, Berlin

INSTITUT DER DEUTSCHEN WIRTSCHAFT, FORSCHUNGSSTELLE ÖKONOMIE UND ÖKOLOGIE (HRSG.) 1995, Umweltmanagement, Zukunftsaufgabe der Unternehmen, Köln

JANKE, G. 1995, Öko-Auditing, Handbuch für Interne Revision des Umweltschutzes im Unternehmen, Berlin

LEICHT, H., DIETMANN, TH., KOHLER, U. 1993, Landschaftsökologische Untersuchungen in den Skigebieten des bayerischen Alpenraums – Darstellung und Methodik, in: Jahrbuch des Vereins zum Schutz der Bergwelt, München, S. 147-196.

PRÖBSTL, U. 1994, Skiing and nature conservation in the Bavarian Alp, Model projects to solve a conflict, in: proceedings of IUFRO Interim Meeting and Excursion in South Korea and China-Taipei 1993, IUFRO Subject Group 6.01. Forest Recreation, Landscape planning and Nature Conservation, S. 116-125.

PRÖBSTL, U. 2001, Skigebiete in den bayerischen Alpen, Ergebnisse einer ökologischen Studie, DSV-Umweltreihe, Band 7, Weilheim

PRÖBSTL, U., FÖRSTER, B. 1996, Ökologische Überprüfung und Bewertung von Skigebieten mit Hilfe geographischer Informationssysteme, in: GIS in Naturschutz und Landschaftspflege, Laufener Seminarbeiträge 4/96, Hrsg. Bayerische Akademie für Naturschutz und Landschaftspflege (ANL), S. 71-78.

PRÖBSTL, U., AMMER, U., KARPF, S. 1998, Wege zu einer verbesserten Begrünung von Schadstellen im Hochgebirge, in: Verein zum Schutz der Bergwelt, S. 57-77.

PRÖBSTL, U., ROTH, R. SCHLEGEL, H., STAUB, R. 1998, Modell für eine ökologische Skigebietsauditierung, Forschungskonzept im Auftrag der Stiftung pro natura - pro ski, Vaduz.

WILLIAMS, P. W., TODD, S. E., 1997, Towards an Environmental Management System for Ski Areas, Mountain Research and Development, **Vol. 17**, Nr. 1, pp. 75-90

PRÖBSTL, U., PIHUSCH, T., 2000: GIS für Monitoring und Auditing in Skigebieten, in: Angewandte Geographische Informationsverarbeitung, **XII,** S. 395-406, Heidelberg

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
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Impacts of Tourism Load on the Mountain Environment (A Case Study of the Krkonoše Mountains National Park - the Czech Republic)

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Abstract: Krkonose Mountains (the Giant Mountains in Czech) as the highest mountains of the Czech Republic belong to the most visited middle-european mountains as they are well facilitated for both summer and winter outdoor recreation. More than 8 million visitors within a year means very serious tourism load on the mountain landscape and ecosystems. Primary impacts (e.g. disturbing plants and animals by trampling and noise, soil erosion or cummulation of rubish) together with secondary impacts of tourism development (a.g. arrising of accomodation capacity, impact on traditional landscape infrastructure by reebuilding of original small mountain chalets, nonsufficient disposal of waste, transport of allochtone organisms) create very cotraversional background for sustainable use of the mountains which are the oldest national park of the Czech Republic. Paper describes these impacts and suggests some forms of conflict solution between tourism development and statutes of the national park.

FOREWORD

Mountains together with coastal areas represent doubtlessly the most attractive types of landscape for outdoor recreation. Both are highly sensitive and vulnerable to the large scale of human impacts. Therefore the harmonization of the relationsheep between the nature environment and its conservation on the one side and the wide scale of its exploitation on the other side belongs to the basic problems and the most important management activities of the bodies responsible for sustainable development such areas. There are a lot of examples of hard conflicts between these two range of human interests from the Alps or from the Mediterranean countries. Many of middle-european mountains stand in the shadow of such famous areas for tourism industry but they have a lot of similar or even bigger problems because of smaller size and therefore higher pressure on the fragile mountain environment. **The Krkonose Mountains**, culminating part of Hercynian middle-mountains, represent example of uneasily manageable conflicts between environmental conservation and contradictory demands for tourism and economic activities in mountain protected area.

AREA DESCRIPTION

Lying astride the Czech and Polish boundary Republic, the mountains called the Krkonoše (the Giant Mountains in English, the Karkonosze in Polish) , the highest mountains of the Czech Republic, belong to the Sudetes, a chain of geologically old, non-calcareous middle-mountains shared by Czech, Poland and Germany.

The Krkonose Mts. are about 40 km long and 20 km wide. Their georelief consists partly of an old denuded surface, partly deeply cut valleys that were sculptered by Pleistocene glaciers and nivation. The highest point Sněžka (1602 m a. s. l.) does not point out high-mountainous size, but the summit area of the Krkonose Mts. (between 1300 and 1600 m a. s. l.) displays a landscape system with numerous elements of subarctic and high-mountain features such as alpine timberline, subarctic peatbogs, glacier corries, snow avalanches and landslides, tors, frost sorted grounds, relic plant and animal species and ecosystems.

Average annual temperature on the summits is between 0 ^{0}C and +1^{0}C only. Snowpack is sustained about 180 days per year, which corresponds to climatic regimes encoutered in mountainous zone of Central Scandinavia. As a result of long-term miltidisciplinary research and detailed analyses, the landscape of the topmost areas of the Krkonose Mts. was described as an **arctic-alpine tundra** (Soukupová and others, 1995; Stursa, 1998).

However, the Krkonose Mts. are not mountain range, whose long-term development was controlled by only natural laws. Their position in the centre of Europe meant that man has subdued nature here step by step since the 13th century and created in the highest Czech mountains an landscape, full of signs of the mutual coexistence of man and mountain nature in both positive and negative sense. Because of their unique natural richness and beautiful landscape with extremely

rich history and culture, the Krkonose Mts. were declared as the first Czech National Park in 1963 (total area is over 360 km^2). On the northern Polish slopes the Karkonosze National park was created even erlier (in 1959, total area is over 55 km^2). Both national parks (and also the **bilateral Biosphere Reserve** of UNESCO since l992) are well-known and much frequented within the all-European context for their unique natural richness, landscape beauty, outstanding conditions for both winter and sommer sports, wide offer of tourist and recreational facilities and easy accessibility from the foothills to the highest elevation.

TOURISM IN THE KRKONOSE MOUNTAIN

The characteristic landscape infrastructure of the Krkonose Mts. became during the period of farming in 17. and 18. centuries. Plenty of tree-less enclaves with mountain cottages are dispersed from the foothills till upper part of the mountains, created a significant bases for the later tourist utilization during the second half of 19th century. First visitors attended the mountains mainly in the summer but with the development of skiing, tourism extended throughout the winter months.

On the beginning of the last century only a few hundred thousands visitors from the large lowlands of Silesia, Germany and Bohemia came in the Krkonoše every year. Many villages slowly turned from small agricultural-industrial and woodworker´s hamlets into tourism centers. Before the end of the 20th century about 6 million visitors (hikers, skiers and holiday-makers) on the Czech side, and nearly 2,5 million visitors on the northern Polish side annually frequent the valleys and summits of the Krkonoše Mts. (Flousek J., 1994).

Thus the both Krkonose Mts. National Parks (abbrev. KRNAP resp. KPN) with **more than 8 milion visitors** in a year belong undoubtedly between the most visited national parks in the Europe and perhaps according to their small area (the whole mountains around 630 km^2 only) to the most visited national parks in the world, unfortunatelly with all evidences of enormous pressure on very fragile mountain nature. Hotels, roads, ski lifts, ski hoists, downhill courses, skii slopes and other facilities serving tourism and sport activities (table 1.), bring about a lot of disturbance into the mountain environment of the Krkonose National Park .

IMPACTS OF TOURISM

There are many direct influences of tourism on the mountain nature, e.g. picking up nice plants, disturbing of wild animmals through the noise, soil erosion due to trampling of vegetation by short cutting ways, cummulation of rubish, air pollution from the dence traffic etc. Beside these **primary impacts** which might be partly diminished by strict control activities of National Park staff or by some regulations, there are also **secondary impacts** of tourism development which are much serious.

	Czech side	Polish side
Total area	54 787 ha	5 564 ha
-core zone (1st + 2nd zone of NP)	8 432 ha	1 715 ha
- buffer zone (3rd zone of NP)	27 925 ha	3 847 ha
-transition zone (buffer zone of NP)	18 430 ha	-
Inhabitants	26 700 = (48,7/km2)	90 = (1,6/km2)
- in core zone	300 = (3,6/km2)	50 = (2,9/km2)
- buffer zone	4 900 = (17,5/km2)	40 = (1,0/km2)
- transition zone	21 500 = (116,7/km2)	-
Visitors in a year (estimate)	6 000 000	2 500 000
Total length of **road network**	1 700 km	250 km
- tourist trails only	800 km	?
Number of **hotels and chalets** on the National Park territory	1 500	22
- core zone only	82	10
Number of **cableways** + **chairlifts**	6	2
„ „ **ski-lifts**	250	10
Length of **downhill courses/ski slopes**	139/112	10/17

Table 1. Selected data about bilateral Biosphere Reserve Krkonose/Karkonosze

They are connected with inadequate landscape infrastructure development and with step-by-step increasing of accomodation capacity, density of roads and traffic load, the water consumption, total amount of visitors etc. If there are well prepared land use plans with respect of the territorial carrying capacity, they could be guaranty of sustainable development or using of landscape and natural sources of the national park. They could be. Unfortunately these secondary symptoms of landscape deteriorization are not visiable immediately, so normal visitor of the National Park doesn´t realize them and thus he doesn´t feel to be responsible for such a harmful impacts. But in fact he is the primary subject of the improvement of tourism standards and busy activities of local enterpricers.

