

**A Study of the Literature and Current Research into
Responsible Tourism and the Sport of Skiing,
Skier Motivation and Destination Choice and
Ski Resort Destination Management Strategies**

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**An Investigation into the Role of Ski Tourists' Level of Awareness of
Responsible Tourism Issues in Determining Destination Choice**

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1 Responsible Tourism

The origins of Responsible Tourism go back to 1972 when, at the UN Conference on the Human Environment, the World Commission on Environment and Development (WCED) was created. In 1987, the WCED produced the Brundtland Report which raised the notion of sustainable development and the need for all countries to ensure they preserve resources and natural environments for future generations. The concept was gaining ground elsewhere with the similar ideas being proposed by the International Union for the Conservation of Nature (IUCN) in their World Conservation Strategy and in 'Our Common Future' produced by the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF). In 1992, at the Rio Earth Summit, 182 governments signed a declaration agreeing to five action areas which would bring sustainability principles to many areas of development. This then led to the creation of Agenda 21 which comprises a set of guidelines for implementing sustainability principles at a national and local level.

Tourism was not cited specifically in Rio, only in 1996 was Agenda 21 for the Travel and Tourism Industry produced. In 1999, the World Tourism Organisation approved a "Global Code of Ethics for Tourism", addressing both tourism's role as a development option, and also the principles of ethics in tourism, or "tourism's contribution to mutual understanding and respect between peoples". This engendered the notion of tourism's responsibility to its host destinations and communities and led to the Cape Town Conference on Responsible Tourism in Destinations in 2002. A Declaration was signed by 280 delegates from 20 countries, identifying the concept of Responsible Tourism as having the following characteristics:

- ◆ Minimising negative economic, environmental, and social impacts
- ◆ Generating greater economic benefits for local people and enhancing the wellbeing of host communities, improving working conditions and access to the industry
- ◆ Involving local people in decisions that affect their lives and life chances
- ◆ Making positive contributions to the conservation of natural and cultural heritage to the maintenance of the world's diversity
- ◆ Providing more enjoyable experiences for tourists through more meaningful connections with local people and a greater understanding of local cultural, social and environmental issues
- ◆ Providing access for physically challenged people and
- ◆ Being culturally sensitive, engenders respect between tourists and locals and builds local pride and confidence

Since the Cape Town conference, Responsible Tourism has moved from the periphery; World Travel Market, the travel industry's key annual trade event, now has a Responsible Tourism day, and this is probably one of the greatest signifiers that the travel industry and destinations no longer view it as a niche product but a mainstream principle. Its growth is happening alongside a growing consumer awareness of ethical issues, such as fair-trade food products and interest in the sourcing of products. Most recently, climate change has risen on the agenda of the media and governments, most specifically focussing on global CO₂ emissions with a key focus on airlines. Responsible Tourism though is not just about the environment and there is a danger of forgetting the social and economic principles. Additionally, it should be noted that Responsible Tourism does not just apply to developing countries; it is equally applicable to developed countries. Krippendorf, who was one of the pioneers in thinking about the impacts of tourism, based his ideas on mass tourism in Switzerland. It is arguable that the first mass tourism to natural environments was to the Alpine regions of Europe back in the 1800s for mountaineering and health resorts.

2 Mountain Environments and Tourism

As mentioned, Agenda 21 was agreed upon and a chapter was devoted to 'Managing Fragile Ecosystems: Sustainable Mountain Development'. It identified that "mountains are an important source of water, energy and biological diversity and a source of key resources such as minerals, forest products, agricultural products and of recreation". This highlights the competing demands on mountain environments of which tourism is just one part. About 10 per cent of the world's population depends on mountain resources. A much larger percentage draws on other mountain resources, especially water. Mountains are a storehouse of biological diversity and endangered species. The mountain ecosystem is one of the most complex and sensitive to climactic change and is essential to the survival of the global ecosystem, but is rapidly changing and experiencing degradation. However, Agenda 21 does not just focus on the environmental aspects; it notes the many peoples who live in mountain environments and the widespread poverty that is often experienced. Life is hard for many mountain communities, but loss of those communities would lead to loss of indigenous knowledge. The report highlights that "proper management of mountain resources and socio-economic development of the people deserves immediate action" and calls for research to be conducted into mountain ecosystems and programmes for the sustainable development of them.

Tourism can be an important way to preserve the mountain communities, bringing revenue and jobs to communities increasingly unable to survive on agriculture alone and where out migration threatens the existence of village communities. However, tourism can cause problems and overdevelopment, as Michel Revaz of CIPRA, (the International Commission for the Protection of the Alps) commented "The Alps are totally overdeveloped; the most exploited mountain range in the world" (www.cipra.org). The Alpine Convention became effective in 1995 with the dual aims of the protection and sustainable development of the Alps. Whilst the Alps constitute the living and economic environment for the indigenous population, they are also vitally important for extra Alpine regions - being the site of important transport routes. They are also an essential habitat and last refuge for many endangered species of plants and animals. They identify the ever-growing pressures caused by man threatening the Alpine region and the need for economic interests to be reconciled with ecological requirements.

3 Sport and Adventure Tourism

Throughout history, travelling for sport is evident whether it involved journeying to the next village to play a game of football or in recent times (as mountains became an attraction instead of an object of fear) to ski (Matley 1981). The concept of sport related tourism has become more prominent over the last few years; however there have been difficulties defining the sector and academia has frequently seen sport and tourism as separate spheres of activity. Gibson (1998) identifies three domains of sport tourism; 'active sport tourism' referring to people who travel to take part in a sport, 'event sport tourism' which refers to people who travel to watch a sports event and 'nostalgia sport tourism' which includes visits to sports museums or stadiums. Skiing, therefore, according to these definitions, would be seen as active sport tourism; however that would account for only part of the ski market, for example British skiers going on holiday to Austria. However, a large part of the ski market is formed of locals skiing in their local ski resorts. Nogawa et al (1996) suggest there is a difference between sports tourists who stay at least 24 hours in a destination and sports excursionists who are day trippers and indeed, how far away from home do they have to be, to be counted as excursionists?

De Knop (1987) identified a sport tourist as an individual who participates in sport on holiday and he identified three types of active sport vacations: (1) the pure sport holiday, such as a dive trip (2) taking advantage of sports facilities at a holiday destination, where sport is not the primary purpose of the trip; and (3) the private sporting holiday, where the tourists take part in non-organised sports activities such as volleyball on the sand or beach cricket. Skiing would be seen as a pure sport holiday in most cases; however, there is an increasing market for the winter holiday, particularly amongst older groups, where sightseeing, spa and skiing all form equal parts of the same holiday where sports may not be the primary purpose. It seems the British have a strong tendency towards active holidays; Glyptis and Jackson (1993) report that 56% of the holidays taken in the UK by British tourists include participating in at least one sport and for 26% of British holidaymakers abroad; sport is the primary vacation activity. It is likely that these percentages will have increased since then with the growing trend for active holidays over the last five years.

Schreiber (1976) was one of the first to develop a profile of the active sport tourist and found that "the sport traveller is more affluent, better educated and more active than other travellers". This has been supported in further studies of the ski market, and it is indeed often the perception of skiing that you need to be affluent both to go skiing and to purchase all the equipment although this is not necessarily the case. Kaae and Lee (1996) conducted a study to compare alpine skiers with cross country skiers and found that both groups were relatively affluent and well educated in comparison with other tourists. Redmond (1991) suggests that the development of sport tourism has been nurtured by the ascent of a highly specialised global leisure industry flooding the marketplace with high tech sports equipment and he argues that "modern technology has served to create an international sporting playground for the reasonably affluent athletic tourist". As Hudson (2000) notes in his study of the international ski industry, there is a vast array of companies supplying the industry with the skis, boots, clothing, safety equipment and accessories who operate at the cutting edge of technology and who perpetuate their own industry by bringing out new and better technology year on year. It was notable in the recession of the late 1980s and early 1990s, when ski holiday participation decreased, that the sports manufacturers also suffered badly, leading to consolidation in the market.

De Knop (1990) attributed the desire for active participation in sports on holidays to increased urbanisation and a wider variety of active leisure pursuits open to Europeans. In 1995, De Knop developed this theory by drawing on figurational sociology, which attributes the popularity of sport in modern society to the civilising process. As society becomes more civilised and behaviour becomes more restrained, there are fewer ways

to express emotion and engage in experiences which generate excitement; thus sport provides the arena for "Controlled Excitement".

