

Value based decision making process for strategic visitor management in the Natura 2000 area Lech River Valley, Tyrol

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Abstract: The Lech valley with the river Lech and its tributaries is an alpine river valley in Austria with a considerable amount of naturally free flowing stretches. The ecological and scientific significance of the Natura 2000 area lies in its high biodiversity and the occurrence of numerous internationally endangered species within the dynamic braided river stretches. Apart from that the area contains a high number of recreational and educational values as well. The area, which is situated within day travel distance of the cities Innsbruck and Munich, is renowned for its biking and hiking trails and its unique water sport opportunities. Nevertheless, most intense impact occurs from the daily use of the local population in the densely populated Lech valley area nearby.

Due to its long and narrow shape the protected area is very vulnerable to impacts and therefore, to avoid negative impacts on natural values from recreational use, not only a management plan, but also a visitor strategy has been developed as part of an extensive European Union LIFE funded project. The decision making process for the establishment of the visitor management concept was based on a GIS supported risk analysis: First current ecological and recreational values have been located and assessed. Subsequently hotspots have been defined in areas, where those contrasting values overlay. These hotspots were defined in areas of high ecological vulnerability and high visitor impact from intense recreational use.

This hotspot analysis served as a basis for discussion and co-operation with the local population and stakeholders to agree on management solutions. As a result specific management actions were defined and the allocation of visitor infrastructure was planned accordingly. As a response to the need for more detailed information about recreational uses and users a visitor monitoring concept was included in the visitor strategy as well. This paper describes practical planning policies to highlight the need for strategic planning of recreational use in protected area management based on the comprehensible evaluation of the hazard potential from uses and the vulnerability of ecological values.

Introduction

Area description and project outline

The Natura 2000 area Lech valley of Tyrol (within the political district of Reutte), covers 41 km², and contains parts of the river Tiroler Lech including the floodplain areas and its forests, the most significant tributary streams and parts of the bordering montane forest stands (Figure 1). The Natura 2000 area represents an impressive ecosystem with enormous scientific significance and contains important recreational and educational values. The ecological significance of the Tiroler Lech lies in the dynamic power of its water and the occurrence of numerous native plant and animal species including those especially adapted to riverine ecosystems.

In 2001 an extensive European Union LIFE funded project was launched at the Lech River, which includes a total of 53 individual projects. The project aims at conserving and restoring the fairly natural, dynamic fluvial habitats by revitalising both the Lech and its tributary streams. A total of 7.82 million Euros

are available in order to carry out the project, which is also to have positive economic impacts on the region.

As part of the LIFE funded project a visitor management concept has been developed in close co-operation with the local population, which builds the basis for this paper about applied visitor management issues and tasks.

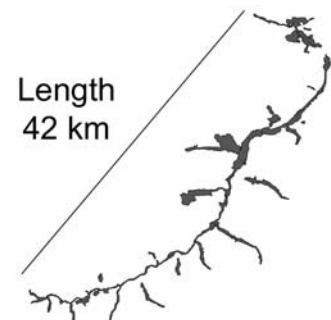


Figure 1. Due to limited space the protected area along the Lech river and its tributaries does not contain buffer zones. Its long and narrow shape makes it more vulnerable to impacts.

Nature conservation tasks

The river Lech represents an important nesting habitat for riparian species. Nowhere can comparable populations of Goosander *Mergus merganser* (which has its most significant occurrence in Austria in Lechtal), the Common Sandpiper *Actitis hypoleucos*, Little Ringed Plover *Charadrius dubius*, Dipper *Cinclus cinclus*, be found. The extensive riparian forests serve as a habitat for numerous bird species of extraordinary diversity compared to other alpine areas.

The Little Ringed Plover's preferred breeding ground is on gravel banks devoid of vegetation. The Common Sandpiper, on the other hand, finds more protection for its nest in the sparse vegetation of pioneer plants. For both species, the Lech is one of the less outstanding remaining breeding grounds in Austria.

The habitat of the grasshopper *Bryodema tuberculata* is to be found at slightly raised places of alpine river gravel banks. Owing to the fact that such places have almost disappeared, this big and beautiful species is today threatened with extinction.

The lady's slipper is one of the rarest and most spectacular orchids. This orchid, classified in Austria as an endangered species, feels most comfortable in the half shaded surroundings of floodplain forests, developing a one to two-flowered inflorescence with large blooms. The distinctive plant with its large, yellow blooms in the shape of a slipper, flowers from May to July. In this time thousands of visitors arrive in the area to see the blooms.