Some examples of secondary impacts:

Rebuilding originally quite small mountain chalets - that means

- - irreversible changes of the mountain landscape infrastructure character, a loss of historical and culture identity or originality by replacement old woody chalets by new hotels, without respect of local architecture style;
- - reducing of extent of species-rich mountain meadows in surrounding those reconstructed and mainly enlarged chalets (very serious impact because these meadows are essential source of biodiversity; a lot of rare, endangered or protected mountain plant and animal species are connected with existence of these semicultural non-forest ecosystems and with regular care for them; Krahulec and others, 1996).

Higher equipment and increasing of accomodation capacity connected with bigger consumption of drinking and homehold water and serious problems with generation, handling and disposal of sewage and waste-water or liquidation of municipal solid waste - that means- large-scale eutrophization and acidifying of mountain habitats in surrounding of mountain chalets and consequently negativ trends in spatial and species succession of native plant communities, above all missing of rare and sensitive mountain species because of dispersion of some nitrophilous plants or anthropophyta which are strongly invasive (Rumex alpinus, Urtica dioica, Cirsium arvense etc).

Extending of mountain roads and paths because the old construction is already not sufficient for higher moving of persons and for more dense traffic. For extending and repairing of roads are often used the geologically unsuitable material such as limestone, melaphyre, basalt or even asphalt, instead of native rocks - that means

- changes of chemical properties of the soils in the vicinity of repaired roads and again the proccess of eutrophization and expansion of the weeds (Vitkova and others, 1999, Malkova and others, 1997) forcing out the natural ecosystems - threat to the genetic structure of native species (table 2.). *Higher moving of people and tracks on mountain roads and paths* - that means (in synergism with the previous impact)
- an enormous transport of seeds of allochtonous plant species, especially weeds and their rapid and the highly succesful dissemination into the vicinity of roads and paths and consequently potential threat to the genetic structure because of uncontrolled hybridization of taxonomically simillar species (e.g. native *Viola sudetica* and allochtone *Viola tricolor*, some microspecies of genera *Hieracium*, *Taraxacum* etc.).
- Aproximately 30% of all vascular species of the Krkonoše Flora are allochtonous transported into the mountains during tle last two or three centuries - for immagination how big threat the transport of plant diaspors is (Stursa, 1996);

Expansive and invasive anthropofytic species	**Expansive apofytic species**	**Endangered native species**
Alchemilla sp.div.	*Calamagrostis villosa*	*Bartsia alpina*
Alopecurus pratensis	*Chaerophyllum hirsutum*	*Campanula bohemica*
Cirsium arvense	*Cirsium hellenioides*	*Epilobium alsinifolium*
Dactylis glomera	*Deschampsia caespitosa*	*Epilobium nutans*
Epilobium adenocaulon	*Filipendula ulmaria*	*Hieracium rubrum*
Epilobium angustifolium	*Hypericum maculatum*	*Juncus trifidus*
Myrrhis odorata	*Poa annua*	*Montia fontana*
Phalaris arundinacea	*Poa chaixii*	*Poa laxa*
Rumex alpinus	*Poa supina*	*Pulsatilla scherfelii*
Rumex longifolius	*Ranunculus acris*	*Swertia perennis*
Tusillago farfara	*Senecio nemorensis*	*Taraxacum alpestre*
Urtica dioica	*Taraxacum officinale agr.*	*Viola sudetica*

Table 2. The most expansive and invasive species of vascular plants and the serious endangered native species at the summit area of the Krkonose Mts due to secondary tourism impacts

- changes in abiotic conditions and species composition of the vegetation along the paths influence undesirable changes in species structure of animals, even disturbance of the animal populations because of strong tourist traffic and too wide roads and therefore dividing of populations into small parts with consequences in genetic structure; the same impact is caused by fragmentation of complexity of mountain landscape with natural pattern of vegetation through too dense net of tourist trails;
- permanent stress for some sensitive species of mammals or birds and graduel disappearing such species like *Tetrao urogallus* or *Bonasa bonasia* from mountain forest ecosystems.

Building of new alpine ski areas, building of new pists or their extending - that means

- - disturbing of forest stands complexity and consequently more rapid physiological damages, pest infestation and dying off mountain spruce forests which are under influence of air pollution (so called phenommena of emmission forest´s walls);
- - revegetation steep slopes after clear-cutting involves problem with appropriate seeds; there are the only seeds of cultivated sortes of grasses on the market , which are suitable for the revegetation of sportgrounds or stabilization of slopes along highways but not for the appliction within the protected areas with strict regime of species conservation. Using these grass cultivars (e.g. *Festuca rubra, Agrostis gigantea, Lolium* sp.div.) means later problem with genetic erosion because of potential threath of spontaneous hybridisation with autochtone population of the same taxa, regardless of conflict with the statute of the national park, where distribution of allochtone organisms is strictly prohibited.

Well, it is obvious that tourism exploitation can induce a lot of serious problems which are in contradiction with the main objectives of protected areas. On the other hand it is doubtless, that tourism sector is the only one potential source of prosperity of local people living inside and outside the national park territory, expecially in the mountainous large-scale protected areas. These two antagonistic functions of the national park landscape evoke a strong confrontation atmosphere between the state administration and ecological bodies on one side and municipalities, indigenous people, enterpreneurs and investors in the area of recreation industry on the other side. Solution of this long-term conflict consists in working out of the proper managament plan for the national park territory, respecting the natural stability of mountain ecosystems. That means to understand the basic principles of what is carrying capacity of the national park environment about.

INDICATORS OF SUSTAINABILITY AND CARRYING CAPACITY

Inspite of many definitions several types of carrying capacity and existence of many publications dealing in this topic (e.g. Ceballos-Lescuráin, 1996; Drdoš and Janik, 1995; Kreisel, 2001), to estimate or to evaluate carrying capacity in such a region like popular mountain national park is ever extremelly difficult and results need not be expected by all stakeholders.

What is the right way to evaluate or to measure a carrying capacity? Which indicators can be used as a warning that the ecological impacts are too strong and the carrying capacity has been already oversteped. Could it be measurable by increased risk of footpath´s erosion, or by speed of pauperization of biodiverzity, by range of water pollution, or by extent of changes of soil´s chemical properties? If we use such indicators, so how to quantify these features, how many degrees plus or minus we could put to single parameters to obtain their weightiness and which ecological impacts are synergistic with the others, etc. Finally we must be aware of absolutelly different sensitivity of single mountain ecosystems which increases with their pauperization.

Therefore is necessary:

- to prepare an inventory of different types of stands or ecosystems of the protected area and to make a list according their sensibility or resistance to anthropogenic impacts,
- to recognize and well describe all types of primary as well as secondary anthropogenic impacts in the area during the proccess of environmental impact assessment taking into account cumulative effects (synergism),
- to carry out the proper long-term monitoring of these impacts; anyway the establishment of special monitoring network for objective way of later evaluation should be done,
- to attempt determine the differences not only in space but even in the time, that means to evaluate the dynamics of some negative impacts (e.g. to measure differences in sensitivity of the trails surface to the trampling not only during summer time but also in herbst or in early spring when there is some synergism with cryogenic factors). Thus, we will be able to realize more effective management activities protecting trails surface against soil erosion,
- to select a list of the most convenient indicators of sustainability and to open a monitoring such indicators.

We have started at the Krkonose Mts. National Park some investigation on **ecological carrying capacity** using recent mapping activities of actual non-forest vegetation and forest vegetation (Nováková and others, 1998)in the framework of Natura 2000 programme. Orthofotomaps are utilised for present field work , basic mapping unit

for the non-forest vegetation is the syntaxon on the alliance level ; approximatelly 30 basic mapping units (alliances)for non-forest vegetation from the submountain to the alpine zone. All syntaxons has been analysed and described according:

characteristic of species diversity, group of diagnostic plant species , occurence of endangere and protected species, invasive plant species, significant animal species

altitudinal description (occurence in the main vegetation belts

abundance (degree 1 – 5; one locality only, very rare, rare, disperse, common)

type of threat: (all types of both abiotic and biotic factors)

carrying capacity (5 degrees, see below)

management policy

Degrees of carrying capacity:

1. very low, high vulnerable ecosystem (high internal as weel as external lability)
2. low, vulnerable ecosystem (high external lability, internal stability)
3. relatively stresstolerant ecosystem, both internal and external stability, vulnerable only through rough mechanical distrubances
4. strestolerant ecosystem
5. high stresstolerant invasive (expansive) ecosystem

Using field vegetation mapping and above mentioned syntaxa description we prepared multicriterial analysis several GIS layers (for example density of tourist trail´s network, construction and quality of trail´s surfaces, density of tourist load, actual vegetation and dispersion of invasive plant species)which enabled us to evaluate how particular part of the national park is or will be sensitive to actual tourism load, if the potential carrying capacity still allows to increase some tourism activities and vice versa.

This is convenient way how to elaborate precise management plan which enables to harmonize both above mentioned functions of protected area (nature coservation as well as sustainable tourism). Anyway, detailed explanation and discussion of criteria for such a landscape evaluation with main stakeholders and land-use planers are extremelly important and essential.

Another convenient indicator of sustainable use of mountain landscape seems to be **management of flower-rich mountain meadows**. They have several very important functions within the pattern of mountain landscape:

- biodiversity protection (species-rich habitats with high number of threatened and strictly protected plants and animals; altogether 450 plant species grow on mountain meadows ´more that 1/3 of total amount of vascular plant species recorded from the Krkonose Mts., Krahulec and other, 1996),
- agricultural function (ecofarming),
- high diversity of landscape character,
- recreational function (mountain chalets, skiing),
- cultural-historical heritage (local architecture of wooden houses/log cabins/, traditional practices lifestyles).

