

A new method for sustainable ecotourism in protected mountain environment areas: the glacier trails in the Lombardy Alps

For at least 10,000 years, the Alps have always represented an adverse environment for human activities. This is because of their morphologic and climatic characteristics (steep slopes, accelerated morphological dynamics, long cold season, snowfall, etc.). Human settlements in the Alps have thus always represented a challenge and the possibility of living in the mountains has always been based on the delicate balance between population size and the availability of resources. This balance has often been disturbed by natural events (for example, climate changes) or human events (for example, economic or political events), which have brought about an actual depopulation of the Alps.

The last event of this type took place after the Industrial Revolution of the 18th - 19th centuries. New manufacturing methods and food production methods, new trade techniques and new means of communication all had a negative effect on the traditional economy of the Alps (based on pasture farming, crop farming and trade) and led to the emigration of numerous inhabitants of the Alps. This created a massive flux of emigrants from the Alps, headed for the plains.

The changed social, economic and cultural conditions characterizing the plains, more or less in the same period, laid the foundations for an intensive flux in the other direction (from the plains towards the Alps). The reasons for this trend are not economic (the search for resources or employment), but rather of a "recreational" type, or to use a more common term, for tourism.

The ancient, traditional utilization of the Alps (prevalently agriculture, forestry and pastoral ac-

tivities) was thus replaced or overtaken by a more modern type of utilization. Early on, the latter was concentrated in the summer months (mountain climbing, trekking and thermal vacationing), and then it was extended to the winter months (skiing).

All of this has given rise to two types of problems: 1) the influx of tourists to the Alps has not involved the entire Alpine region, but only several particular areas; 2) the intensive influx of tourists in those areas has created serious problems in terms of environmental impact.

As regards the first problem, marked differences have been noted between the economic development of the tourist areas (which have developed urban lifestyles and habits and often slowed down the exodus towards the plains) and that of the areas that are not tourist spots (where a rural lifestyle has remained intact and the exodus has continued, resulting in the complete depopulation of some mountain valleys). The reasons underlying this difference in the influx of tourists can usually be found in the physical geography of the various areas, or more in general, in the natural features of the various areas. The basic factors contributing to the appeal of some regions have consisted in the presence of high mountains (the highest in each individual Alpine sector, such as Monte Bianco for the Western Alps), of isolated peaks (like the Matterhorn), which are particularly suited to climbing (like the Dolomites), or the presence of areas suited for skiing.

As regards the second problem, it should be emphasized that environmental problems of various types are created in the areas that have the



highest influx of tourists because tourists demand levels of accommodations and services that are as similar as possible to those offered in urban settings. This has brought about an accentuated level of urbanization, with the development of new vacation spots where the mountains become mere backdrops often hidden from view by skyscrapers (as in Cervinia). Problems with overpopulation have become widespread and concentrated over very short periods during the year (winter and summer holidays). Pollution problems affecting the air, water and soil (owing to waste disposal) are widespread. Noise pollution is also part of the picture. All of this has had a marked impact on the fauna and flora as well.

In recent decades, these two types of problems have begun to affect not only the tourist spots found at lower altitudes that are closer to major cities and visited by a larger number of tourists, but also the high mountain areas, which are visited by trekkers and mountain climbers, whose numbers have increased substantially.

Remedies have been sought for these problems with the creation of protected areas. In the Italian Alps, two large national parks could well stand as symbols of these protected areas: the Parco Nazionale del Gran Paradiso [Gran Paradiso National Park], in the Western Alps, established in 1922, and the Parco Nazionale dello Stelvio [Stelvio National Park], in the Central Alps, established in 1935. Numerous others of various names and types have been established in more recent times. For example, in the Lombardy Alps *natural regional parks* (like those in the Bernina-Disgrazia group, Valle Masino, where this region's highest peak is found, reaching over 4000 m; those in the Livignasco, Adamello and Orobic Alps), *natural reserves* (for conservation land and for scientific purposes) and *natural monuments* (individual elements in the natural environment that are particularly valuable and calling for integral preservation) were planned starting from 1983, but only some have actually been implemented.