Rojek and Urry (1997) describe how since most of the population lives in urban areas, mountains and other wild places represent escape locations that offer excitement, stimulation and potential adventure. This dislocation of self from the ordinary to the extraordinary appears to provide a pleasurable experience that is central to sports and adventure tourism; however, the irony is that most tourists buy a holiday packaged for maximum efficiency. With the growing commodification of modern life, 'Leisure time' which is proclaimed and expected to be an escape from routine work, often becomes another routinised, packaged commodity, thereby failing to be anything like a carefree, relaxed alternative to work (Watson & Kopachevsky 1994). The function of tourism is to sell a commodity to a group of consumers whether it is a sun and sand holiday or an adventure holiday. Even climbing Everest has, to some extent, become another commodity with a price where you pay an ascent fee. In a ski resort, the skiing is the commodity and the lift pass is the package with the price attached.

Mountains are particularly attractive destinations for adventure tourism as they offer a range of activity options in a setting steeped in actual and symbolic representations of adventure; wild and rugged places that attract extreme weather conditions and contain objective dangers (Beedie & Hudson 2003). Mountaineering and white water rafting are seen as hard adventure with the associated level of risk, skiing is seen as a soft adventure activity with many of the elements of risk reduced as much as possible. However, sports and adventure tourists (whether hard or soft) rarely leave the urban frame and their habits travel with them expecting the same levels of comfort as at home and expecting to be insulated from the less desirable elements. This is exemplified by the increasing desire for quality accommodation, perfectly groomed pistes and heated chairlifts whilst skiing for example, and in other environments, the 'fluffy white towels' in an African safari.

4 The Evolution of the Ski Industry

There are references to skiing back in the mid-nineteenth century when cross country style skis were used in the Nordic regions but it was in the 1890s when recreational skiing emerged in North America (Hudson 2000) and around the same time social skiing clubs started to be developed in Europe and North America. It is believed that skiing holidays as such began when a hotelier in St Moritz invited a group of his regular summer visitors to visit in winter (Cockerell 1988). After their trip, the guests were so enthusiastic about the pleasures of visiting the mountains in winter that taking a winter holiday in Switzerland became 'de rigueur' for the British upper classes, who had already become familiar with Switzerland through their summer mountaineering trips. This was the beginning of the unlikely but close association of the British with skiing. In 1903, as skiing was gaining popularity amongst the British upper classes, a group of those early pioneers gathered in London to set up an organisation to help develop downhill skiing in the Alps, improve the style of those already participating and encourage others to take up the sport - that was the beginning of the Ski Club of Great Britain. In 1905, with typical British desire for rules and order, the first system of ski tests (worldwide) was developed, which are now commonplace. At that stage, there were no lifts and it was time consuming to climb up the mountain for skiing. In 1911 an Englishman, Sir Henry Lunn, managed to persuade the local authorities in Mürren to open the Lauterbrunnen-Mürren railway in winter. The following year the Lauberhorn drag lift opened. It was Lunn, the Club's pioneer, who developed the first modern slalom course in Mürren and the first ever downhill race, organised in Montana, Switzerland in 1911 and founded the Kandahar Ski Club to promote the disciplines of downhill and slalom which were then incorporated together with the exact rules as developed by the Ski Club of Great Britain, into the Olympic Games. In 1905, skiing was included as an exhibition sport in the Olympic games to recognise the growing interest in the sport and the desire on the part of destination managers to stimulate demand to keep their resorts open in winter. This is believed to be the beginning of the concept to create a broader set of physical facilities in order to develop a sustainable market base for skiing for a whole season (Williams 1993).

By the beginning of the First World War there were as many German skiers in Switzerland as British, and hotel accommodation was in good supply. The profile of skiing was being raised in the source markets and in 1924 skiing was introduced as a formal event in the winter Olympics in Chamonix, France, and was highlighted again at the 1932 Winter Olympics in Lake Placid. These two events placed skiing at the forefront of winter recreational activity in both Europe and North America (Hudson 2000). Until the 1930s, skiers were essentially reliant on the early railways of resorts such as Zermatt in Switzerland which had formerly only been used by summer visitors. In 1929, the first mechanical lift just for skiers was installed in Canada and throughout the 1930s, lifts soon became commonplace and this opened up the idea of skiing in other resorts without existing railways. In 1936, Union Pacific developed the first tourism oriented ski resort

in Sun Valley, Idaho, and this became the prototype for world class ski areas in North America and saw the dividing of the model of ski resort development between North America and Europe.

In Europe, the summer Alpine destinations saw the potential of skiing to arrest the decline of mountain communities and create sustainable year-round income; lifts were developed fast and at the same time equipment improved with the development of the Kandahar binding (which replaced the heel strap with a spring loaded cable) which improved safety and was the forerunner to modern skiing technique. The winter Olympics of 1936 included both downhill and slalom races and the stage was set for increased growth only temporarily halted with the Second World War.

After the war, skiing demand mushroomed worldwide, military troops who had experienced skiing in northern combat areas took to skiing as recreation thus equipment and facilities developed fast. Rising standards of living meant that skiing became a standard fixture in the travel patterns of a core group of North American and European residents. In the 1950's, a new phase of ski resort development took place that was characterised in France by the purpose built resorts of Courcheval and Tignes. Ski facilities and services associated with lodging, food, beverages and entertainment became important components of the ski vacation experience (Tanler 1966). The 1960s saw the start of a skiing boom, with leather boots and wooden skis phased out and replaced with metal and fibreglass skis and plastic boots. The 1970s were a period of massive market and product expansion followed by a period of industry consolidation in the 1980s. Skiing became an affordable and mainstream holiday in Britain in the 1990s, the cost of air fares to North America fell to such a level that a ski holiday there for Europeans became feasible and the British were able to experience the difference and make a comparison between the North American model and the European model.

In some areas, supply started to outstrip demand and many ski destinations were forced to address both market and product issues in a more businesslike fashion and a more tourism focussed approach to ski area development commenced. Poor snow conditions in the 1990s and stagnant demand forced further consolidation and investment; in North America there were 735 ski areas in 1982 but by 2002 this had decreased to 490.

Demand stabilised and started to increase again since 2000, aided by the introduction of new skis which has made skiing a little easier to learn and the rising popularity of snowboarding which accounts for 29% of visits. Snowboarding has attracted a whole new market of young people to the winter sports market and its inclusion as a formal event in the Turin winter Olympics in 2006 raised the profile further. The events were noticeably very popular spectator sports and showcased the sport and the various disciplines very well.

5 The North American Model versus the European Model

North America and Europe, in general, operate their ski resorts at either end of a continuum with the Corporate model at one end and the Community model at the other.

Destination management in a North American context is characterised by vertical integration by a dominant business corporation, which leases the mountain from the state or the United States Forest Service. Such corporations manage for profit a strategic selection of service providers incorporated by ownership or contracts. The major business units are centred on the ski product of the destination; lift operations, ski schools, ski rentals, mountain restaurants, retail franchises etc. A certain amount of the destination bed base is also often run by the ski corporations. All the staff in the facilities are effectively working for one company and that company can have total control of the holiday experience from end to end.

Flagestad and Hope (2001) suggest that the ski corporations have a dominant influence on how the destination is operated as a strategic business unit as well as strong political power in the community related development of the destination. The corporations are publicly listed shareholding companies such as Vail Resorts Inc, Intrawest and the American Skiing Company. They question whether it is possible to bring about an organisational structure at destination level which has a concern for the welfare and quality of life of the local community where the system is based on the principle of improving organisational economic efficiency. Reduction of transaction costs is seen as one of the benefits of the North American model where the operation of all the ski related activities by one company leads to savings in marketing, information, reservations etc.

The Community model found in much of Europe is characterised by specialised individual independent service providers operating in a decentralised way, where no single company/organisation has any dominant administrative power or dominant ownership. The existing village community is at the core of the resort and

locally owned businesses are found with multiple owners of facilities. Strategic leadership is anchored in a stakeholder-orientated management and is concerned with issues of sustainability. Destination planning, product development, destination marketing and management lie with the political and administrative institutions. Some parts of Europe, most notably France, have developed purpose built ski areas close to existing villages to separate the tourism from the core of the village, generally at a higher altitude, but these tend to be locally owned and developed.

There are reasons to hypothesise that the North American model offers a greater service mentality and that the destination is managed and marketed in a cohesive manner since the corporation controls a critical mass of service providers and it may perform better in creating customer satisfaction. However, it could be argued that the corporate model merely enables easier collection of customer satisfaction data! It is also argued that benefits are gained by internalising the processes since externalities (which result when the investment in one activity may impact other activities in a positive or negative way) are reduced, thus the impacts would be within the one company and leading to better decision making. On the other hand, the corporate model may offer the customer a sterile experience with no sense of a real community, and may exclude local residents and distort the balance of the community by selling real estate for commercial gain for holiday use. A lack of internal competition may lead to less efficiency; therefore perhaps two corporate entities may be better than one.