For keeping of all these functions appropriate system of funding and supporting from the state budget or from other bodies is absolutelly needed. Recently there are two systematic grants in the Czech Republic (Ministry of agriculture and Ministry of Environment of the Czech Republic) using since 1994. As the National Park Administration is responsible for administration these state funds, results of implementation such state funding policy could be used as a convenient indicator of sustainable development of the National Park and Biosphere Reserve territory.

Therefore the Administration of KRNAP prepared a methodology of long-term monitoring such indicators of sustainability with three main objectives:

1. Evaluation of influence of various types of meadow management on biodiversity
2. Targeting of state support on most convenient parts of NP territory
3. Development of State policy of Landscape Care Funding if necessary according results of monitoring

Such monitoring could contribute to:

- better communication between NP Administration and indigenous people and local communities
- restoration of regular care for mountain meadows as a part of biodiversity protection
- supporting of landscape sustainability on the territory of the National Park and the Biosphere Reserve Krkonose

PSYCHOLOGICAL CARRYING CAPACITY

Untill NOW mainly aspects connected with evaluation of biological or environmental carrying capacity has been mentioned. However, it is very important to be aware, that visitor´s behaviour and attitudes, their wishes and motivation for the visit of protected area, their knowledge what is unique, significant or typical for visited area, what types of visitor´s rules are valid within the area, all these aspects can significantly influence amount of negative impacts of visitors in the protected area. Therefore is crucial to realize well prepared education and information programmes and also to increase our knowledges about feedback in visitor´s behaviour, that means if visitors are satisfied or dissappointed during their trip in protected area etc. These are very important information about the other type of carrying capacity - so-called the psychological carrying capacity.

To estimate this second type of carrying capacity is even more complicated than the first one. But if the psychological carrying capacity is oversteped - the consequences are also negative for the landscape. Many conflicts between visitors and nature and between visitors themselves. What more, these conflicts can owergrows within the conflicts between visitors and local people - thus advantages of the national park statutes become to be dissadvantages for local people. It might be the beginning of missunderstanding between protected area´s staff and indigenous people or municipalities.

Therefore the monitoring of visitor´s behaviour, the evaluation of public opinion, permanent education of both local people and visitors and patient explanation what the sustainable tourism development is about, are so important. This is the only way for stimulation the indigenous people, local communities as well as visitors on the protection of valuable nature and landscape of the national park.

We have investigated some quantitative as well as qualitative aspects of tourism load in some hot spots of the Krkonose national park in 1996 (Cihar and other, 1998). Results are presented in other paper during this conference.

Inspite a fact that there is a direct relationship between degree of our knowledges about both visitors and local people psychology and effectiveness of our magement activities within protected areas, a lot of gaps still exist in this field . We need urgently to know more details about perception of nature or protected landscape by various groups of visitors in relations to their age, education, occupation or social standing, what´s visitor attitudes to the rules, regulations and restrictions valid on territory of visited protected areas, etc. Very important tools for our communication with indigenous people and significant stakeholders consists in visiable flux of incomes from tourism bussiness as a clear economical beneffits of the existence of protected area for local people.

CONLUSIONS

Having such real data about both ecological and psychological carrying capacity we might be able to prepare an adequate tourism management plan as an one chapter of the complete management plan for the national park. Main objectives such document, beeing prepared not only by conservationists but in cooperation with all targed stakeholders, should be to define and to realize such management activities, which enable to keep up an equilibrium between sustainable use and the protection of natural sources in protected areas. Thus we schould be able to make the right decission of what vision of the mountain landscape we will prefare - either bussy scenery on figure 1. or romantic scenery on figure 2.

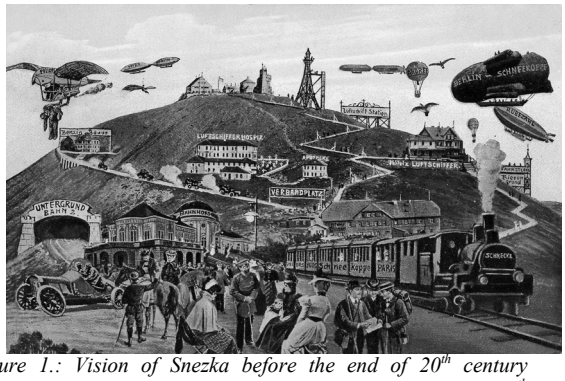

Figure 1.: Vision of Snezka before the end of 20th century according stylized postcard from the beginning of the 20th century

REFERENCES

Ceballos-Lescurain, H. (1996): Tourism, ecotourism and protected areas. – IUCN, Gland.

Cihar, M., Trebicky, V., Stursa, J. and Vitek, O. (1998): [Tourism aspects of the sustainable development in the Krkonose Mts. National Park], in Sarosiek, J. and Stursa, J. (eds.): Geologiczne Problemy Karkonoszy, 285-283, wyd. Acarus, Poznan (in Czech).

Drdos, J. and Janik, M. (1995): Slovak national Parks: carrying capacity, spatial projection of nature protectin, management plans. – in Acta Environmentalica Universitatis Comenianae, Vol. 95, No. 4-5, 39-49, Bratislava.

Flousek, J. (1994): Krkonose/Karkonose Bilateral Biosphere Reserve, in Jenik J. and Price M.F.(eds.): Biosphere Reserves on the Crossroads of Central Europe, Empora, 49-65, Prague.

Krahulec, F., Blazkova, D., Balatova-Tulackova, E., Stursa, J., Pechackova, S. and Fabsicova, M. (1996): [Grasslands of the Krkonose Mountains: Plant communities and their dynamics]. In Opera Corcontica, Vol. 33, 3-250, (in Czech).

Kreisel, B.,ed. (2001): Loving them to death? . Published by EUROPARC Federation, 136 pp., Grafenau

Malkova,. J., Malinova, J. and Oslejskova, H. (1997): [Contribution to distribution of anthropophytic plants in summit area of the eastern Krkonose Mts.], in Opera Corcontica, Vol. 34, 105-132 (in Czech).

Novakova, E., Schwarz, O. and Stursa, J. (1998): [Ecological carrying capacity of the National Park and Biosphere Reserve Krkonose], in Sarosiek, J. and Stursa, J. (eds.): Geologiczne Problemy Karkonoszy, 217-226, wyd. Acarus, Poznan (in Czech).

Soukupova, L., Kocianova, M., Jenik J. and Sekyra J. (1995): Arctic-alpine tundra in the Krkonose, the Sudetes. In Opera Corcontica, Vol. 32, 5-88.

Stursa, J. (1996): [Changes in the Flora and Vegetation of the Krkonoše Mts.], in Vacek S.(ed.): Monitoring, vyzkum a management ekosystemu na uzemi KRNAP, 307-312 (in Czech)

Stursa, J. (1998): Research and Management of the Giant Mountains´Arctic-Alpine Tundra (Czech Republic), in Ambio, Vol. 27, No.4, 358-360.

Vitkova, M., Vitek, O. and Branis M. (2000): [Trail network in subalpine and Alpine Belts of the Western Part of the Giant. Mts. – History and Present]. In Opera Corcontica, Vol. 36(1999), 133-152 (in Czech)

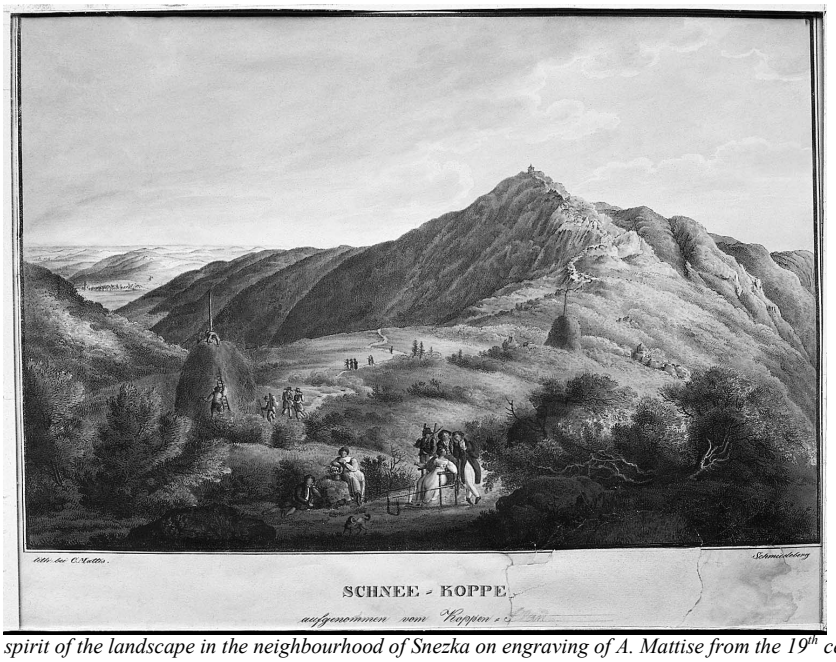

Figure 2.: Picturesque spirit of the landscape in the neighbourhood of Snezka on engraving of A. Mattise from the 19th century

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
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Development of Ecotourism in the Largest National Park "Yugyd va"

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Abstract: The National Park "Yugyd va", Komi, Russia is used predominantly by the Russian population for summer and winter recreation purposes. The National Park (NP) organizes, plans and controls visitor flows. Management of visitor flows is directly and indirectly realized by the NP. The direct management includes functional zone division, normalizing recreation loads, law-enforcement activity. The indirect management includes regulation of visitors access in determined places of the NP because of complex and dangerous routes or specific objects organization of tourist infrastructure. Monitoring of visitor activities in the National Park is realized by short-term visitor observation and route registration. Organization of visitor flow is realized on the basis of agreement between the NP and tour operators. The NP regulates of tourism and recreation by restriction of moving the visitors on the NP area on the basis of permissible recreation loads.