Among all of the protected areas in Lombardy, the most extensive is Stelvio National Park. In this Region, it covers a surface area of about 600 km²; and 70% of this area is found at altitudes exceeding 2000 m, with numerous peaks surpassing an altitude of 3500 m (Gran Zebrù is the highest peak – a beautiful, uniform metamorphosed dolomite pyramid that reaches an elevation of 3851 m).

The problems that afflict large protected areas are also present in Stelvio National Park: 1) problems with relations with the local communities that see the Park as a limit to their economic de-

velopment; 2) marked differences in the influx of tourists among the various Park areas; 3) environmental impact in the areas with the highest numbers of visitors.

A series of studies have been conducted in collaboration with the Park Management staff. The aim was to test methods for the utilization of natural assets, particularly geomorphologic assets. The methods are based on use for ecotourism at the cultural level.

The objectives are many (cultural, ecological, and economic):

- 1) to stimulate interest in and knowledge about high-mountain natural phenomena
- 2) to enhance their value in a sustainable manner, using methods that will reduce the impact on the environment
- 3) to reduce the impact in the areas subject to the highest level of visitors by reducing the number of tourists
- 4) to increase the influx of tourists in the areas with the lowest levels of visitors, creating elements of a naturalistic nature that will appeal to tourists.

The practical effects of this effort consist in the creation of special hiking trails that make it possible to approach one of most interesting natural elements (particularly geomorphologic elements) in the Park, the glaciers (we should note that the largest glaciers existing in the Italian Alps are found in Stelvio National Park).

Forni Glacier was chosen. It is a large valley glacier, the largest in the Italian Alps with a surface area of 13 km². This area's most distinguishing feature is that it presents a complete sequence of moraines that are of increasingly more recent age as one approaches the glacier. In fact, there are moraines ranging in age from the Late Glacial period (18,000 years ago), to the Holocene (3,000 years ago), the Little Ice Age (1850), the first half of the 20th century (1920) and the second half of the 20th century (1965-1985).

Therefore, visitors can reconstruct the history of all of the advance and retreat phases of the glacier, observe the morphologic effects of these phases (moraine ridges, roches moutonnées, small glacial lakes, hanging valleys, glacial cirques and gorges) and understand the scope of the environmental phenomena (particularly the climatic phenomena) that brought about these phases.

The Forni Glacier trail route was created in 1995. It was called the *Sentiero Glaciologico del Centenario* [Centennial Glacier Trail] in memory of a century of glaciological studies of this same glacier begun in Italy in 1895.



The Trail was designed and created in collaboration with local agencies and scientific organizations (Stelvio National Park, the Forest Service, the Alpine Guides, the Italian Alpine Club, the Italian Glaciological Committee and the University of Milan).

New trails were not cleared because older, pre-existing routes were used in connection with each other (livestock grazing paths, pack trails used during World War I, during which this area saw some of the battles fought at the highest altitudes, even over 3500 m, and trails used to reach the Alpine huts).

A park information sign has been placed at the starting-point of the Trail. It provides information on the trail characteristics. In addition, eight points of major interest have been identified along the Trail and they are marked by special signs indicating the various morphologic units to be observed.

The Trail starts at 2100 m at the Rifugio dei Forni (an Alpine hut), where the road ends for vehicles and there is a large parking area. It climbs the slope on the hydrographic right of Valle dei Forni, reaching the Branca Hut (2387 m), ascends the long moraine of the Little Ice Age, and then crosses the glacier tongue at about 2650 m. This is undoubtedly the most spectacular and most interesting part of the route because it makes it possible to observe the activity of the glacier, to observe the daily effects of melting, to see the varying morphology created by ablation and flow (crevasses, moulins, dirt ice cones, glacier tables, medial moraines, bediers, ice-dammed lakes, cryoconite holes).

The trail then continues along the left slope of the valley and reaches the parking area at the departure point again. It is thus a circular route lasting for 4-5 hours, making it suitable for well-equipped and experienced tourists.