Problem statement

Regional context and recreational use

At the Lech river, as at other rivers in Central Europe, for a long time protection from the water and creation of land were the main focus of the structural water measures that were undertaken. Since having satisfied these needs, different aims have become more and more important today, namely to conserve and recreate a fluvial landscape with a character as close to nature as possible, which offers place for leisure time activities, recreation and the experience of nature.

Due to its long and narrow shape, settlements and business sites are directly bordering the significant protected area. The floodplains and the river bed areas have traditionally been used for recreation by the local people due to easy access from the nearby settlements. Their activities are ranging from sun bathing and children playing on the gravel banks to picnicking and camping in the nearby floodplain forests. Apart from these unofficial uses by local people from adjacent residential areas, there is a very popular officially marked biking and hiking trail that runs along the river bed. Finally, there are kayakers and rafters travelling down the stream and landing on gravel banks.

Therefore, the pressure on the protected area from this variety of uses is generally very high, although

there are local differences in the activities and frequencies of visitors (e.g. intensive use of the area around the flooded gravel pit, partly high frequencies on biking trails). Visitor management is difficult to implement due to the shape of the area. Furthermore, the possibilities for providing visitor facilities, which do not cause a disturbance, are restricted because of the many contact points to the river areas.

More or less all floodplains are easily accessible, as there are numerous entrances and foot paths leading in. This also makes effective visitor monitoring difficult to implement. Specific data about the numbers, activities and impact of visitors as a basis for the visitor strategy are lacking.

Taking this into account a visitor monitoring concept has been developed as part of the preparation of the visitor management concept by the Bodenkultur University, Institute for Landscape Architecture and Landscape management (Arnberger 2002).

Due to the increasing popularity of the area, a large potential for the development of tourism is predicted. The Lech river lies within day travel distance of the cities Munich and Innsbruck, which is part of the reason for the variation of visitor frequencies and user groups during a week.

Whereas the use by local people from adjacent residential areas is more evenly spread on weekdays, high user densities occur on weekends from city – dwellers arriving by car. Those getaway visits are often day trips or 2–3 day visits that tend to focus on a specific activity (e.g. biking along the river) or area (e.g. visiting the blooming “Lady's Slipper orchids”).

Goals and objectives

The region is interested in triggering regional development and stimulating sustainable tourism and marketing. Nevertheless, there is an increasing pressure on an area that has to be safeguarded as much as possible. So, sustainable and environmentally sound development of tourism and recreational use/infrastructure should be guided by a visitor strategy.

The development of this regional visitor strategy including direct and indirect management actions was the first step to co-ordinate and link management measures in order to maximise their positive effects. The visitor strategy should include:

- Offering improved educational facilities and hiking trails in order to promote a gentle sustainable recreational use
- Areas for experiencing nature and opportunities for locals to use certain areas of the riverbed
- Information strategy (media, folder, panels) and corporate design
- Facilities (educational trails, visitor centre, view points)
- Identification of spatially, temporally flexible especially protected low impact zones within the ecological core zones, on the basis of a conflict analysis and continual observation (max. 10% of the Natura 2000 area)

- Rangers in the field (information, control) and excursions (environmental education)
- Monitoring of the number of visitors, activities and their impact as a basis for effective future visitor management would be highly desirable.

In order to ensure acceptance of the visitor strategy among the local communities close co-operation with regional stakeholders and tourist organisations was a prerequisite for establishing the concept and particularly for defining management measures.

Methods

Value based decision making process

As a basis for the spatial planning of management measures, a GIS supported decision making process has been applied. The methodical approach was based on spatially and technically defining ecological and recreational values within the area in order to be able to analyse current conflicts and to avoid future conflicts that could occur from planning new visitor infrastructure.

First, all available ecological data to represent the current condition of the protected area had been gathered and evaluated. The most significant studies about habitat structure (Cerny 2001) and wildlife (Landmann 2002) were used to build a geographical information map that contains information about the current sensitivity of the protected area. For this purpose the entire area had been covered by a field inventory and subsequently the data were integrated

in the map and database.