However, in contrast, the Community model, through stronger stakeholder involvement, may perform better than the corporate model in managing the destination on a responsible basis, since the community directly depends on, but is impacted by the tourism. Therefore, on ecological and social dimensions of sustainability, the community will protect the surrounding natural environment. However, small communities and local rivalry may make joint decision-making difficult and a lack of cohesion to promote a destination consistently; thus communities may be more successful where there is some form of overarching coordinating body.

6 The British Ski Market

The long association between the British and skiing has already been noted, and the market today currently stands at over a million skiers. The British, having few real opportunities for skiing at home, form a large and important section of the market for ski resorts throughout Europe and increasingly the USA and Canada.

The most recent analysis of the British ski market has been published by Crystal Holidays (a subsidiary of TUI Travel). It was published in July 2006 and incorporates statistics from the winter season 2005/6. It aims to bring together various different sources of information including the tour operators' own statistics, AC Nielsen's TravelTrack, Snowsport GB data, CAA published statistics, tourist office figures and travel agency feedback. It is difficult to gain comprehensive data on the British ski industry and combine such a number of sources, therefore "the figures cannot be taken as absolute but, given the breadth of sources used, are believed to be as balanced and accurate as possible" (Crystal Holidays 2006).

The British ski market rose 6.9% in the winter season 2005/06 to 1,156,000 people continuing the steady upward trend that has been witnessed since 2000. Out of this number, tour operators take 58% of the market, 31% are independent travellers and the remainder is made up of the schools market. All three markets experienced growth, although the independent sector is difficult to measure with varying statistics reported from the low cost airlines (Crystal Holidays 2006). Recent good snow has helped this rise, together with the growing popularity of snowboarding which is continuing to open up the market to a new segment.

France continues to be the most popular destination for British skiers with 36% of the market, followed by Austria (20%), Italy (14%), Andorra (12%), Switzerland (5%) and Bulgaria (3%). The proportions for Austria and France, Switzerland and Bulgaria are tending to remain broadly similar year on year; the changes are occurring with a decline for Italy and Andorra which is taken up by increases for the USA, Canada and other 'new' destinations (Crystal Holidays 2006). The continuing appeal of France to the British market reflects a number of features; it is still seen as the country for self drive and self catering and, therefore, a lower cost holiday can be enjoyed (despite the fact that driving times can be similar for Switzerland and Austria). France has a large chalet and club hotel product which is a popular choice for the British market and the quality of which has seen a marked rise in recent times. This is effectively the "all inclusive" ski holiday with no hassle and a fixed price which is also a growing trend. Also the growing popularity of Eurostar and the ski train is currently only benefiting France.

Flying, as the method of travel, has increased by 7% in the last year; however, the no-frills carriers saw an increase of 15% over last season. The largest source of flights is the scheduled airlines (including tour

operator allocations on scheduled airlines) (45%), followed by no-frills airlines (37%) and tour operator charter (17%). It should be noted, however, that the lines between the three categories are becoming blurred with tour operators chartering seats on scheduled flights and charter flights selling seats separately, and a number of former in-house airlines becoming scheduled carriers such as Thomsonfly and Thomas Cook airlines. The number of no-frills carriers continues to rise and the route network continues to expand with smaller airports being added which often significantly reduces transfer times. For example, Easyjet has increased its capacity into ski resorts by 25% in the last year. However, it is notable that some no-frills carriers are beginning to have less appeal to the ski market due to tight restrictions and high costs for luggage and sports equipment.

Crystal is the largest operator carrying 160,000 people (24%) in the 2005/6 season and continuing a steady upward trend. Inghams takes the second slot with 18% of market share. Thomson and Neilson are the two operators with the next highest carryings, who are also continuing to expand steadily. These four tour operators are the dominant forces in the British market for volume. First Choice and Airtours/Panorama both show a continuing decline in carryings (Crystal Holidays 2006). The tour operator market is dominated by the aforementioned operators and there are few mid size operators. The remainder of the market is made up of small specialised tour operations that specialise on either a particular market segment or a particular resort. They are often very successful with a very loyal clientele.

Tour operators were threatened by the no-frills market in previous years; however, they are now succeeding in differentiating themselves and re-asserting their value. The rise in the no-frills airlines stimulated demand for the ski weekend and several shorter ski trips in a year, and for smaller airports with quicker turnaround times and short transfers. The tour operators have responded with obtaining access to the smaller airports, gaining hotel allocation for weekends, and are increasing the completeness of the package, to offer a hassle free, easy holiday as opposed to piecing the elements together. The transfer is the area of concern and expense for independent skiers; car hire is expensive when the car is actually only needed for the arrival and departure, and concerns about driving conditions, snow and the requirement for snow chains puts many off self drive. Resorts are responding to this by offering coach transfers themselves to help the no-frills / independent market but the tour operator eases this with the inclusive product and is increasingly offering many facilities for families such as day care, après ski clubs and baby sitting.

As can be seen from the aforementioned statistics, with 58% of the ski market (670,000 skiers), the British tour operators exert a lot of power over the British ski industry. They are important intermediaries and "can influence the choices of consumers, the practices of suppliers and the development patterns of destinations" (Tour Operators Initiative, 2003).

7 Ski Motivation and Destination Choice

Means End Theory is the integration of the push and pull factors, the abstract motivations and the concrete product attributes into a single framework. It focuses on the cognitive linkages between the relatively concrete attributes (the 'means') and the more abstract consequences these attributes provide for consumers and the highly abstract personal values (the 'ends') these consequences help re-enforce. It provides a way to understand the relationship between consumers and the products they purchase and consume; how the attribute of a destination can fulfil a need of an individual. Means End Theory has three levels of abstraction; product attributes, consequences of product consumption and personal values relevant to the customer. In a skiing context a product attribute would be the number of black runs in a resort. The consequences are the perceived benefits or costs associated with the attribute, thus, in relation to the number of black runs the consequence might be 'feeling challenged'. The personal values are the end states of existence the consumer seeks to achieve; in response to 'feeling challenged' this might be achievement or excitement. Traditional multi-attribute models of choice tend to concentrate on if and to what degree an attribute is important. The means end approach focuses on how and why something is important (Gutman 1982).

Klenosky et al (1993) conducted a study using a Means End analysis of motivations to examine some of the deeper motivations underlying destination choice among Canadian skiers. Data was analysed to construct a Hierarchical Value Map for ski destination choice. The attributes listed by respondents were; 'level of grooming', 'friendly people', 'entertainment', 'local culture', 'familiarity', 'snow conditions', 'resort services', 'distance', 'lodging', 'crowding', 'difficulty', 'hills and trails' and 'ski packages'. These are the attributes of the destination or the 'pull' factors. The consequences of these were collated into seven groups; 'save time', 'save money', 'ski more', 'choice', 'variety', 'challenge' and 'social atmosphere'. Out of these consequences or perceived benefits, the personal values were derived; these were 'belonging', 'fun and excitement',

'achievement' and 'safety'. This demonstrates how destination attributes translate into values that are important to individuals and how these may change at different times. These values are motivational concepts which are influencing destination choice. The Means End Theory worked well to understand skiers' motivations and the linkages derived when examining the relationships between them and show interesting ways that a resort might choose to promote itself, for example, 'challenging pistes' links to 'fun and achievement', 'snow conditions' can link to both 'safety' and 'fun'.

Gratton (1990) argues that an economic approach to motivation should be combined with a psychological perspective on individual behaviour since 'stimulation seeking' is the motivation for many, if not most, leisure demands and particularly those of sports tourists. Leisure activities provide varying levels of stimulation and can be split into low skilled and high skilled activities. A low skill activity, it is argued, can be stimulating when tried the first time but quickly becomes boring when repeated i.e., beach holidays, theme parks. These activities face demand volatility, since consumers exhaust the stimulation possibilities on offer. Contrastingly, activities that allow participants to learn and develop new skills; ie language, cultural skills or sporting skills, are known as high skilled activities and there has been a recent notable increase in demand for this type of holiday. As individuals acquire more skills they are better able to accept a higher level of stimulation. Thus, as greater levels of skill are acquired, more challenging destinations are sought. Accordingly, Ewart & Hollenhurst (1994) found that in their studies of anglers, white water rafters and climbers in North America, skill level was a good predictor of participation frequency and location. Referring back to the studies of Klenosky et al (1993) above, the most important cluster of motivations relating to 'achievement' included elements such as 'hills and trails', 'difficulty', 'ski variety', 'choice' and 'challenging'. This research clearly points to the influence of skilled consumption in destination choice for skiers.

Where activities require a high level of skill or give opportunities to learn new skills, participants continue to search for stimulation through repeated experiences as new challenges emerge and skill levels rise. Skilled consumption, therefore, assumes that as an individual becomes more skilful at a leisure pursuit the individual will require more challenging experiences to reach the same level of stimulation that was experienced as a more novice participant. Without this level of stimulation the participant will become bored.