In five years, the Centennial Trail has definitely become a classic cultural excursion trail visited by many tourists during their summer vacations in Alta Valtellina.

Some of the objectives underlying its creation have been reached and they specifically include:

- 1) The popular scientific awareness of and interest aroused in naturalistic and mainly geomorphologic and glaciological subjects have been positive. In this regard, a guidebook has also been published. It explains the most important scientific topics concerning the route. (Smiraglia, 1995).
- 2) Although they are difficult to quantify, the effects in terms of economic development at the

local level, have been positive. Indirect evidence consists in the re-modeling of and increase in the accommodations (number of beds) at the two Alpine huts mentioned previously (Forni and Branca huts), as well as the ever-increasing use of Alpine guides accompanying tourist groups along the Trail almost on a daily basis during the summer.

However, another negative factor that has come up in recent years should be added - and that is, the increase in erosion along the Trail. In fact, the increase in tourists along the Trail has definitely caused greater erosion on the steepest stretches, particularly on the moraine ridges. In fact, the grassy cover has decreased due to trampling and the width of the trail has widened. The flowing waters created by rainfall or the melting of the snow are also increasing erosion even further. Experimental studies are presently being conducted on this process to quantify the extent of the erosion and to limit the effects. Moreover, the destruction of a part of the moraine of the Little Ice Age, carried out in order to widen the access road leading to Branca Hut, must also be added to these effects.

In any case, the method chosen to implement ecotourism does seem to be quite positive overall. The creation of a new route is now being planned for a secondary valley in Stelvio Park, not far from Forni Glacier, Valpisella valley. Until now, this valley has been totally isolated from tourist routes. The scientific theme that it will deal with shall be rock glaciers, particular debris land forms that contain permafrost internally. The trail shall be named "The Rock Glacier Trail".

This second route is considered to be a useful tool for the utilization of the National Park and the natural assets in it on the part of summer tourists. In any case, it is an initiative addressed to persons who are already familiar with the Park area or with "ecotourism" in the summer season and who are interested in and focused on the high-altitude natural mountain environment. However, proposing visits and sustainable utilization to the category of high-mountain users whose visits are concentrated in the winter season seems highly unlikely. This category can be defined as consisting of skiers arriving for the traditional winter vacation week or weekend and who enjoy these places solely as "downhill slopes".

It is difficult to propose a different approach to the high-altitude environment to this category of users. This is because their time is totally dedicated to skiing and because most often this category of tourists does not visit the mountain environ-



ment during the summer season, preferring seaside locations or more commercial and less naturalistic places. Therefore, this is a category that is not open to a different way of understanding and a different use of the Alpine environment. Mountain locations where summer skiing is possible represent an important opportunity for approaching this category of users. These areas attract tourists, regular winter season visitors and occasional summer visitors. The Stelvio Pass area stands out first and foremost among the areas offering summer skiing and that can be used for this purpose. For almost seventy years several glaciers there (Vedretta Piana, Madaccio and Platigliole) have been used for summer skiing. These glaciers are located inside Stelvio National Park, that is, in a protected area. One glacier in particular, Ghiacciaio della Vedretta Piana, has been the focus of various studies (Smiraglia & Diolauti, 2000). It is located in the Stelvio Pass ski district. The studies have focused on the quantitative definition of the glacier resource (which, it should be noted, is not renewable in the short term and even in the long term it is climate-dependent) and the definition of the impact that human activity in the summer season determines on this natural resource. In this area, the proposals for activities as alternatives to summer skiing (Diolauti et alii, in this volume), aimed at understanding and utilizing the Park asset, are particularly interesting and welcome. In addition to offering a more responsible use of the

glacier resource (utilized here solely for summer skiing and often subject to littering by tourists who throw unwanted waste in crevasses), they could also have interesting and positive effects on the awareness of winter tourists (summer skiers are probable visitors to mountain areas in the winter for skiing), focused on the proper use of environmental assets in high-altitude areas or at least made more conscious of the issue at hand, sustainable utilization of protected areas.

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