INTRODUCTION

National Park “Yugyd-va” (“Clear water”) is situated in the north-east part of Komi Republic, on western slopes of Prepolar and Northern Ural mountains and Pechorskaya lowland. The park was founded in 1993. In December, 1995 National Park “Yugyd-va” and Pechora-Ilych Nature Reserve were included by UNESCO in the list of World Natural and Cultural Heritage and named “Pristine forests of Komi”. The total park area is equal 1.9 mln ha. Nowadays this is largest reserve area in Russia and Europe. So due to its very large area and small staff in the NP there always exists a danger of uncontrolled spontaneous tourism, which can damage the unique ecosystems and discredit the idea of ecotourism.

The basis of conditions creation for regulated tourism and recreation is work out and realization of system of management and economic actions by the NP, which are directed on attraction of tourists and tour operators in the NP and creation of highly effective tourist's infrastructure. The aim of the NP management in tourism and recreation sphere is development of tourist industry in the Komi Republic on the principles of rational utilization of natural resources and conservation of natural and historical-cultural unique of the NP area.

METHODS

The following methods for the NP management in tourism and recreation sphere were used:

- Effective system creation of management of visitor flows of the NP
- Organisation of tourist activity and visitor's service by enlist the services of local population and private sector
- System creation of constant improvement of the NP tourist infrastructure by additional financing from different sources
- Qualification increase of the NP workers busy in scope of tourism
- Integration of tourism and recreation in the NP into regional social and economic systems

SOME RESULTS OF EFFECTIVE SYSTEM CREATION OF MANAGEMENT OF VISITORS FLOWS IN THE NP

The NP organizes, plans and controls visitor flows. Management of visitor flows is directly and indirectly realized by the NP. The direct management includes functional zone division, normalizing recreation loads, law-enforcement activity. The indirect management includes regulation of visitors access in determined places of the NP because of complex and dangerous routes or specific objects organization of tourist infrastructure.

The NP area is subdivided on 7 zones:

1. zone of reserve regime with 7 complex, 1 ornithological, 3 ichthyological, 23 geological, 2 floristic, 6 archeological natural reservations
2. zone of reserve regime with rocky natural formations and tundra regions
3. zone of regulated tourism
4. recreation zone for sport hunting and fishing based on tourism

5. zone of agricultural landscapes
6. zone of visitor service
7. zone of economic-production activity.

The NP regulates of tourism and recreation by restriction of moving the visitors on the NP area on the basis of permissible recreation loads. The loads were calculated by scientific researchers of Russian Academy of Sciences. The park organizes many tourist routes: traveling on foot, mountain, water, ski. Most tourists prefer water routes. A total distance of river routes is equal 1108 km.

The order and dates of visit, permissible number of visitors for different functional zones are determined by the NP itself. Those also depend on year season and weather peculiarities. The main visitor flows are recorded on the rivers Kojim, Kosyu, Synya, Vangyr, Schugor, Podcherem. Number of visitors constantly increases from 1321 (1995) to 2856 (1999) and 2709 (2000), and consequently a total sum of visitor's fee also increases from 6 000 rbl. (1995) to 51000 rbl. (2000). Organization of visitor flow is realized on the basis of agreement between the NP and tour operators. Unfortunately there are not many quality tour operators in the Komi Republic and Russia. So the NP organizes different routes for visitors based on visitor's application forms sent 2 weeks before visit.

Not large visitor flows is explained by presence of uncontrolled spontaneous tourism, short warm season, mosquitoes, absence of good transport roads. The park area is a great and has not good infrastructure. In spite of these facts 12 workers of the park have certificates of ecotourism instructors, 2 tourpackets are prepared, set of maps (different parts of the park) and 2 information booklets are published. Every year ecological camps for kids from different parts of Russia are organized on the rivers Podcherem and Schugor. It is noted that in 2001 majority of visitors registered in the park control posts. The park workers try to decrease number of uncontrolled tourists through publications and reports in mass information media and lectures in different organizations.

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
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Ecotourism demand in North-East Italy

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Abstract: There are three regions in North-East Italy: Friuli Venezia Giulia, Veneto and Trentino-Alto Adige. These regions have highly differentiated environmental and natural features. In fact, in this small area we can find the biomes of the main European temperate zones. The environment is important because there are a large number of National and Regional Natural Parks, as well as small protected areas that many people visit every year.
Since the nineties, the authors have been involved in research to examine and analyse ecotourism in North-East Italy.
The main objectives were to: a) define a methodology that would quantify the recreational flow from the results of phone and in-person interviews, b) analyse ecotourism demand, socio-economic visitor features, tourist facilities and economic flow.
The statistical models study the number of visits through a travel cost method, and willingness to pay by means of contingent valuation methods.
The findings have allowed us to fill the considerable information gap regarding ecotourism and the recreational use of the landscape. From the survey we have collected precise data on the economic and social importance of ecotourism, such as recreational benefit and expense flow.

INTRODUCTION

There is a wide consensus regarding the concept of ecotourism in the sense that we all understand the message that it sends (i.e. nature, local community, economics, conservation, culture and the symbiotic relationship between tourism and nature conservation). However, agreement on a universal definition has not yet been reached. The term, coined by Hector Ceballos-Lascurain[8] in 1983, has been accepted by the World Conservation Union (IUCN): 'Ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present) that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations' (Ceballos-Lascurain, 1996)[9].

In this sense the features of ecotourism are more specific than the broader concept of sustainable tourism[10] (Bottrill & Pearce, 1995; Coccossis & Nijkamp, 1995; CEC, 1999, WCED, 1987).

Moreover ecotourism is a recent theme. Its late arrival on the scene is not, however, related to the recent development of nature-related tourism, but to the fact that tourism and natural resource exploitation have only recently been linked to conservation. In fact, the relationship between tourism and nature has a long tradition. Since 1800 both in Veneto and Friuli Venezia Giulia the mountain areas were visited by mountaineers from all over Europe. Subsequently, trips to the mountains developed into mass tourism[11]. In the same way, other natural areas were transformed into resorts. In recent years, awareness of the need for conservation has increased, and places addressed to different uses (like agricultural land or border areas) have been involved in renaturalisation and wilderness conservation projects. Consequently, there is greater interest in hill and lowland areas, such as wetlands or places where wild animals have been introduced, and visitor flows have risen.

At present there is no qualitative and quantitative information available regarding the size of visitor flow and recreational benefit, even if a

[8] Member of Commission of Environmental Cooperation, CEC.
[9] The three main characteristics of ecotourism are defined as: nature based; environmentally educated; and sustainably managed (Blamey, 2000).
[10] Definition coined by World Travel and Tourism Council, World Tourism Organization, Earth Council 'Sustainable tourism meets the needs of present tourist and host regions while protecting and enhancing opportunity for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life-support systems'.
[11] In the alpine region 5 million beds are offered; every year 60 million of tourists reach Alps to stay in the resort and as many to visit them daily. The tourist turnover is about 23.000 million of Euro, representing circa 5% of the whole world tourist turnover (CIPRA, 2000).

few research projects are beginning to study the matter[12].

The purpose of this paper is to illustrate the results of this limited research, which was carried out both in the Veneto and Friuli Venezia Giulia regions. The aim is to describe and quantify visitor flow and to determine the socio-economic role of ecotourism[13].

ESTIMATION OF VISITOR FLOWS IN NATURAL AREAS

The main problem in analysing ecotourist demand concerns the estimation of visitor flow. At present in Italy there is no detailed or reliable information on the subject. In fact, the only data available is related to the presence of tourists in hotels. This kind of information is limited because: a) it does not take day-trippers into account; b) many people stay either in second-homes or with friends; c) in general there is very little information about the places visited during the holidays and recreational activities. In order to fill this data gap, many surveys have been carried out in Veneto and Friuli Venezia Giulia using different methods (Mitchell & Carson, 1989; Bishop & Romano, 1998).

The issue of estimating visitor flows in natural areas raises several problems connected with the kind of area studied (Chase et al., 1998). The ways of estimating the visitor numbers are related to: 1) dimension of the area under investigation; 2) the number of access points; 3) payment or not of an entrance fee.

It is widely accepted that these elements are strictly connected because small natural areas have few access points and this allows for both better control/management of flow and the payment of entrance fees. This situation, however, is very infrequent in the zones we studied because in most cases the natural areas are very large and have a lot of access points.

The most frequent situations both in Veneto and Friuli Venezia Giulia are the following:

- highly extensive mountain areas with many access points;
- small natural areas with few access points, where nobody controls visitor numbers and no entrance fee is required;
- small natural areas with an entrance fee.

Only in the last case is information about the number of visitors collected.

In the first two cases, if we want to estimate visitor flow, we need either to set up phone/postal surveys regarding the whole population of potential visitors, or to carry out field surveys. In this latter case the problem regards the number of access points.

Estimation using phone surveys

In 1999 and 2000 two phone surveys were carried out, one in Friuli Venezia Giulia and the other in Veneto (Tempesta & Thiene, 2001; Marangon & Gottardo, 2001). The purpose of the research was to analyse the tourist-recreational behaviour in mountain areas. In particular, the survey aimed to discover the number of daily hiking/trekking visitors in the most important mountain massif and forest districts; the number of days spent in the mountains; type of recreational activities carried out during each trip. Two stratified samples were defined, one composed of 500 and the other of 760 people. They were interviewed in both regions.