Richards (1996) tested the concept of the skilled consumer on the British ski market. He aimed to analyse participation patterns and destination determinants of UK skiers using an extensive questionnaire in 1993. The questionnaire covered previous ski participation, determinants of ski destination choice, perceptions of European and American ski resorts, and socio-demographic characteristics. Skill level was also self classified into beginners, intermediates and advanced. It was found that skilled consumption related very well to ski holidays with ski destination choice linked to the degree of skill acquisition and previous experience of the skier. For more experienced skiers, the quality and variety of runs was important and they were more likely to base their choice on skiing related factors such as snow quality and variety of terrain. Advanced skiers would travel to specific resorts in search of optimal conditions, take more holidays and stay for longer. Additionally, more frequent participation was strongly linked to higher income and socio economic groups and was price inelastic. Less experienced skiers emphasised price and accommodation. Richards concluded that skill levels were better predictors of destination choice than socio economic group or income. Skilled consumption leads to two different consequences; firstly, if it continues to grow and a skier's skill level improves, the skier needs more stimulation and this leads to an unending search for more excitement and secondly, only a small proportion of people will be expected to reach the highest levels due to the high marginal costs of extra holidays to improve skill.

The notion of skilled consumption has interesting consequences for the travel industry. Demand for skiing can therefore be increased not just by recruiting new skiers but also through more frequent consumption by skilled skiers eager to develop and refine their skills. However, this creates difficulties for the mass market tour operators when selling to either beginners or advanced skiers. Beginners, as unskilled consumers (more focussed on basic facilities such as accommodation) do not have the knowledge to interpret the ski product when explained to them by the tour operator or travel agent. Advanced skiers are skilled consumers and understand the ski product far better than the average employee in a tour operator or travel agent. Thus, this is where the recommendation of friends or family or the reference groups as discussed earlier becomes important for the beginner and advanced skiers and also the success of specialist ski operators who employ advanced skiers as staff.

Holden (1999) investigated the intrinsic needs of skiers and conducted some research at the Cairngorm ski area in Scotland. Skiers were asked to indicate the level of importance of each of 27 needs as a reason for their participation. The 27 needs were categorised into five groups and it was apparent that the need for 'thrills' was rated the highest with advanced skiers and snowboarders, again supporting the theory of skilled consumption and desire for increased stimulation. This was followed by the group called 'relaxation' of which

'to have a break from my daily routine' was the most common need, this supports the notion of increased interest in adventure sports as a release from urban society. Snowboarders rated 'relationships' the highest out of all the groups together with 'self esteem' and 'development' demonstrating the group nature of snowboarding and arguably the younger age of snowboarders in general. Holden found that as skiers progress with the sport, the need for stimulation becomes progressively more important as does the need for self esteem, development and fulfilment.

8 Skier Attitudes towards Responsible Tourism and the Environment

There has been limited research on skiers and their environmental commitment and what has been conducted is highly contradictory. The National Ski Areas Association of America found that skiers, more than many other groups of tourists, were especially worried about the environmental impacts of development and growth; however Fry (1995) found that skiers do not have strong views about the environment and more experienced skiers actually favour expansion of ski areas. In an environmental awareness study in Austria, the majority of skiers were prepared to pay an environmental tax if it meant that something constructive would be done for the environment. Although the skiers in the Austrian survey showed a high degree of awareness they were not prepared to restrict their skiing to protect the environment. They valued good lifts, unlimited ski slope choice and perfect ski conditions helped by snow machines. Weiss et al (1998) believe that the conflicting social expectations of ski tourists, who seek technological efficiency and authentic nature at the same time, threaten the environment. It is clear that further research is required to clarify the opinions of skiers.

Hudson and Ritchie (2001) sought to investigate the environmental awareness of skiers as well as their willingness to pay for environmentally friendly products. Their cross cultural analysis was conducted in Banff and Lake Louise in the Canadian Rockies. They found that 70% of people believed that skiing is an environmentally friendly/compatible sport. However, 65% of people felt that ski terrain should be limited because it disturbs wildlife but 64% of people believed that ski terrain harmed the land less than the surrounding development. In their ski destination choice, 63% of people did not take into account how environmentally friendly a resort is. They found there was a general lack of awareness or thought from skiers about the environment, and indeed several respondents commented to the researchers that this was the first time they had given it any thought. 78% of people were unaware that creating pistes can actually create new habitat and 76% of people believed that elk in the national park are disturbed by visitors despite research to the contrary. People were unsure whether snowmaking was a good or bad thing. The research then listed a number of environmental policies that a resort could implement and for each scenario the respondents were asked whether they would be more or less likely to visit a resort that had instated a particular policy. In every case, a majority of skiers said they would be more likely to visit a resort with the environmental policy except for one scenario; they would not be pleased if night skiing was prohibited to avoid disrupting wildlife. In accordance with previous studies, they found that skiers would pay more to visit a green resort using a 'Willingness to Pay' model despite the fact that a majority of them had not considered the subject before. An interesting result of the cross cultural analysis was that skiers from the UK appeared much more sensitive towards the environmental impacts of skiing than the Canadians and Americans. Hudson suggested this could be due to the fact that British skiers have seen environmental degradation in the Alps. Canadians would pay less for a 'green' resort since they hold the belief that Banff National Park is their local playground and they have a right to use it. Nearly half the skiers believed numbers should be capped to protect the environment. Overall, the study showed that there is a lack of knowledge and general confusion amongst skiers about environmental issues pertaining to skiing.

It is arguable that the environment has not been at the forefront of the marketing of resorts and that there is a requirement for the education of skiers. Ski Area Management (which analyses the ski industry in North America) conducted a poll asking whether ski areas adequately address environmental issues; of 235 people who responded to the poll, 62% said 'yes'. However, it is arguable that if the skiers are unsure of what the environmental issues are, it is questionable how they can believe that the issues are being addressed. The Banff-Bow Valley study supports this idea reporting that the general public has little appreciation for and understanding of the seriousness of ecological degradation in a setting where, to the untrained eye, nothing appears to be wrong (Ritchie 1999).

Hudson (1996) has suggested that despite the fact that there is a wide range of environmental benefits that could be brought to ski resorts, the existing customer base may have little understanding of or interest in green issues and there is a danger that radical greening may alienate customers.

9 Skiing Versus the Environment?

In Banff National Park, the dilemma of balancing the protection of national park values whilst making provision for their enjoyment is a longstanding one which has become progressively more difficult in recent times with increased tourist and recreation demand and increasingly verbal environmental pressure groups. Parks Canada has recently found itself caught between the environmental organisations on the one hand and the business community on the other. Initially, their tactic was to stand back to let them fight each other, however, as resolution seemed impossible the government decided to intervene and appoint the Banff Bow Valley Task Force to assess the cumulative environmental impacts of development. They needed to find some middle ground that would satisfy both parties. They made several recommendations including stricter limits to growth, creating visitor management programmes, refocusing and upgrading of the role of tourism improvements in education, awareness and interpretation. For the ski resorts specifically, they recommended caps on skier numbers, prohibiting night skiing and restrictions on future expansion.

Consolidation in North America has led to fewer ski resorts and in a highly competitive marketplace resorts have to satisfy an increasingly demanding and fragmented market (Hudson & Ritchie 2001). Referring to the earlier discussion of 'skilled consumption', these ski resorts are having to continually satisfy a demand for more stimulation, more variety and more challenge, and this requires development – however they are facing growing opposition to development based on environmental concerns. Skiing has been cast in the same light as timber and mining in the United States and is being called "the next extractive industry", rather than a socially beneficial form of recreation (Castle 1999). In North America, opposition to ski resort expansion and development has centred on environmental issues, and virtually every form of construction or expansion is being challenged. On the other hand, the owners and developers say that it is a relatively minor degradation compared with road building/logging etc. The whole issue came to a head in 1998 in Vail in Colorado; just two days after the first trees were cleared for a controversial expansion, the Earth Liberation front inflicted \$12million worth of damage on the resort (Hudson 2000).

The United States Forest Service (USFS) now has a new proposal for the White River National Forest which is located amongst some of Colorado's most popular resorts including Keystone, Breckenridge, Copper, Vail, Beaver Creek and Aspen. The new proposal would halt any development for at least 10 years. The USFS now believes that a higher priority be given to physical and biological resources than to human uses of the forest. The plan makes no attempt to meet the long term public demand for skiing on National Forest Service lands and does not endorse recreation and tourism as key values. This demonstrates one of the many conflicts of interest that exist to complicate the controversy; the USFS claims it is the 'World Leader in Skiing Opportunity'.