On the one hand, the database “ecological values” contained information about the value of a biotope type and its structure (Figure 2). On the other hand, information about habitat potential for various bird and mammal species was included. Therefore, the assessment of the sensitivity of a biotope was not exclusively linked to the estimation of its vulnerability to disturbance, but rather on its own ecological value *and* its value as a habitat. Obviously, this sensitivity of a habitat type can differ considerably from the vulnerability of wildlife species living there (e.g. gravel banks severing as nesting sites for sensitive bird species). Hence, first the value of each biotope type was estimated and categorised generally for the entire project area, then the value of each habitat was defined individually by the occurrence of valuable wildlife species within. It was assumed that the occurrence of several endangered wildlife species made an area more sensitive to impact than none or one. Furthermore, it was considered that open areas without buffers are more susceptible to impact.

Subsequently, the recreational infrastructure (hiking, biking, mountain-biking trails, cross-country skiing, parking lots) and unofficial uses (picnic, barbecue, rafting and kayak, foot paths leading to the river banks) have been mapped in detail (Figure 3), assessed and categorised according to their impact. In accordance to relevant literature the impact for the uses had been defined as follows (Schneider-Jacoby 2001, Reichholf 2001, Walls 1999, Yalden 1990):

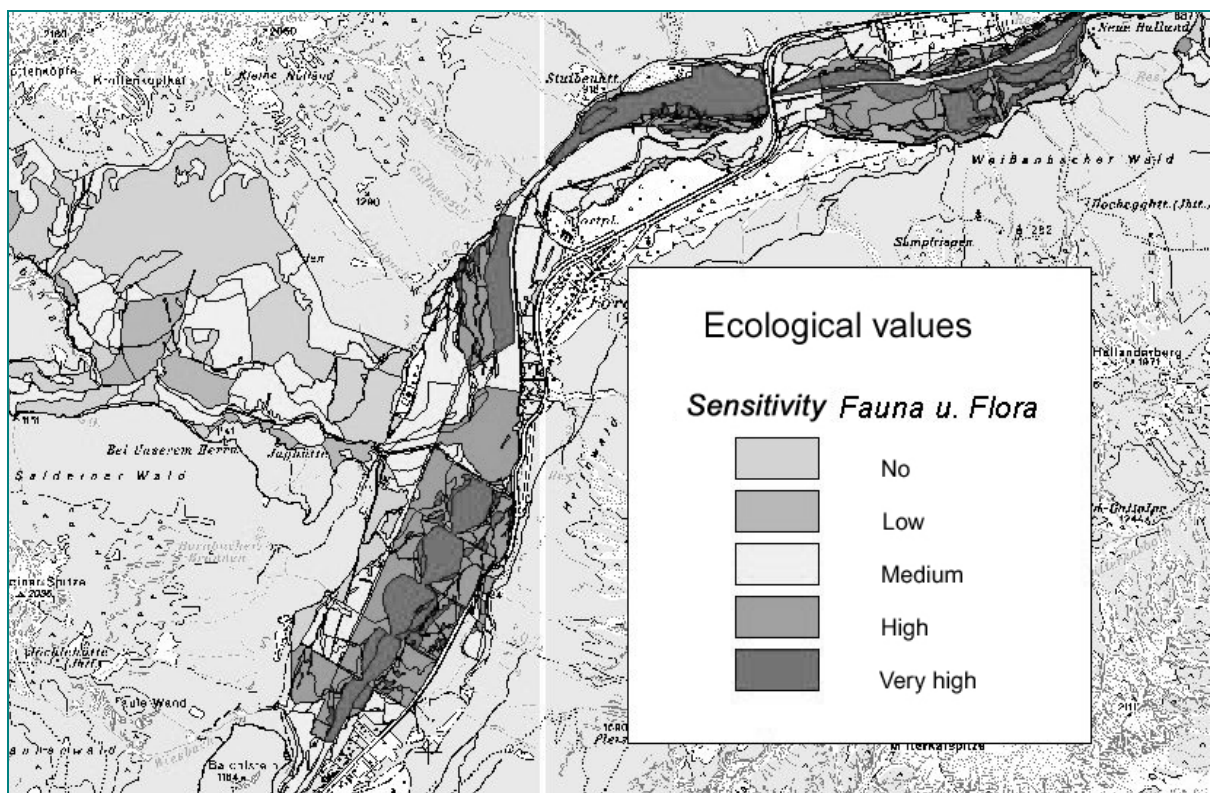


Figure 2. The map shows the high ecological value of the free flowing stretch of the river Lech with its sinuous water channels and highly variable flows.