The results show that in Veneto 48,1% of the sample had been on day trips, while 12,6% had been on holiday; in Friuli the percentages were lower, so we discovered that 33,8% had been on daily excursions and just 4,8% had been on holiday. Therefore, visiting alpine and prealpine areas is a very common practice in both the regions, especially in regard to daily excursions. While we met difficulties estimating the number of people on holiday, it was easier to define the number of day-trippers, which was estimated to be 6 million either in Friuli or in Veneto. Besides, it resulted that the average number of excursions was higher in Friuli than in Veneto. On the contrary, the number of excursions per hectare was higher in Veneto (21 against 12 excursions per hectare) than in Friuli (see Tables 1 and 2). For a better interpretation of the estimation we should consider in person surveys, which estimated that 25% of mountain visitors had been on holiday. Therefore, visitor flow was equivalent to 26 and 16 units per hectare in a year. These values are similar to those reached in other alpine zones and in this way they are substantially reliable.

At this point we should highlight that it is very difficult to estimate visitor numbers in each natural area. If we consider the average number of excursions done in each massif/district with a confidence interval of 95%, we can observe that in some cases the lower boundary is negative. Therefore, the estimation cannot be reliable (Tables 1 and 2). This problem depends on district dimension, in so much as smaller districts were visited by fewer people and so the estimation was more problematical. In fact, a meaningful sample should be larger than those used in our research. Therefore, phone surveys are only able to collect general information. On the other hand, they can

[12] The value of the world's ecosystem service and natural capital is a very interesting theme (Costanza et al., 1997; OECD, 1992). This research is going in this direction focusing in on the recreational value.

[13] To study in depth consult: Marangon et al., 2000; Marangon & Gottardo, 2001; Marangon & Tempesta, 1998; Marangon & Tempesta, 1999; Tempesta & Thiene, 2000a; Tempesta & Thiene, 2000b; Tempesta & Thiene, 2001; Visintin, 2000.

Mountain massif	Surface Km^2	Trips			95% Confidence Interval	
		mean	total	per ha	Lower Bound	Upper Bound
Vette Feltrine - Monte del Sole	779	0,0639	285.513	3,67	0,0356	0,0922
Piccole Dolomiti - Pasubio	80	0,1995	891.500	111,44	0,1258	0,2732
Cansiglio - Alpago	196	0,0795	355.435	18,13	0,0490	0,1101
Asiago - Monte Grappa	408	0,4876	2.179.223	53,41	0,3694	0,6058
Baldo-Lessini	157	0,1382	617.641	39,34	0,0873	0,1891
Antelao-Marmarole	235	0,0365	163.150	6,94	0,0172	0,0558
Pelmo	21	0,0404	180.631	86,01	0,0190	0,0618
Tofane-Cristallo	198	0,0626	279.686	14,13	0,0404	0,0848
Duranno-Cima Preti	99	0,0143	64.095	6,47	-0,0012	0,0299
Sorapiss-Cadini	80	0,0104	46.614	5,83	0,0032	0,0176
Bosconero	20	0,0117	52.441	26,22	-0,0020	0,0255
Tre Cime-Croda dei Toni-Popera	78	0,0665	297.167	38,10	0,0439	0,0891
Civetta - Moiazza	145	0,0795	355.435	24,51	0,0496	0,1094
Marmolada	77	0,0691	308.820	40,11	0,0255	0,1127
Nuvolau-Averau-Croda da Lago	150	0,0326	145.670	9,71	0,0148	0,0504
Agner- Pale S. Lucano	149	0,0169	75.748	5,08	0,0078	0,0261
Total	2.872	1,4094	6.298.771	21,93	1,23575	1,58302

Table 1: Day trip number estimation in Veneto mountain zones.

District	Surface Km^2	Trips			95% Confidence Interval	
		mean	Total	per ha	Lower Bound	Upper Bound
Valcanale	423,28	1,8063	2.140.805	50,58	1,2191	2,3935
Canal del Ferro	313,38	0,1107	131.165	4,19	-0,0218	0,2431
Carnia	1.221,02	0,7154	847.890	6,94	0,4194	1,0114
Dolomiti Friulane	422,27	0,1186	140.534	3,33	-0,0078	0,2449
Prealpi Giulie	317,42	0,3636	430.972	13,58	0,1083	0,6189
Prealpi Carniche e P.C.Merid.	655,11	0,3162	374.758	5,72	0,0433	0,5891
Prealpi Venete	381,05	0,2589	306.833	8,05	0,0728	0,4450
Prealpi Giulie Meridionali	414,50	0,6462	765.912	18,48	0,1943	1,0982
Colline Moreniche	81,30	0,0632	74.952	9,22	-0,0117	0,1382
Collio e Colli Orientali del Friul.	212,46	0,1383	163.957	7,72	-0,0591	0,3358
Carso	321,64	0,6067	719.067	22,36	0,2160	0,9974
Total	4.763,4	5,1443	6.096.843	12,80	4,1175	6,1711

Table 2: Day trip number estimation in Friuli mountain and hill districts. .

give an overall estimate of the number of visitors in areas that are well-defined and extensive.

Estimation using field data

In order to overcome the difficulties connected with phone surveys, a field survey was used. There are no problems in areas with few access points. In this case, we defined a stratified sample that included counting the entries over a number of days in which the areas were visited. In general, counting was carried out in one third/quarter of all visiting days. This method is reliable and not so expensive when there are no more than 3 access points to check. Above that number survey costs increase, especially in mountain and hill zones, because interviewers have difficulties in reaching them.

In the case of multiple access points we suggest using the following method:

- identify the main parking areas;
- define a stratified survey calendar;
- count the number of cars in the parking area, taking care to note the time;
- carry out in-person interviews in order to calculate:
  a) average number of people per car;
  b) the relationship between the fraction of total arrivals recorded in the parking area (sh) and the times (hours in the day) (h) in which they was counted using the following formula:

$$sh = f(h) \qquad [1]$$

By means of formula [1], from the number of cars in the parking area at a given time it is possible to estimate the number of cars present in the parking area during the whole day. In this way, a single interviewer can complete counting in a large number of parking areas. For example, in the case of Natural Park of the Dolomiti Ampezzane, 17

Area	Typology	Geografic area	Province	Surface Km^2
National Park of the Dolomiti Bellunesi	National Park	Mountain	Belluno	32,00
Natural Park of the Dolomiti Ampezzane	Regional Park	Mountain	Belluno	11,20
Property Regole Ampezzane Cortina**	Collective ownership	Mountain	Belluno	13,00
Vincheto Celarda	State nature reserve	Mountain	Belluno	0,80
Waterfall of Molina (Cascate di Molina)	Regional nature reserve	Hill	Verona	0,15
Isonzo delta (Foce dell'Isonzo)	Regional nature reserve	Coast	Gorizia/Udine	23,40
Valle Canal Novo	Regional nature reserve	Coast	Udine	0,36
Quadris nature area (Fagagna)	Bird reserve	Hill	Udine	0,10
Griffin vulture project (Forgaria nel Fr.)	Regional nature reserve	Piedmont zone	Udine	5,10
Caves of Villanova (Lusevera)	Caves	Mountain	Udine	0,02*
Historical garden Villa Varda (Brugnera)	Garden of Palladian Villa	Plain	Pordenone	0,18

Table 3: Environmental and natural features, localisation of studied areas
** Estimated just on the base of length of open to visitors caves*
** * The right name is 'Property owned by the Regole Ampezzane south of Cortina'.*

parking areas were checked, and through 500 interviews it was possible to estimate the following formula:

$$sh = \frac{1}{1+e^{13{,}40+1{,}29 \bullet h}} \qquad r^2 = 0{,}99$$

In this way we estimated that 540.000 people had visited the area mainly in July and August (more than 65% of presences). This figure is very different from that obtained through the phone survey (Tempesta and Thiene, 2000b).

Applying this method to the land owned by the Regole Ampezzane it was possible to estimate that 340.000 people had visited the area during the Summer of 2000.

VISITOR FLOW IN THE AREAS STUDIED

The surveys on ecotourism both in Veneto and in Friuli Venezia Giulia involved natural areas which were diversified either as regards their dimensions or their geographical-ecological-environmental features (Table 3). In fact, there are National Parks, Regional Parks, Nature Reserves and areas managed by private or non-profit associations. Consequently, land use is extremely variable and allows people to practise recreational activities that are not strictly connected with the environment and nature (Table 3).

Tourist flow, which was estimated using the method described above, is highly variable. Large alpine parks stand out from other natural areas as regards the total number of visits. Every year they are visited by a wide range of people, varying in number from 285.000 to 540.000 units (Table 4).

However, the situation changes if we consider the number of visitors per hectare. In fact we observed that higher flows are connected with single-purpose visits. In this case, it appears as though the areas are treated as an “outdoor museum". This is evident in the natural areas of the Waterfall of Molina (Cascate di Molina), the Caves of Villanova (Grotte di Villanova), the historical garden of Villa Varda (parco storico di Villa Varda) and the Quadris Nature Reserve in Fagagna (Oasi dei Quadris di Fagagna). Considering the extension of the zones examined, tourist flow is very high in both the areas studied near Cortina. In this case, the number of visits is influenced by the presence of the well-known resort of Cortina.

VISITOR CHARACTERISTCS AND RECREATIONAL ACTIVITIES

In order to collect information regarding visitor characteristics and recreational activities about 8.400 people were interviewed in person. The sample of people interviewed in mountain zones is very small and therefore the following data are only indicative (Table 4).