Conflicts between environmentalists and ski resort developers can also be found in ski areas around the rest of the world. The Alps are among Europe's most threatened wilderness with the rapid growth of skiing central to the crisis. Mountain Wilderness, Alp Action, the World Wildlife Fund and the League Valaisan pour la Protection de Nature are dedicating themselves to raising awareness of environmental problems and preventing further damage. In Austria, a battle between the environmentalists and the community of Ischgl, regarding a new higher lift and pistes has been running for years.

Skiing is receiving a negative press in the media in the UK, "As we start our coverage of winter sports this season, spare a thought for the environment, skiing is one of the least 'green' activities..." (The Times 2007). However, throughout all this controversy, it is apparent that the belief is that it is possible to have a ski industry or protect the environment – not both. Furthermore, in all arguments, the focus is purely on the environmental impacts – not the social or economic impacts; there have been no studies into the overall impact of tourism in a mountain community in the perspective of Responsible Tourism, balancing the social, economic and environmental impacts.

10 Skiing and Climate Change

The ski industry worldwide also faces a very real impact from global climate change. The poor snow experienced in Europe in the late 1980s and early 1990s, the erratic seasons since 2000 and arguably later seasons occurring are potentially some of the first signs of change. The 2006/7 season saw the first ever cancellation of the Hahnenkamm downhill race in Kitzbühel in January due to lack of snow and much of Europe had little snow until February. Mountain areas are one of the most sensitive to climate change; throughout the world glaciers are receding and since 1850 Swiss glaciers have lost a quarter of their surface area (Buerki et al 2003). Other first order impacts are melting permafrost and floods some of which have already been experienced in the Alps in recent years, and these will have other economic and safety impacts. Melting permafrost, essentially frozen soil, is likely to increase the risk of landslides and raise the costs associated with anchoring and bracing cable car stations, lift pylons and other structures. Avalanches

may also become more common due to inconsistent temperatures, increasing the risks to skiers and local communities as well as damage to infrastructure.

The second order impacts will occur in mountain agriculture, mountain hydropower and mountain tourism. Climate change is a real threat to the snow sports industry and lower earnings in the winter season will have real economic impacts. The ski tourism industry will 'climb' up the mountains to reach more reliable ski areas and higher altitudes – which will put further pressure on sensitive environments.

The impacts will be felt far more in resorts at low altitudes and thus particularly in Austria, Germany and Italy where a majority of resorts are found below 1300m. However, even in Switzerland, which has a majority of resorts at higher altitudes, the impacts will be felt. The tourism industry is the third most important export industry for Switzerland providing 300,000 full time jobs – for the alpine area it is the most important source of income providing regional growth for the rural areas. Today, 85% of Switzerland's 230 ski resorts can be considered snow reliable. If the line of snow reliability were to rise to 1500m as a result of climate change the number would drop to 63% (Buerki 2000). With unpredictable snow levels 37% of resorts will have acute difficulties attracting overseas tourists. Experts have suggested that the tourism related losses facing a country like Switzerland due to climate change could be as high as \$1.2 billion annually. The impacts of climate change in Australia, Canada and the USA are potentially less due to the high level of artificial snowmaking. Artificial snow offers a lifeline to ski resorts, however, it is controversial as will be discussed later. Nonetheless, under climate change scenarios and current snowmaking technology, the average ski season would be expected to reduce by 7-32% by 2050s, without snowmaking this would be 37-57%. Swiss snow making doubled between 1993 – 1995 covering 3.6% of groomed area (Koenig & Abegg 1997). Since that study investment in snowmaking across Europe has increased dramatically.

It could be argued that as a potential victim of global warming, the ski industry could focus on short term goals "to make the most of the industry whilst we still have it". However, the ski industry is not just an alternative or supplementary source of income to communities, in many cases it is the sole source of income and enables the very viability of many mountain communities, thus protecting the industry will protect their way of life. Therefore, the ski industry and the mountain communities have a responsibility and self interest in taking action to combat climate change.

They can take encouragement from the resilience and passion of skiers, in a recent survey it was found that during seasons of poor snow only 4% of skiers would give up, 49% would change to higher snow sure resorts and 32% might ski less often (Koenig & Abegg 1997).

It is suggested by the 'Keep Winter Cool' campaign in America and the 'Save our Snow' campaign in the UK, that skiers, given that their sport takes place in the mountains where arguably the impacts of climate changes are most apparent, should care more about climate change and the environment. However, as noted from the earlier discussion, skiers seem generally unaware and make no connection between their sport, its impacts and climate change. It seems there is much work to do to rectify this standpoint.

11 The Impacts of Skiing

11.1 Economic Impacts

Since the beginning of the 20th century when skiing first emerged as a recreational activity, it has been seen as a vital method to arrest the decline of mountain communities and prevent out migration to valley or industrial areas. There have been no studies to accurately measure the economic benefits of skiing to communities; however it is evident that there are many communities world wide that would either no longer exist or would not enjoy a reasonable standard of living were it not for the skiing industry. In the French Alps, snow and the snow sports industry have been dubbed 'white gold' due to its extraordinary value to the region and, as noted earlier, it is the most important source of income in the alpine areas of Switzerland.

It is still seen as a key method of development despite the concerns of climate change or the negative impacts on the environment. Mühlinghaus & Wälty (2001) conducted some research in Switzerland in two small mountain communities; Urnäsch and Schamserberg. Urnäsch is a community with 2370 inhabitants many of whom were formerly employed by the textile industry. This has declined such that currently the textile industry only supports 14% of jobs and agriculture only 15% of jobs, which is also declining. The local residents see only two options for future development; the expansion of the local ski area to increase tourism and attract new residents who commute elsewhere. Equally in Schamserberg, out of the 390 residents, 60% are farmers, whose livelihood is threatened now they are receiving less state support. Everyone in the community agrees on the promotion of tourism as the only livelihood option and the community is contemplating the construction of a small ski resort. However, not everyone believes skiing is

the way out; there are fierce arguments that on the one hand it will be the only chance for the region versus opponents who say it will never be profitable and will destroy an untouched environment.

In Cairngorm in Scotland, it is estimated that 70% of employment in the Badenoch and Strathspey areas comes from tourism and associated services compared with the 8% employed in agriculture, forestry and fishing combined. The Scottish Office estimated that downhill skiing in a good season can generate over £20million worth of expenditure in local economies and this has aided population stability and prevented out migration (Holden 1999b).

In Canada, a report by PricewaterhouseCoopers highlighted the positive economic impacts of skiing. Out of the CAN\$954m spent in Alberta's parks year round in 1999, CAN\$329m was directly attributed to downhill skiing and sustained 10,400 person years of province wide employment. Additionally, this supported the rest of the country since it was responsible for the importation of CAN\$64 million worth of goods from other parts of Canada. Furthermore, the winter season then enabled park businesses to employ people year round and thus employment was stabilised. The United States Forest Service states that the value of tourism is 25 times greater than logging.

In Germany in the 1970s, the Green Party was very successful in blocking many developments of new lifts in Bavaria; consequently the installations became very old, slow and unpopular. The resorts could no longer attract skiers and the area went into economic decline. In early 2000, this situation changed, new lifts were installed and now the resorts are able to attract skiers, the local economy is thriving again and unemployment reduced. The positive impacts of the snow sports industry on local economies through revenue, population stability and reduction in seasonality are often overlooked by the environmentalists.

11.2 Social Impacts

The social impacts of the ski industry on local communities are less well documented, most importantly though is the need for local communities to retain ownership and thus control over their own destiny. This is arguably the most certain way for the community to maintain their cultural identity and develop in the manner they see fit. When outside corporations have control of a large section of the key services, the potential for loss of identity is large.

Referencing the numbers above; 9000 guests in a resort of only 1500 residents is a large impact on the social structure of the village for a large part of the year – guests outnumbering locals by 6:1. There is a risk of the local culture being lost amongst a holiday culture of skiers partying hard. Après ski has become an intrinsic part of a ski holiday, particularly in European resorts, but it can become out of control with negative impacts for the resort image and the local residents. Back in the 1980's, the small Austrian village of Söll offered too much in the way of après ski and cheap prices and the village soon attracted a 'lager lout, rowdy' clientele, which cost the resort revenue in years to come as the families stayed away. More recently, the Austrian village of Kitzbühel, one of Europe's leading ski resorts, is to restrict Russian tourists from visiting the slopes. The village decided to cap the number of Russians to 10% of visitors after complaints from hoteliers. Wealthy Russians have flooded into the resort to buy properties but locals have complained that they are too noisy and drink too much (Local Government Association, 2007).

In contrast, skiers also seek out the local cultural elements, particularly the food and local music whilst on a ski holiday; such as fondue evenings and Tyrolean evenings and it is arguable that many traditions are being upheld strongly in resorts in order to differentiate the ski experience from other countries.