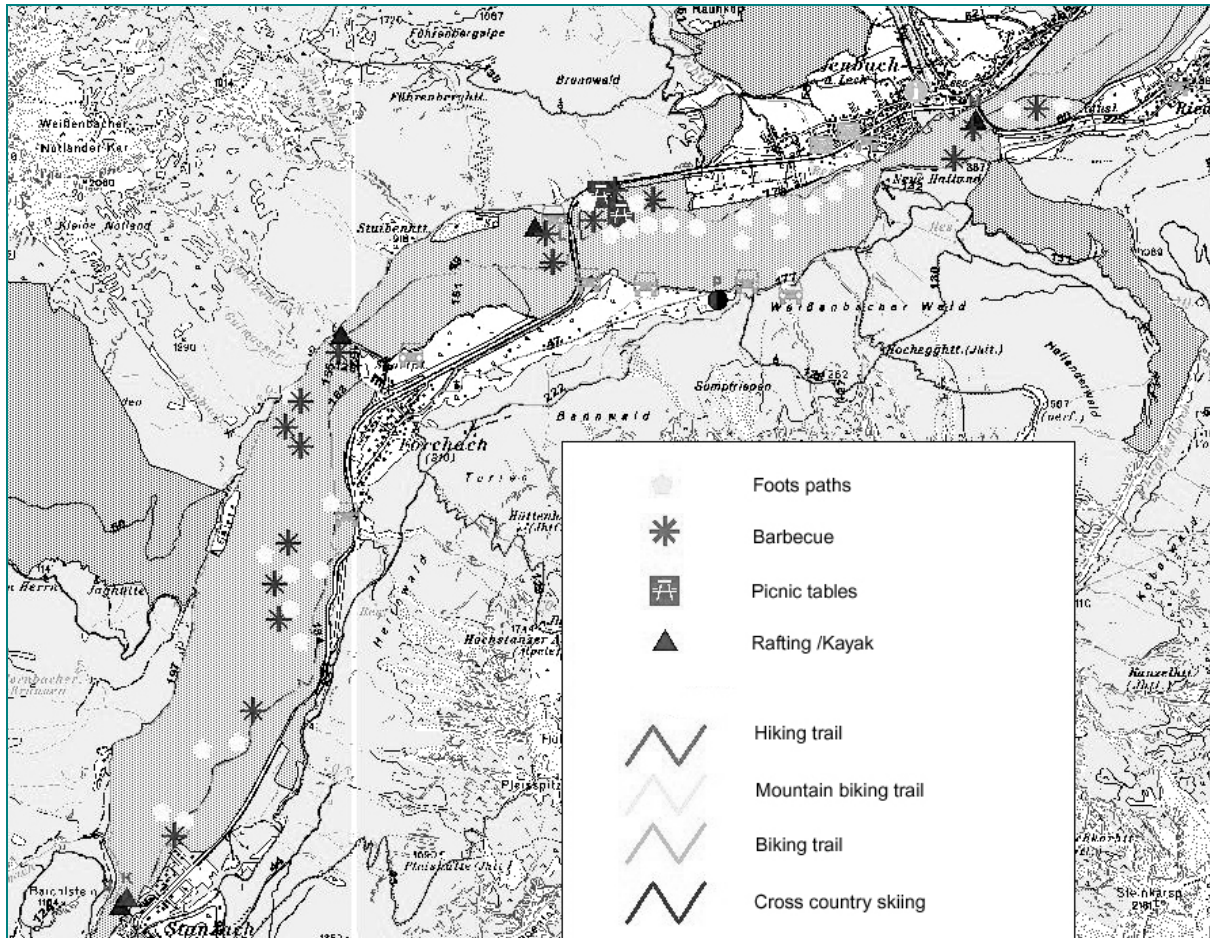


Figure 3. At the Middle Lech (see Figure 2) high user densities and various recreational uses are concentrated on the attractive gravel banks of the river stretch.

- Visitor frequency: Due to the lack of current visitor data, such as user frequencies, user densities had to be estimated based on interviews with locals and specialists familiar to the area.
- Visitor use: Visitor uses were categorised according to their intensity and impact on wildlife.