The average age in the sample was aligned with the average age in Italy (39years), as was the average family size, around 3 units. On the contrary, the mean of family income was much higher than the national average at around 16.000 Euro per year. Average income was even higher in the Dolomite resorts. In fact here the figure was above 28.500 Euro (Table 4). These data were in keeping with an above-average educational level. In fact the sample share with a degree or a secondary school qualification was in the worst of the cases more than 52%, often going beyond 70%, while the national average is just 33%. Therefore, the North-East Italian ecotourist is a cultured person who enjoys a well-off lifestyle. The catchment area, which is defined as 'the distance covered by the 90th percentile', could be a significant indicator for the attraction potential of a defined area, and for the value tourists attach to it. The catchment area is broader in most of the mountain areas (exceeding in general 100 km) (Table 5). It is also extensive in many of the single-attraction natural areas studied. The griffin vulture project, the Waterfalls of Molina, the Caves of Villanova and the Valle Canal Novo are able to attract visitors coming from a long way off

Area	Visitors		Interviews	Age	Income (Euro)	Family	Graduates/ diploma*
	Total	per ha	%	mean	mean	mean	%
National Park of the Dolomiti Bellunesi	285.000	89,0	0,07	37	19.600	3,7	52
Natural Park of the Dolomiti Ampezzane	540.000	482,1	0,09	42	28.400	3,3	81
Property Regole Ampezzane Cortina	340.000	261,5	0,15	39	38.200	2,9	80
Vincheto Celarda	8.000	100,0	3,95	37	18.600	3,1	69
Waterfall of Molina (Cascate di Molina)	34.000	2266,7	2,80	37	18.100	3,4	72
Isonzo delta (Foce dell'Isonzo)	31.000	13,2	3,11	40	24.300	3,0	81
Valle Canal Novo	12.850	356,9	9,63	41	22.700	3,0	66
Quadris nature area (Fagagna)	9.000	900,0	11,34	40	18.100	3,1	74
Griffin vulture project (Forgaria nel Fr.)	8.000	15,7	10,63	40	23.800	3,1	71
Caves of Villanova (Lusevera)	6.470	3235,0	13,76	39	24.300	3,3	69
Historical garden Villa Varda (Brugnera)	69.500	3861,1	1,43	35	35	3,6	65

Table 4:Visitor Characteristics
** diploma means high school diploma*

Area	Catchment area (km)	Visitor activities (%)				
		Pic nics	Hiking	Natwatc*	Excursions	Other
National Park of the Dolomiti Bellunesi	100	43	17	16	18	6
Natural Park of the Dolomiti Ampezzane	150	8	3	45	58	4
Property Regole Ampezzane Cortina	220	2	38	53	31	6
Vincheto Celarda	75	0	40	60	0	0
Waterfall of Molina (Cascate di Molina)	115	0	71	42	0	0
Isonzo delta (Foce dell'Isonzo)	77	0	54	70	0	7
Valle Canal Novo	120	0	33	70	0	28
Quadris nature area (Fagagna)	73	0	44	48	0	8
Griffin vulture project (Forgaria nel Fr.)	97	0	47	37	0	20
Caves of Villanova (Lusevera)	98	5	0	67	7	22
Historical garden Villa Varda (Brugnera)	35	4	67	27	0	36

Table 5: Dimension of catchment area and visitor activities
**Natwatc means Nature watching*

in virtue either of their unique natural heritage or, more likely, because of the information facilities that help the visitor to understand nature. Therefore the catchment capability of a natural area is strictly influenced by developing, enhancing and promoting environmental projects.

As regards the reasons inducing people to visit the site, some conflicting elements emerge (Table 5). In fact, the decision to visit an area is not always founded on a naturalistic reason. Moreover, it is a secondary choice only in the National Park of the Dolomiti Bellunesi (in the Dolomites). The reason for this is connected with the dimension of the zone, as the surface area makes the park ideal for multipurpose visits that are often unrelated to the natural features of the area. In fact, the most environmentally interesting areas inside the park are inaccessible to many people.

On the other hand, the nature-based choice is the main reason for people visiting both other mountain areas and small wetlands. It is very interesting to note that people generally mentioned activities like walking or trekking for almost all the areas examined.

ACCOMODATION, VISITOR EXPENDITURE AND RECREATIONAL BENEFIT

A measure of the economic role of ecotourism is given by travelling expenditure borne by visitors to reach natural areas. As expected, expenses are correlated with both distance and use of tourist facilities. First of all, it is interesting to observe that in most of the cases analysed tourists are day-trippers who do not require any accommodation. The only exceptions are the two Dolomite areas near Cortina, where this kind of visitor is not very common. In this case, expenditure includes almost exclusively travel costs and cost of meals (Table 6). However, sometimes the entrance fee is the main expenditure.

Even if we exclude the two Dolomite areas, the average expense varies greatly throughout the sample, but this could be mainly ascribed to the payment or not of an entrance fee. The ability of natural areas to generate expenditure flows is indicated by the visitor expenditure per hectare figure. We should note that there are several differences among the areas studied. If we ignore the value for the Caves of Villanova, because of

Area	Expenditure per trip (Euro)					Expenditure (Euro)	
	Travel	Ticket*	Food	Accom.	Total	Total	per ha
National Park of the Dolomiti Bellunesi	3,6		7,9	0,3	11,8	4.026.401,3	1.054,6
Natural Park of the Dolomiti Ampezzane	3,5	3,4	9,7	16,1	32,7	17.639.585,4	15.749,9
Property Regole Ampezzane Cortina	19,3	3,1	7,0	14,2	43,5	14.802.687,6	11.386,8
Vincheto Celarda	3,4		0,4		3,8	30.161,1	377,0
Waterfall of Molina (Cascate di Molina)	2,1	2,0	1,9		6,0	203.690,6	13.579,2
Isonzo delta (Foce dell'Isonzo)	1,3	3,6	3,5	0,4	8,9	275.374,8	117,8
Valle Canal Novo	1,3	2,3	6,4		9,9	127.874,7	3.552,2
Quadris nature area (Fagagna)	0,7		1,7		2,4	21.846,1	2.184,6
Griffin vulture project (Forgaria nel Fr.)	1,5		4,8	0,2	6,5	51.852,3	101,7
Caves of Villanova (Lusevera)	1,5	3,7	3,4		8,6	55.467,5	27.734,3
Historical garden Villa Varda (Brugnera)	2,5		0,3		2,8	192.018,7	10.668,5

Table 6: Expenditure flows ** Entrance fee or cable railway in mountain zones*

Area	Recreational benefit per trip (Euro)				Benefit (Euro)	
	TCZ	TCI	CVM	Mean	Total	per ha
National Park of the Dolomiti Bellunesi		5,5	5,3	5,4	1.843.751,1	482,9
Natural Park of the Dolomiti Ampezzane		3,1	6,8	4,9	2.663.368,2	2.377,8
Property Regole Ampezzane Cortina			4,1	4,1	1.404.762,8	1.080,4
Vincheto Celarda	2,1	4,6	4,1	3,6	28.405,1	357,4
Waterfall of Molina (Cascate di Molina)			4,2	4,2	142.542,1	9.495,1
Isonzo delta (Foce dell'Isonzo)	6,3		3,9	5,1	158.552,3	67,7
Valle Canal Novo	6,2	10,0	7,6	8,0	102.258,5	2.839,0
Quadris nature area (Fagagna)			1,7	1,7	15.493,7	1.533,9
Griffin vulture project (Forgaria nel Fr.)	5,4		3,5	4,5	35.635,5	69,7
Caves of Villanova (Lusevera)			10,9	10,9	70.754,6	35.314,3
Historical garden Villa Varda (Brugnera)		4,8	2,3	3,6	247.899,3	13.759,4

Table 7: Recreational benefit

the difficulty in estimating the extension of the area, the per hectare value varies between a few hundred Euro and over ten thousand Euro. In particular, the expenditure flow is very high in mountain and hill areas. In some cases this is due to high tourist development, in others it is thanks to the exploitation of natural areas by the private sector.

In order to assess the recreational benefits, we used both direct and indirect approaches[14] (Table 7). We should note that, from some points of view, benefits per trip are quite similar because they only vary between 3,5 and 5,5 Euro, which highlights the considerable recreational value of the areas examined.

Obviously, the per hectare total benefit flow is influenced by the number of visitors and this is why it appears to be so variable. In general it is higher than for other alternative economic uses, like forest or agricultural productivity.

CONCLUSION

In the second half of the 1990s several surveys, which were carried out both in Veneto and Friuli Venezia Giulia, collected information regarding the size and features of ecotourism.

By applying appropriate counting methods we were able to quantify visitor flow in many natural areas. Despite a high level of variability, factors capable of increasing visitor flow were substantially related to the extent of tourist development in the area and to the facilities supporting outdoor activities, especially as concerns nature and the environment.

Data collected through interviews highlighted that the choice of visiting areas of great natural beauty does not just depend on an interest in nature. It often depends on an unspecified need for a natural habitat that has not yet been affected by urban and agricultural growth.

What is more, the fact that the ecotourist's level of education is higher than the national average is encouraging. So it is reasonable to assume that ecotourists will have a more careful approach towards nature and the environment. Because of the relationship between educational level and ecotourist flow, we can assume that a steady increase in school attendance will encourage people to visit natural areas.

Finally, we should highlight the expenditure flow generated by ecotourism and the great recreational benefit deriving from it. In conclusion, ecotourism seems to play a significant role in the economic development of the areas studied. In particular it favours the development of marginal areas (such as hill and mountain zones) or guarantees recreational and cultural benefits to the

[14] Statistical models study the benefit of visits through several methods. We applied an indirect approach, the so called travel cost method (individual travel cost, TCI and zonal travel cost, TCZ), and a direct approach, contingent valuation method (CVM) (Mitchell & Carson, 1989; Bishop & Romano, 1998).

inhabitants of overcrowded areas on the Veneto and Friuli plain.