As identified above, there are key employment and economic benefits from the ski industry; however it is important that there is diversity in the employment offered. It can be the case that the entire village is dependent on tourism and this makes the village very susceptible to vagaries in demand. Additionally, many of the jobs are low paid and it is important for the local community to obtain as varied an employment base as possible.

The nature of alpine tourism is often very seasonal; there are few resorts in Europe that promote themselves as four season resorts. This is more successful in North America where there are, for example, golf packages in spring and 'fall' colour walking packages in autumn. The seasonality may have implications for the stability of employment since a resort can only employ staff on a seasonal, short term basis. However, in many resorts the off season is the time when they get the village back to themselves, take a holiday, and revive their traditional way of life.

Perhaps one of the key social impacts is the effect of development on local housing prices. Often the local community sells off land for development in order to make a profit and wealthy second home owners

purchase the property and artificially inflate the prices such that local people can no longer afford to buy property locally and are forced away from the village.

11.3 Environmental Impacts

As detailed in the aforementioned discussion on the controversy surrounding skiing in recent times, the environmentalists frequently outline the damage to the environment caused by the various aspects of skiing such as the pistes and the artificial snow and the impact on flora and fauna. In a survey by US researchers, it was found that the environmental knowledge on which both the ski operators and environmentalists were basing their knowledge was not encouragingly high (Fry 1995). UTSB Research (Under the Sleeping Buffalo), a non-profit making environmental organisation in Banff that monitors public policy, published a report that looked at ski resorts and their effect on ecological, social and economic health entitled 'Down a Slippery Slope'. Even the UTSB concluded that "There are enormous discrepancies between what we currently know about the impacts of ski areas on the environment and what we need to know if we are to make educated decisions on the future of ski resorts" (Legault 1997). It seems that much of the current debate is based on conjecture rather than hard evidence and there is a requirement for more research.

The impacts of skiing on the environment effectively fall into two areas; those impacts caused by the creation of ski areas such as the pistes and the lifts, and those impacts caused on an ongoing basis related to the day-to-day maintenance of a ski resort. It is arguable that many ski destination managers are aware of and admit mistakes have been made in the past and certain things cannot now be changed. Additionally, it should be noted that many infrastructure items have a long payback and cannot be changed quickly. However, there are many areas where destination managers can have a large influence both in the day to day management and also when planning future development.

11.3.1 Development and Resources

European ski resorts have grown up around traditional mountain villages that were surrounded by pasture land. As the resort developed, agricultural land was given up for development of hotels and facilities. However, the actual mountain community of year round residents generally has not increased largely, thus guests in the ski season vastly inflate the population. For example in Lech in Austria, the year round community is 1500 but the village has nearly 9000 guest beds. This places a very high demand on local resources, such as water supply and waste management. Often, the infrastructural development does not keep up with the commercial development. Additionally, in some countries, such as in France, the purpose built resorts of the 1960s and 1970s have resulted in questionable architectural styles in the mountains, incongruous with the local architecture, such as Flaine, which become an eyesore and often empty for much of the year.

In Banff town site, urban growth and development have created an undeniably large ecological footprint (Draper 1997). Supply issues were exacerbated since tourist facilities such as accommodation, commercial laundry facilities, swimming pools, landscapes and golf course irrigation all consume above average quantities of water. Whilst the permanent population in Banff was less than 6,000, with a capacity of over 10,000 bed nights plus over 200 shops and 100 restaurants, the infrastructure needed to support 30,000. The waste management systems could not cope and the town received much negative publicity when the sewage systems became overloaded and effluent spilled into the Bow River, used for recreation and in the middle of a National Park. Banff has required enormous upgrading to the water management and waste management.

In the Australian Alps, protected area managers judge tourism as having a range of impacts on water quality with pollution from untreated human waste downstream from ski resorts rated the most important. Within the ski resorts, contamination of rivers and creeks by treated human waste as well as runoff from ski slopes, roads and car parks were thought to be the most important issues. Poor disposal of food waste was also encouraging feral animals (Pickering et al 2004).

Naturally these environmental impacts are not specific to ski resorts, however ski resorts often are more inaccessible and infrastructure projects more complex. Exemplifying the complexities, skiing requires facilities to be provided on the mountainside such as lift buildings and mountain restaurants. These buildings require power and water and create waste. It is often the case that mountain buildings are not connected to the sewage system of the town due to the complexity and this can result in pollution up the mountain.

As Krippendorf noted back in 1987, in many holiday areas the building industry has completely detached itself from the tourism industry. In Swiss mountain areas, vast swathes of chalets, weekend homes and second homes have been built with the aim of making a quick profit and without concern for the long term interests of the local community. Aside from the land that is being lost to development, ownership of the

property and thus control of the bed stock falls out of local hands. The local community then has a large group of overseas owners renting out their properties for prices they choose which may undermine the price and quality positioning of the resort and take profits out of the resort. Also, large numbers of properties may lie empty for most of the year and the land has been lost forever.

In North America, a large part of the income stream of the corporations running the ski resort is the sale of real estate. Ironically, many of these holiday apartments are being purchased by 'baby boomers' who will reach the end of their skiing careers in the not too distant future. The resorts will then be filled with people wishing to pursue other activities as opposed to skiing, and the resort will lose the revenue from the ski equipment and lift passes and have to attract yet more people. It becomes a vicious cycle of development.

11.3.2 Pistes; Creation, Maintenance and Artificial Snow

A piste is effectively a trail on the mountain where the snow has been compressed to make a smooth surface to ski on. Pistes are a necessity for the mass market of skiers; only the advanced skier has the skill to ski off-piste and all skiers need to learn on piste. Ski resorts are often categorised by the number of pistes they contain, and referring back to skilled consumption, the more advanced the skier is, the faster they will ski, the more ground they will cover and the more variety they will seek. Thus there is pressure to increase the numbers of pistes in a resort. Pistes can be formed in one of three ways; they may follow the natural landscape of the mountain, they may follow some of the natural landscape but modification to the terrain is required to negotiate certain natural features or to make it safer or less steep, or they can be created from scratch by cutting through a forest. Modification to the terrain is often referred to as machine grading and is frequently achieved by bulldozing the land to remove rocks and move soil around to create a smooth slope.

In Cairngorm, Scotland, during the construction phase in the 1960s and 1970s lift pylons and buildings were taken onto the site by tracked vehicles and pistes were bulldozed into the mountainside removing boulders, topsoil and vegetation. The removal of vegetation led to negative impacts on the fauna and an increase in flash floods up to the early 1980s which also caused sediment to be deposited elsewhere on otherwise unspoilt vegetation (Holden 1999b).

Rolando et al (2007) studied the effects of piste preparation on alpine grassland bird communities in the Italian Alps. They investigated the differences between three different plots; away from pistes, adjacent to pistes and on new pistes which had been created in the last year through machine scraping and grading and artificially reseeded with herbs. It was found that the plots away from the pistes had the greatest bird species richness and diversity and the greatest grassland species diversity and those on pistes had the lowest. Plots beside the pistes did not support lower numbers of species but had significant lower density. Richness and abundance of arthropods were significantly lower on ski pistes than on other plot types; given that many invertebrates are preyed upon by birds, low food availability on ski runs may be one of the factors reducing the attractiveness of these patches to birds.

Machine grading universally seems to be high impact and detrimental causing particularly severe and lasting impacts on alpine vegetation which are mitigated neither by time nor revegetation measures. Wipf et al (2005) found that pistes which had been machine graded had lower vegetation cover, productivity, species diversity and abundance of early flowering species and higher proportions of bare ground leading to surface run off and erosion.

However, it is not the case that machine grading has to be so invasive. It is possible for the topsoil to be removed (like turf), the ground works completed and the topsoil turf to be replaced. This maintains the ecosystem exactly as it was and overcomes the difficulties experienced with reseeded/ revegetating at altitude which almost universally fails to a certain degree. None of the above studies have examined pistes created in this manner; this is an area that requires further study.

Naturally, cutting through forest, particularly where it is old growth, is a major negative environmental impact and one which is vigorously opposed, particularly in North America, where many resorts lie completely below the tree line. The removal of trees in this manner can cause severe erosion and loss of habitat. However, not all impacts of piste creation are negative; some types of disturbance can increase biodiversity by suppressing dominant species or create favourable conditions for new habitat. The clearing of trees to make way for pistes in Lake Louise in Canada greatly improved the habitat for grizzly bears by providing excellent conditions for crowberry and buffalo berry production (Hudson 2002).

In their studies of the negative impacts of skiing around Banff, UTSA Research noted that soil erosion had occurred as a result of tree clearance to create pistes and the slope alterations had changed drainage

patterns. Additionally they noted harm to wildlife species that relied on forest cover and which were displaced or had their movement corridors restricted.