Biking and cross country skiing along the marked bike trail were considered as less intense than mountain biking and hiking. The highest impact occurs from uses that actually intrude into the habitat such as barbecuing on gravel banks or walking on foot paths leading into the floodplain forests.

Risk analysis model

The decision making process for the establishment of the visitor management concept was based on a GIS supported risk analysis (Figure 4 and 5). As in other risk analysis models (Egli 1996) the following process was applied: First the current ecological values had been located and assessed (sensitivity to damage). Then the impacts from the visitor infrastructure and use (danger defined through the frequency and intensity of recreational use) had been overlaid in a 100 m buffer (Margraf 2001).

Consequently the risk was defined in areas, where those contrasting ecological and recreational values conflicted. Hence, hotspots were defined in areas of high ecological value (vulnerability) and high visitor impact from intense recreational use.

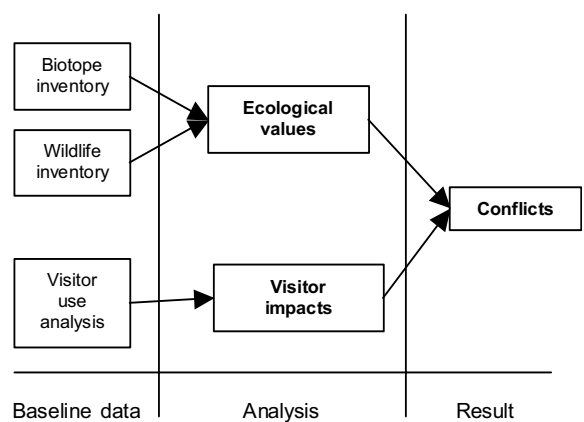


Figure 4. The methodology is based on overlaying ecological values and visitor impacts to define hotspots and areas of intense conflict.