REFERENCES

Bishop, R. C., & Romano, D. (1998): Environmental resource valuation. Applications of the Contingent Valuation Method in Italy, Kluwer Academic Publishers, Boston.

Blamey, R. K. (2000): Principles of ecotourism. In Weaver, D. B., Ed., The encyclopedia of ecotourism, CABI Publishing, Wallingford, UK.

Bottrill, C. G., & Pearce, D. G. (1995): Ecotourism: Towards a key elements approach to operationalising the concept, in : Journal of Sustainable Tourism, Vol. 3, No. 1, 45-54.

Ceballos-Lascurain, H. (1996): Tourism, Ecotourism and Protected Areas, IUCN, Gland, Switzerland.

CEC (1999): The Development of Sustainable Tourism in Natural Areas in North America: Background, Issues and Opportunities. Discussion paper prepared by Brief, D., Ceballos-Lascuráin, H., Drost, A., Hull, J., Spalding, M., & Wild, C.,. Montreal: Commission for Environmental Cooperation.

Chase, L.C., Lee, D.R., Schulze, W.D., & Anderson, D.J. (1998): Ecotourism demand an differential pricing of national park access in Costa Rica, in: Land Economics, November , Vol.74, No. 4, 466-82.

CIPRA (2000): Turismo nelle Alpi: Qualità economica - qualità ambientale, in: CIPRA Info, No. 57, 9.

Coccossis, H., & Nijkamp, P. (1995): Sustainable Tourism Development, Avebury, Aldershot, USA.

Costanza, R., D'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neil, R., Paruelo, J., Raskin, R.G., Sutton, P., & Van Den Belt, M. (1997), The value of the world's ecosystem services and natural capital, in: Nature, Vol. 387, 253-260.

Marangon, F., & Gottardo, E. (2001): La valutazione monetaria del danno ai boschi del Friuli Venezia Giulia. In: Marangon, F., & Tempesta, T., Eds., La valutazione dei beni ambientali come supporto alle decisioni pubbliche. Una riflessione alla luce della normativa comunitaria e nazionale, FORUM, Udine.

Marangon, F., & Tempesta, T. (1998): La gestione economica delle aree protette tra pubblico e privato: il caso di una zona umida costiera a Marano Lagunare, FORUM, Udine.

Marangon, F., & Tempesta, T. (1999): Obiettivi pubblici e privati nella gestione delle aree protette. Il caso della Riserva Naturale delle Cascate di Molina (VR), in: Aestimum, No.38, dicembre 1999.

Marangon, F., Collini, S., & Tempesta, T. (2000): La fruizione turistica delle grotte: una valutazione economica della domanda. In: Marangon, F., & Massarutto, A., Eds., Uso sostenibile delle risorse ambientali e delle aree protette, FORUM, Udine.

Mitchell, R. C., & Carson, R.T. (1989): Using Survey to Value Public Goods. The Contingent Valuation Method, Resources for Future, Washington D.C.

OECD (1992), Market and government failures in environmental management: wetland and forests, OECD, Paris.

Tempesta, T., & Thiene, M. (2000a): Aree protette ed attività ricreative: un'indagine nel parco nazionale delle dolomiti bellunesi, in: Genio Rurale, No.5.

Tempesta, T., & Thiene, M. (2000b): Benefits and costs of tourism and outdoor recreation in the Natural Park of the Ampezzo Dolomites (Veneto-Italy). Proceeding of the international conference on Agritourism and Rural Tourism. A key option for the Rural Integrated and Sustainable Development Strategy, Perugia 21-22 September.

Tempesta, T., & Thiene, M. (2001): Costi e benefici sociali dell'attività escursionistica ed alpinistica. Rapporto fra sentieristica e sicurezza degli escursionisti, in: Atti del Convegno Sentieri al bivio?, Trento, 1 giugno 2001.

Visintin, F. (2000): L'ecoturismo sostenibile nella Riserva naturale Regionale della Foce dell'Isonzo. In Marangon, F., & Massarutto, A., Eds., Uso sostenibile delle risorse ambientali e delle aree protette, FORUM, Udine.

WCED (1987): Our Common Future, World Commission on Environment and Development, New York.

Monitoring and Management of Visitor Flows in Recreational and Protected Areas
Conference Proceedings ed by A. Arnberger, C. Brandenburg, A. Muhar 2002, pages 380-383

Visitors and Managers: Differing Evaluations Concerning Recreational Impacts and Preferences for Management Actions?

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Abstract: During the summer of 1999 tourists were interviewed along two important scenic roads in Norway. Later on managers in all Norwegian counties were asked some of the same questions. The questionnaire presented twelve photos of trails and paths in different conditions, and twelve potential management actions concerning minimizing or repairing impacts on the ground. The results show significant differences between the two groups in their evaluations of photos with comprehensive impacts and corduroy covered paths. The managers have a lower level of tolerance towards impact, and the visitors are more in favor of using corduroy. Almost all of the proposed management actions were also rated significantly different, but the two groups are still quite consistent in their overall rating patterns: Actions concerning information of visitors or shielding the resource are favored; using fees is unacceptable.

INTRODUCTION

The impact of recreation and tourism on the natural environment has been an important research and policy topic in recent years (Liddle, 1997, Hammitt & Cole, 1998). Reported visitor concern about such impacts has been promoted as a basis for s practice of self-regulation and management intervention. Nonetheless, there have been relatively few empirical evaluations of how such impacts affect the visitor experience.

Provisions of (physical) facilities in recreational areas often have a double purpose. They offer service to the visitors, but their primary purpose might equally well be as management actions with the purpose of limiting impacts on the natural environment.

Research in the outdoor recreation field suggests that land managers may be more concerned about impacts than are the visitors. But how do the two groups judge the need for facilities, and which management actions are regarded as good or acceptable tools in order to repair or minimize impacts?

It is important to understand the visitors' evaluations (as a stakeholder group) in order to determine whether "conventional wisdom" about concern for such impacts are accurate, and whether facilities and management actions are necessary. Moreover, it is important to know to what extent the visitors represent a homogeneous group and whether various stakeholders support a given management action or set of actions.

This paper reports results from two studies in Norway concerning evaluations of impacts and stated preferences for facilities and other management actions. The results will be discussed in relation to recreational experiences, management objectives, and also in relation to what is acceptable environmental conditions and the establishment of environmental standards.

METHODS

The evaluations are based on respondent ratings of 12 nature-oriented photos showing paths and trails in different conditions and shapes, combined with ratings of several (written presentations of) potential management actions for minimizing or repairing impacts. The rating questions used a 7-point scale, where a low number indicates a negative valuation of a picture or a management action. Four is a neutral statement. Surveys were administered to visitors along Sognefjellsvegen (a scenic road through a mountain area in the middle of Southern Norway) and along Atlanterhavsvegen (a scenic road along a part of the coast between the two towns Molde and Kristiansund N) during the summer 1999 (N=569). The visitors were contacted along the roadside, where they filled out a self-report questionnaire. A broad mixture of nationalities was represented in the sample: 40 % Norwegians, 24 % Germans, 9 % Dutch, 8 % Swedes and 6 % Danes, together with tourists from 14 other nations.

All the relevant managers at the county level (The Environmental Division at the 20 County Governors Offices) in the entire country were mailed a questionnaire during the autumn 2000 (N=205). The managers were (on an average level) much more experienced in outdoor recreation than the visitors.

The relevant questions for the results presented here were identical in the two studies. The analysis used are ANOVA (analysis of variance) and Factor

Analysis (Principal Component Analysis, Varimax rotation)

RESULTS

Impacts on the ground

Significant differences (ANOVA, 5 % level) were found between the managers and visitors for 10 of the 12 pictures. Each of the last two pictures show a path with little or limited impact on the ground, and both were given a high positive rating from both groups (mean values 5,45 and 5,71 for the two pictures). The rest of the pictures display a great variety in types and levels of impacts, and there is also (as always with photos) quite a lot of other information (more or less hidden) in the pictures. A factor analysis tries to simplify data in a complex material; in this case data "hidden in the 12 pictures".

A factor analysis revealing three factors explains 54,0 % of the variance. The factors can be described as following:

- **Factor 1**: Comprehensive impact on the ground (comprised by seven pictures) - called HI-IMPACT
- **Factor 2**: Logged paths, to shield the ground from impacts (two pictures) – called CORDUROY PATH
- **Factor 3**: Minor impact on the ground (three pictures) – called LO-IMPACT.

Analysis of variance (of the factor scores) shows that there are significant differences between the visitors and the managers in how they valuate HI-IMPACT ($F(1, 697) = 94.64$, $p < .001$) and CORDUROY PATH ($F(1, 697) = 23.18$, $p < .001$), but not LO-IMPACT ($F(1, 697) = .22$, $p = .643$). (Factor 3 includes the two pictures that did not show significant differences in themselves either, between the two groups – mentioned above).

So what do these differences actually indicate? We can make three new variables, each of them reflecting one factor. We get an average rating for each respondent by combining the rating scores for the pictures that make up each of the factors. This way we can visualize the pattern:

HI-IMPACT: The average score is low (meaning 'negative' rating of the pictures) for both groups on this factor, but especially low for the managers (2.8). The visitors' average is 3.8. The interpretation is that the visitors have a higher tolerance for recreational impact on the ground than do the managers.

CORDUROY PATH: Here the average score is close to neutral (4). But the visitors' average is in the positive direction (4.7) while the managers' average is somewhat negative (3.9). It seems like the visitors appreciate facilitation like wooden cover along or on a trail, more than the managers.