As discussed earlier, artificial snow is increasingly used to guarantee the snow cover of a resort for the entire season but only a few investigations have been carried out systematically to specify the environmental impacts. As winter snowfall becomes more erratic and with the likelihood of climate change, conditions may require more artificial snow but its use is controversial. Mountain Wilderness (2007) reports that 188 French resorts are equipped with artificial snow covering 4300ha of pistes or 15% of surface area and there are a further 20 projects in progress. Opponents point to the energy used to run the snow guns and CO₂ that is emitted. It is undoubtedly the case that they do use a lot of power to create the snow; however it is possible for the energy to be derived from renewable sources. Another argument against the snow guns is the visual impact of the guns and the pipes up on the mountain. As more and more infrastructure litters the mountainside, the wilderness that is being sought by urban dwellers as an escape from their daily lives starts to look more and more urban and thus loses its appeal. Another argument against artificial snow is the amount of water that is required to make it. Reservoirs are often built up the mountain, in order to utilise gravity to move the water to the guns. Wetlands are often destroyed to create reservoirs since there is already a natural water catchment; however this loses an important habitat. The reservoirs are often an eyesore to the natural landscape. Alternatively, the water is derived by taking a percentage of the flow from natural rivers and streams, thus modifying the river's rate of flow with its consequent impact on the aquatic life and biodiversity of the streams. The final criticism of artificial snow is the use of additives in the artificial snow to help the freezing process and the ecological consequences of this.

Rixen et al made a study in 2003 about the ecological implications of ski piste preparation and of artificial snow production. They found that main direct impacts of ski piste preparation on the vegetation were related to the compaction of the snow cover caused by the piste grooming; namely the induction of soil frost, the formation of ice layers, mechanical damage and a delay in plant development. The vegetation reacts with changes in species composition and a decrease in biodiversity.

However, artificial snow modifies some of these impacts; the soil frost is mitigated due to an increased insulation of the snow pack and the mechanical impacts of snow-grooming vehicles are mitigated due to the deeper snow cover. The deeper snow cover reduces the disturbance to the vegetation below. The snow melt of the piste is postponed through a combination of compression and artificial snow and thus vegetation development is delayed though not damaged.

Furthermore, they found that artificial snow induces new impacts to the alpine environment. The longer artificial snow had been used on ski pistes the higher the moisture and nutrient levels. Changes in indicator values for soil nutrients and moisture could be considered beneficial for plant growth. Artificial snow is often made from river water with a high mineral content; when it melts it increases the input of water and ions to ski pistes, which can have a fertilizing effect and hence change the plant species composition. Increasingly, snow additives made of potentially phytopathogenic bacteria are used in artificial snow and they enhance ice crystal formation due to their ice nucleation activity. Although sterilised, additives affected the growth of some alpine plant species in laboratory experiments, although it is inconclusive whether this impact is negative. No effects of artificial snow on plant productivity could be detected. The impact of artificial snow on diversity was ambiguous.

Salts are applied to improve the snow quality for ski races. The environmental impacts of most salts have not yet been investigated, but a commonly used nitrate salt has intense fertilising properties. Again this could be non-beneficial to the vegetation; however, this has yet to be clarified.

Rixen et al made another study in 2004 to investigate snow depth and density from groomed ski pistes with compacted snow and their effects on ground temperatures and timing of snowmelt. They analysed groomed pistes with and without artificial snow as well as adjacent ungroomed off-piste control plots beside the piste. On pistes with natural snow, the thin and compacted snow cover led to severe and long lasting seasonal soil frost. On pistes with artificial snow, soil frost occurred less frequently because of increased insulation due to the greater snow depth. However, due to the greater snow mass, the beginning of the snow-free season was delayed by more than 2 weeks. Average winter ground temperatures under a continuous snow cover were decreased by approximately 1 °C on both piste types compared with off-piste control plots. The results suggest that the heat balance of alpine soils is changed by both piste types, either by an extensive heat loss on pistes with natural snow or by prolonged snow cover on pistes with artificial snow. They did not conclude whether the impact was positive or negative – merely that there was a difference.

Keller et al 2004 conducted a similar study in central Switzerland to analyse whether the soil below groomed ski slopes with artificial snow may be subjected to more pronounced cooling than the soil below a natural snowpack. They found that snow density, snow hardness and thermal conductivity were significantly higher on the ski slope than in the natural snowpack. However, these differences did not affect the cooling of the soil, since no difference was observed between the ski slope and the natural snow cover. This might be because cold periods were rare and short and thus any snowpack could protect the soil from freezing. The major impact of the ski-slope grooming was a 4 week delay in snowmelt and soil warming at the end of the season. The study demonstrates that there is no site-independent answer as to whether a groomed snowpack affects the thermal conditions in the soil.

Thus, it can be seen that there is no clear answer. All types of ski piste management cause deviations from the natural structure and composition, however it is inconclusive whether the impacts are positive or negative. The impacts of ski pistes in general and of artificial snow in particular appear comparatively moderate, but are by no means negligible. Conclusions to be drawn are that machine grading without the protection of the top soil should be avoided at all costs and tree clearance should only be conducted with an environmental impact analysis to balance the loss of one habitat with the gain of another. Artificial snow should be created with renewable energy sources, using water from sustainable sources that do not impact the biodiversity in natural streams and planned with care to not litter the mountainside with equipment. Long term snow production should be banned in areas where any increase in the supply of nutrients and water is a concern and pistes should not be allowed where any changes in composition or decrease in species richness cannot be tolerated

11.3.3 Lifts and Facilities

Lifts are the other essential piece of equipment in a ski resort, to transport skiers up the mountain for skiing. They are frequently also used in summer for walkers and cyclists or as attractions in themselves for the views. Technologies have improved enormously since the early days; from slow, noisy and dirty lifts, fuelled by diesel, to being quick, quiet and run on electricity. Opponents also point to the vast amounts of electricity required to run the lifts and the associated CO₂ emissions, though every new lift is more efficient than before and they may, of course be run on renewable energy. Indeed, they may in fact improve the environment; the installation of new lifts in Sölden and Nassfeld has enabled the closure of a road between the two and removed the related pollution caused by the permanent traffic jam.

They cause a visual impact to the mountainside year round, particularly above the tree line. Attempts to paint pylons in different colours to blend in more have met limited success. Their construction can be invasive with the requirement for access roads for tracked vehicles. When Vail cut access roads along Two Elk Creek to build the chairlifts and lodges, the problem of erosion and water pollution occurred. Soil from the dirt roads flowed into creeks and disrupted the local fish and game. As with pistes, lifts often require changes to be made to the landscape or cuttings made through the trees. The same impacts and mitigations are relevant.

11.3.4 Wildlife

Many of the impacts of skiing on wildlife have already been discussed in the earlier sections. However, in addition, species may be displaced, such as deer, whose roaming grounds are moved by the installation of facilities and the disruption throughout the day and night that this causes. Off-piste skiing may impact wildlife more; however there has been little research into this. Holden (1999b) identified that in Cairngorm ecological studies have revealed negative consequences for the flora and fauna since the development of downhill skiing. Consequences for birdlife include reductions in the numbers of ptarmigan and red grouse resulting from collisions with cable wires and the disturbance of ground nesting birds by off-piste skiing.

It is arguable though that off-piste skiing is self governing; only advanced skiers are capable of skiing off-piste and there must be sufficient snow to protect against injury and damage to equipment. Since it is natural snow and non-compacted, over a metre is required to give a covering of 20cms when compacted by the ski. In addition, perfect powder conditions are rare throughout the season; as soon as there is melt and re-freeze a crust is formed which is not pleasant to ski on, rain or wet snow causes crud which is very heavy to ski on and when the snow is tracked by other skiers it quickly loses its appeal, thus the level of usage of off-piste areas is arguably low. Additionally there are often few areas that are suitable or safe for off-piste skiing. Tree skiing also falls into the same category of usage as off-piste although could be more of a refuge for hibernating or foraging wildlife. Both of these issues can be solved with management through allowance in some zones or restrictions on others together with information/penalties.

Heli-skiing, albeit a minority sport, the very nature of which is to transport skiers to completely natural unspoilt areas takes people to the very areas to which the wildlife has moved as a refuge from the ski resort.

It is argued that there should be no heli-skiing allowed or certainly close research on the movement patterns of wildlife.

11.3.5 Pollution

Traffic congestion and the associated pollution are real issues for many ski resorts. The nature of their locations often means the only way to access them is via road (much less the case in Switzerland where trains prevail). Additionally, once in resort, the nature of a tight valley location often means that at peak times, traffic jams and parking difficulties prevail. Whilst most tourists on a package arrive by a transfer coach, the rise in low cost airlines has led to an increase of people hiring a car to reach their destination and locals frequently drive to their nearest resort leading to serious weekend congestion. The mountain climate can add to the problem; when an inversion occurs (where the temperature in the valley is actually lower than at the top of the mountain), the air and pollution gets trapped and can be very visible.