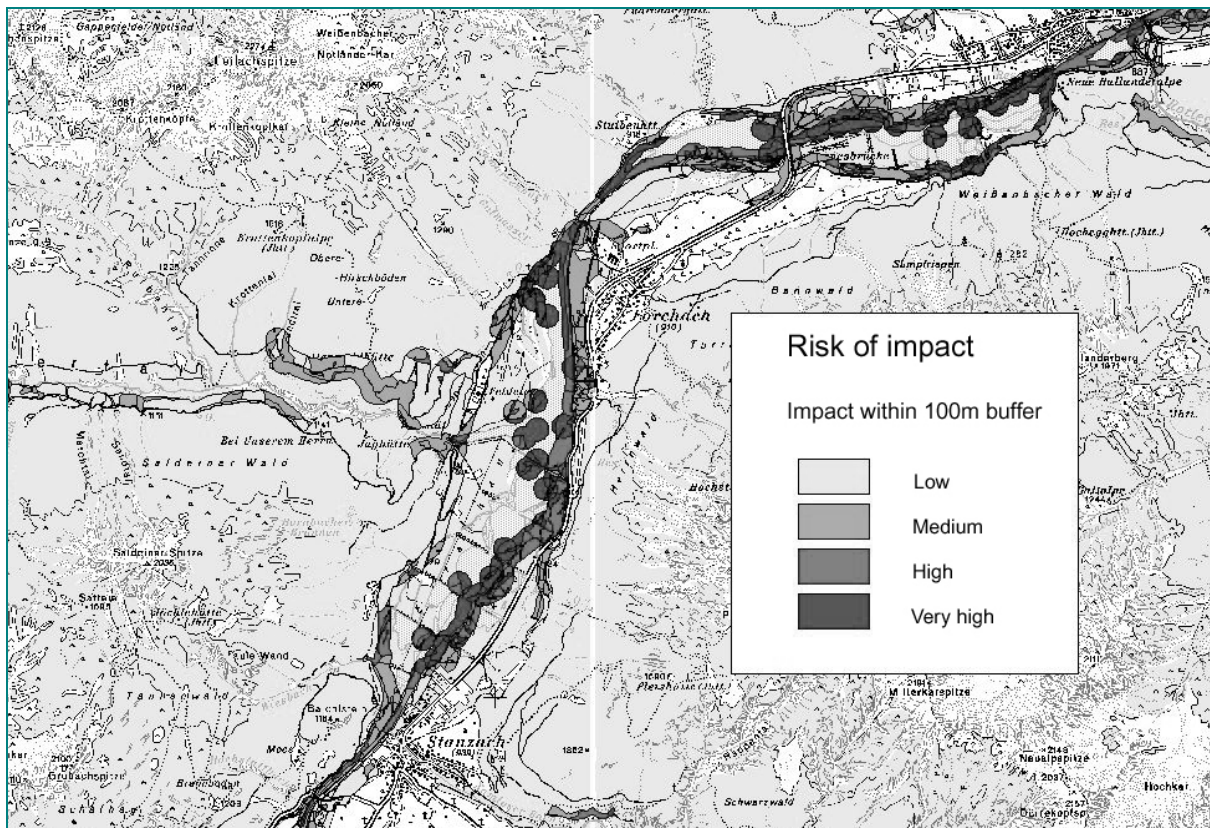


Figure 5. The map that has been developed as part of the risk analysis shows the areas of intense conflict. The application of a GIS based planning process allowed to cover the entire Natura 2000 area in the spatial analysis.

This hotspot analysis served as a basis for discussion and co-operation with the local population and stakeholders to agree on management solutions.

GIS application

The results of the field inventories were digitised and processed into digital theme maps by using a Geographical Information System (GIS; Programme: Arc View). The work with GIS does not only provide a graphical representation of very high quality, but also allows to carry out spatial analyses and the overlay of the different content maps (e.g. ecological values and recreational uses) as described above.

Management goals and objectives

Proposed management plan

As mentioned above, the definition of current hotspots (where ecological and recreational needs are conflicting) served as a basis for spatially defining measures for visitor management in order to protect intrinsic ecological values and to fulfil the visitors' need for recreation and environmental education.

First, the biking trail that runs along the Lech river was allocated on one side of the river according to the results of the risk analysis. At the moment the trail frequently splits up and is partly marked on both sides, which leads to impact on both river banks and makes orientation difficult. After the definition of

one axis, that changes river banks where necessary, all planned visitor infrastructure was concentrated in 21 visitor management zones along this axis in order to channel use on specific sites through facility design and to reduce impacts in the areas in between.

In contrast, the areas of highest ecological value were defined as low impact zones.

The management zones are generally located close to areas of current high user densities, as locals will probably continue to use those places that they are accustomed to. The detailed planning of attractive visitor management zones should help to provide alternatives to currently used sites and thus subconsciously influence visitor behaviour and use.

Various types of infrastructure will be integrated in the management zones:

- Interpretative paths
- Viewing platforms
- River access & recreation zones (located at sites of current river revitalisation projects)
- Rafting and kayak exit points
- Information points and visitor centre
- Outside of the visitor management zones the following measures will be applied:
- Low impact zones, where uses and access can temporarily be regulated
- Rangers operating in the field

All funds will be invested in the maintenance of the infrastructure along the axis, while other paths will

eventually become less attractive and could partly be screened (especially foot paths in the floodplains). Psychological barriers (such as handrails along educational trails) and sufficient information about impacts will be used to avoid signs.

Implementation and perspective

One of the main tasks in the development of the conceptual visitor management strategy was the public involvement in the planning process in order to gain acceptance in the region. Therefore the proposed visitor concept has been presented to the communities and tourist organisations and discussed in detail. Consequently, adaptations according to local needs have been made.

The management measures will be implemented over the next ten years. The installation of two educational trails and three viewing platforms has been integrated in the LIFE funded project and will thus be carried out as pilot projects.

Discussion

The fact that the development of a visitor strategy was integrated in this extensive LIFE project highlights the increasing importance of recreational use and its strategic planning in protected area management. The LIFE project aims at triggering a development, though afterwards the funds for the implementation of the entire set of management measures depend on the protection status that the Natura 2000 area will be transferred to in national legislation. The national protection status "nature conservation area" or "national park" are currently being discussed for the Natura 2000 area at Lech river, which will make a difference in funding on a Bundesländer and state level.

It proved to be important to involve local communities in the planning process and to convey understandable (technical and graphic) information about conflicts between current recreational uses and the need to safeguard conservation interests.

Finally, a conceptual visitor strategy appeared to be essential to co-ordinate the sustainable development of recreational infrastructure in the region and to protect the intrinsic ecological values outdoor recreation actually depends on.

Acknowledgments

The Provincial Government of Tyrol, Department of Conservation, initiated and commissioned all parts of the LIFE funded project within the Natura 2000 area at the river Lech, including the visitor strategy described above.

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