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.

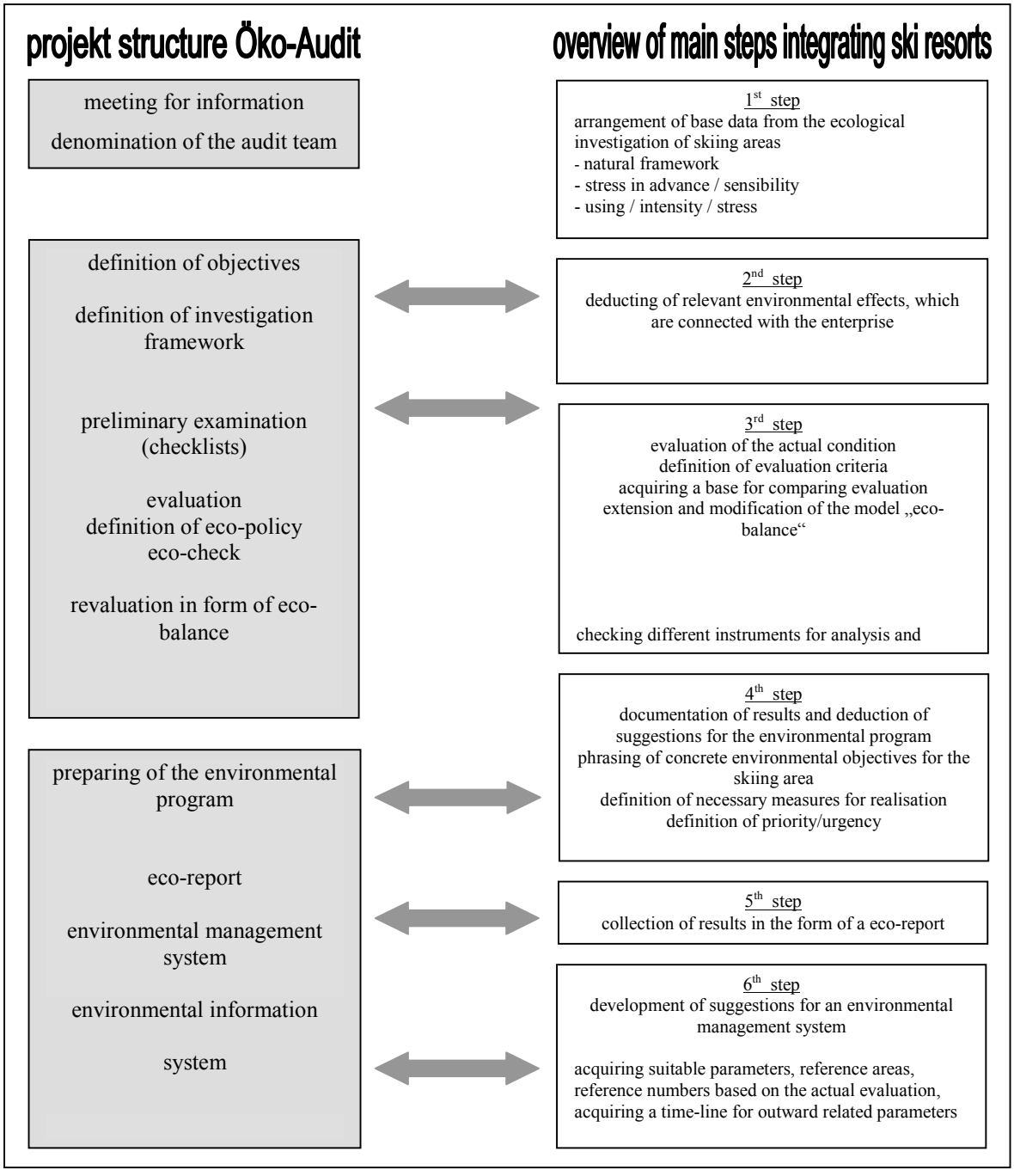

Figure 2: model for the EU-Eco-Audit in skiing resorts corresponding to the steps of the EU-Eco-Audit (see AMMER, PRÖBSTL 1995)

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.

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