LO-IMPACT: The average score is almost identical for both groups, and this is the only factor with an average score clearly in a positive direction (5.6). The interpretation is that both groups tolerate, and probably even appreciate, the moderate impact along a path.

Valuation of facilities and management actions

We presented 12 different types of facilities or management actions to the respondents. All of them represent an alternative in managing recreational impacts. The results show a great variety in how both the visitors and the managers evaluate the different alternatives.

Once again we used an exploratory factor analysis in trying to reveal an overall pattern in the material. The analysis gave four factors (Eigenvalues > 1) explaining 57,7 % of the variance. The factor loading matrix is presented in Table 1.

Proposed management action	Factor 1	Factor 2	Factor 3	Factor 4
Regulate the number of visitors in wildland areas	.766			
Regulate certain activities in certain areas	.720			
Prohibit big groups	.712			
Only allow camping on specific sites	.429			
Fee requirement for entering a specific area		.827		
A yearly fee for using the nature for recreational purposes		.771		
Fee requirements for activities that especially impact the natural resources		.686		
Inform visitors in order to guide the use to robust areas			.835	
Inform visitors in how to impact as little as possible			.826	
Restore and strengthen the sites by supplying more soil before sowing or planting				.835
Close especially impacted sites for some years, so that the vegetation can recover				.552
Making corduroy paths across bogs				.421

Table 1. *Rotated factor loading matrix (sorted) for variables on management actions*

The result of the factor analysis is quite easy to interpret. The variables with high loading on each of the factors can be thematically simplified like this:

- **Factor 1**: Regulations and prohibitions
- **Factor 2**: Economical means
- **Factor 3**: Informing the public
- **Factor 4**: Protecting or repairing the resource

There is a significant difference between the visitors and the managers for all four factors. Regulations and prohibitions (factor 1) is more appreciated by the managers than the visitors ($F(1, 517) = 11.87$, $p<.01$). It is opposite with the economical means (factor 2); these are more acceptable among the visitors ($F(1, 517) = 30.60$, $p<.001$). To inform the public (factor 3) seems to be more welcomed among the managers than among the public itself ($F(1, 517) = 19.36$, $p<.001$). To protect or repair the resource (factor 4) is valued more positively among the visitors than the managers ($F(1, 517) = 20.39$, $p<.001$). But these results only present the differences between the two groups, not their actual view on the different actions.

Table 2 presents the valuation of the different management proposals in a descending order, with the most favored ones at the top (based on the mean value in the whole sample). Generally spoken, it is highly acceptable to inform the visitors how to behave, but not to make them pay. The different suggestions with prohibitions and regulations varies along the scale; it is more accepted with specific regulations (certain activities in certain areas) than more general regulation (visitors in wildland areas).

DISCUSSION

The results show that there are significant differences between the visitors and the managers both in their level of tolerance for recreational impact, and in what they consider to be good management practice in dealing with recreational impacts. However, it is very important to note that the two interest groups, despite the differences, follow almost the same pattern in how they evaluate both the impact and the management actions. Although the visitors have a higher tolerance than the managers for recreational impact along a path, they still prefer a path with little impact. And although the visitors are less appreciative than the managers of 'information of visitors' as a management action, they still find this the most favorable one among the proposed actions. We have the opposite case with 'fee actions': These are (perhaps surprisingly?) more acceptable among the visitors than among the managers, but they are still rated as unacceptable management actions. Today it is not relevant policy in Norway, anyhow, to introduce fees as a management actions, because of 'Allemannsretten'.

Management actions	Interest group	Mean (n)	Mean (N)
Inform visitors in how to impact as little as possible	V	6.1	6.1
	M	6.2	
Inform visitors in order to guide the use to robust areas	V	5.7	5.8
	M	6.2	
Close especially impacted sites for some years, so that the vegetation can recover	V	5.8	5.7
	M	5.5	
Regulate certain activities in certain areas	V	5.2	5.4
	M	5.9	
Making corduroy paths across bogs	V	5.3	5.3
	M	5.2	
Restore and strengthen the sites by supplying more soil before sowing or planting	V	5.2	5.1
	M	4.7	
Prohibit big groups	V	4.3	4.4
	M	4.8	
Only allow camping on specific sites	V	4.5	4.4
	M	3.9	
Fee requirements for activities that especially impact the natural resources	V	4.2	4.2
	M	4.1	
Regulate the number of visitors in wildland areas	V	3.7	3.8
	M	3.8	
Fee requirement for entering a specific area	V	3.0	2.7
	M	2.2	
A yearly fee for using the nature for recreational purposes	V	2.4	2.2
	M	1.6	

Table 2. *How the two interest groups (Visitors and Managers) value different management proposals – separately (n) and all together (N). The scale goes from 1 (= very bad) to 7 (= very good).*

This public right of access says (both according to tradition and law) that anyone is allowed to walk etc. on uncultivated land, without paying, and no matter who owns the land, *"... when it is done considerately and with due care"* (Ministry of Environment 1985, Vistad 2001a).

The ratings on the different management actions show quite a similar pattern as the results from a previous study in two recreational areas in Norway (Vistad 2001). An important point here is that these two recreational areas are located quite a distance from the road. They require hiking or canoeing to be reached, and these visitors were also more experienced recreationists. Anyhow, the level of experience does not seem to influence the results dramatically: The most popular actions (the same list was used in the two studies) were those based on use of information, and on protecting or repairing the resource, and the least favorable ones were fees – quite similar to the present study.

Many studies conclude that recreational impact on the ground are quite accepted by the visitors, especially when compared with impacts like litter and other "unnatural" traces (Stankey & Schreyer, 1987, Kuss et al., 1990, Vistad, 1995). This study shows that the tolerance for impact on the ground is very much a question of how comprehensive the impact is. Cole et al. (1997) have a similar conclusion in their study from high-use destinations in six wilderness areas.

These findings show the relevance of discussing and studying "the limits of acceptable change" of a recreational resource. Evaluating and defining standards of quality is one of the important, but difficult tasks for the managers (Anderson et al., 1998, Lime et al., 2000, Manning, 2000). For the managers it must be pleasant to confirm that their view – in this study – is very much mirrored by the visitors' view. But there are still important differences to be noticed.

An important reminder is the fact that the visitors (or even managers) seldom or never appears to be a homogeneous group. Here the visitors and managers have been treated as two groups, only comparing mean values. There will probably be a broader variety in the results if we bring in the potential of segmenting variables like attitudes, recreational experience, gender, nationality etc.

REFERENCES

Anderson, D. H., Lime, D. W. & Wang. T. L. (1998): Maintaining the Quality of Park Resources and Visitor Experiences: A Handbook for Managers. TC-777. University of Minnesota, St. Paul

Cole, D. N., Watson, A. E., Hall, T. E. & Spildie, D. R. (1997): High-Use destinations in Wilderness: Social and Biophysical Imparts, Visitor Responses, and Management Options. Research paper INT-RP-496. Intermountain Research Station, Forest Service,

Hammitt, W. E. & Cole, D. N. (1998): Wildland Recreation: Ecology and Management, 2nd ed. Wiley, Chichester

Kuss, F. R., Graefe, A. R. & Vaske, J. J. (1990): Visitor Impact Management. A Review of Research. National Parks and Conservation Association, Washington, D. C.

Liddle, M. (1997): Recreation Ecology: the Ecological Impact of Outdoor Recreation and Ecotourism. Chapman & Hall, London.

Lime, D. W., Anderson, D. H. & Wang, T. L. (2000) : A Decision Process to Maintain the Quality of Recreation Resources and Visitor Esperiences. In: Fulton, D. C., Nelson, K. C., Anderson, D. H. & Lime, D. W. Eds. Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications. Workshop, 1-3 Febr. 2000. University of Minnesota, St. Paul.

Manning, R. E. (2000): Defining and Establishing Indicators and Standards of Quality. In: Fulton, D. C., Nelson, K. C., Anderson, D. H. & Lime, D. W. Eds. Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications. Workshop, 1-3 Febr. 2000. University of Minnesota, St. Paul.

Ministry of Environment (1985): The Open-Air Recration Act (an English translation and explanation of The Outdoor Recreation Act – 'Lov om Friluftslivet'). Oslo

Stankey, G. H. & Schreyer R. (1987): Attitudes Toward Wilderness and Factors Affecting Visitor Behavior: A State-of-knowledge Review. In: Proceedings – National Wilderness Research Conference: Issues. State-of-Knowledge, Future Directions. Fort Collins, CO, July 23-26, 1985 – GTR INT-220, Intermountain Research Station, Ogden, Utah

Vistad, O. I. (2001): Er Slitasje frå Friluftslivet eit Problem? (Is Recreational Impact a Problem?) In: Vorkinn, M. & Hjelle, A. M. Aa. Eds. Friluftsliv. Delrapport 2 fra Forskingsprogrammet Bruk og forvaltning av Utmark. The Research Council of Norway. Division for Environment and Development, Oslo

Vistad, O. I. (2001a): Allemannsretten – On Access and Recreation in Norway, In: Usher, M. B. Ed. Enjoyment and Understanding of the Natural Heritage. Scottish Natural Heritage, The Stationary Office, Edinburgh

Vistad, O. I. (1995): I Skogen og i Skolten. Ein Analyse av Friluftsliv, Miljøoppleving, Påverknad og Forvaltning i Femundsmarka, med Jamføringar til Rogen og Långfjället. (In the Head and in the Forest. An Analysis of Outdoor Recreation, Environmental Experience, Impacts and Management in Femundsmarka National Park, with Comparisons to Rogen and Långfjället Nature Reserves). PhD Thesis, Dept. of Geography, University of Trondheim.