Whilst in Europe, most staff live in resort throughout the season, in North America the ski facilities are often away from the community and staff, as well as skiers, drive to resort. Driving is also more a tendency for skiers due to the equipment required.

12 What is being done by Ski Areas?

Many ski resorts acknowledge that mistakes have been made in the last 20-40 years, and it is arguable that the greatest impacts occur during development construction, much of which is now slowing down. Many governments in North America and Europe mandate some form of environmental assessment, however, for the most part they do not address post development monitoring. Todd & Williams (1996) note that the need for a systematic approach to managing ski areas in a sustainable fashion has been growing over several years; driven by an appreciation of the ski industry's impacts on mountain environments, increasing conflicts between ski area developers and environmental stakeholder groups on issues related to growth and the benefits to be gained by applying environmental management practices in their operations.

There are many actions that can be taken by a resort from converting snowmaking energy to heat base lodges, modifying ski slope design to remove the need for roads, using water based paints to eliminate the need for solvents, installing recycling toilets, powering facilities with renewable energy etc. It is notable that there are many actions that can be taken that go beyond the typical responses of recycling and reducing the number of towels washed in hotels. The Aspen skiing company has taken a lead and their Environmental Affairs director (a first for the industry) has been instrumental in implementing a green campaign. They apply the term 'industrial ecology' to their measures many of which are large scale requiring up front development costs. Their achievements were recognised at the 2006 Responsible Tourism Awards at World Travel Market where Aspen won the category for 'Best Destination', for its long list of 'green firsts' in the ski industry co-ordinated by the Aspen Skiing Company. Nonetheless, even they experienced obstacles to progress in the form of cultural barriers and real world difficulties associated with implementation (Schendler 2003). Whistler Blackcomb won the category for "Best in a Mountain Environment" for their mountain stewardship. Heavenly at Lake Tahoe has made significant improvements and, as part of its mitigation for new lifts and pistes, has created freshwater marshes along alpine streams, reseeded exposed pistes, built rock supports to stabilise slopes and surveyed the wildlife areas so they can be avoided in future. Robert Redford's commitment to the environment is evident in his resort Sundance in Utah; car parking spaces have been removed, the fourth person in every car skis free, recycling bins are in every room and the list goes on. Many European resorts have obtained ISO14001 for their environmental management of their ski facilities and countries such as Austria and Switzerland are leading Europe in their use of renewable energy and their waste management and recycling. Austria has some of the most stringent restrictions when developing new lifts.

Todd & Williams (1996) proposed that a set of sustainability principles should be drawn up by consensus and an environmental management framework developed to ensure they would be implemented and monitored. Such an Environmental Management System (EMS) could be of value since it reduces the risks of penalties and financial liability for environmental damage, improves customer and public relations, reduces operating costs and improves access to lenders and investors. Additionally, the voluntary nature of an EMS represents an efficient way of protecting environmental resources without the presence of a strong regulatory regime. In Europe, the international standard ISO14001 effectively performs this role; it specifies a framework of control for an Environmental Management System against which an organisation can be certified by a third party. In North America, the business preference has been for flexibility, and they propose a different voluntary system. A survey of North American ski companies investigated which environmental policies they identified as the most important; protecting the scenic beauty, managing sewage and ensuring water

quality headed the list. When asked about motivating factors, public image topped the list followed by environmental quality, community relations and cost savings (Todd & Williams 1996).

Perhaps in response to the proposals by Todd & Williams, or in recognition of the growing issue, the National Ski Areas Association (NSAA) developed its 'Sustainable Slopes Programme' (SSP) in 2000. The NSAA is a trade association established in 1962, the purpose of which is to represent, serve and promote the mutual interests of its membership. Amongst its varied aims is the objective "Promote proper utilisation of environmental resources". Further to this, their environmental vision statement states that they would like their members "To be leaders among outdoor recreation providers by managing our business in a way that demonstrates our commitment to environmental protection and stewardship while meeting public expectations". The mission statement reinforces this, stating "We are committed to improving environmental performance in all aspects of our operations and managing our areas to allow for their continued enjoyment by future generations".

The NSAA acts as a facilitator for an industry led initiative to raise the collective environmental performance of the industry. They have set up three initiatives; 'The Green Room' which is a database of good environmental practice in its member resorts, 'Keep Winter Cool' which is a partnership with the Natural Resources Defence Council to raise visibility and public understanding of global warming and the 'Sustainable Slopes Programme' (SSP) which is an environmental charter for ski areas.

The SSP was developed in collaboration with a number of partnering organisations including conservation charities and environmental protection foundations and was endorsed by 178 resorts. It is a comprehensive assessment tool which enables resorts to clearly assess their current situation and provides methodologies to enable resorts to continually monitor progress. Ski areas are expected to implement annual self assessment of their environmental performance, there is no external validation and no penalties for non-compliance. It takes an "avoid, minimise, mitigate" approach to natural resource management and aims to promote "beyond compliance" in the following areas:

- ◆ Stewardship of the natural surroundings
- ◆ Balancing human needs with ecosystem protection
- ◆ Concentrating activities to limit impacts on wild areas
- ◆ Sustaining ecological, climatic and hydrological systems
- ◆ Maintaining characteristics that make landscapes unique
- ◆ Leading by example in the reduction of greenhouse gas emissions
- ◆ Placing priority on safety
- ◆ Planning design and construction
- ◆ Operations: water resources for snowmaking, facilities, landscaping, summer activities, quality management and waste water management
- ◆ Energy consumption and clean energy: facilities, snowmaking, lifts, vehicle fleets
- ◆ Waste management: waste reduction, product re-use, recycling, hazardous wastes
- ◆ Fish and wildlife
- ◆ Forest and vegetative management
- ◆ Wetlands and riparian areas
- ◆ Air quality
- ◆ Visual quality
- ◆ Transportation
- ◆ Education and outreach

The Charter enjoys official partnership from an array of federal and state organisations and non-profit environmental organisations; however, it is notable that none of the major environmental conservation organisations that were initially involved in the design of the SSP decided to become official partners. In 2000, 160 ski areas enrolled but by 2006 this had only increased to 178 (36% of US ski areas). The survey was completed by a high of 90 in 2002 which fell to 54 in 2005 a 22% decline despite the funding provided by the USFS.

Trade associations often support voluntary programmes because they can help in maintaining a positive industry wide environmental reputation that reduces scrutiny from environmentalists and the media and pre-empt the possible imposition of regulation and in some cases voluntary initiatives can promote improved environmental performance. The SSP however has been strongly criticised by environmentalists as a "green washing" scheme because of its lack of specific environmental performance standards and third party oversight.

Rivera & de Leon (2004) conducted a study on 109 US western ski areas, to investigate whether the SSP actually works. They proposed five hypotheses:

- ◆ Facilities facing higher federal government environmental oversight are more likely to participate in voluntary environmental programs
- ◆ Facilities facing higher State level environmental pressures are more likely to participate in voluntary environmental programs
- ◆ Larger facilities are more likely to participate in voluntary environmental programs
- ◆ Facilities owned by publicly traded firms are more likely to participate in voluntary environmental programs
- ◆ Facilities participating in industry sponsored voluntary environmental programs are more likely to show higher environmental performance

They compared the data provided by ski areas with independent data collected by the Ski Area Citizens Coalition (SACC). Since 2000, the SACC has conducted assessments of the environmental performance of western ski resorts and annually publishes the results online as environmental scorecards with grades (from A-F) based on their percentage compliance with multiple environmental performance criteria. The SACC obtains its information from Government documents collected through the Freedom of Information Act requests. The NSAA vehemently criticised the use of the scorecards as “an un-audited, inherently flawed and biased measure of environmental reporting” and attempts to portray the SACC as “an alliance of radical environmental groups whose goal is to obstruct the expansion of the industry” (Dorsey 2004). The NSAA particularly points out that undue emphasis is placed on expansion related activities such as real estate development and those refusing to respond.

Rivera & de Leon (2004) found that higher participation in the sustainable slopes programme showed a significant relationship with lower environmental performance, i.e. trying to improve their ‘green’ credentials without actually doing anything – ‘greenwash’. They also found that large ski areas were more likely to participate. Publicly traded companies showed lower environmental performance – emphasising the focus on short term gains and lack of interest in such issues by the stock market. The only variable that had a positive and statistically significant relationship with environmental performance was higher state pressure – ski areas were more likely to participate and more likely to have higher performance. They proposed that States with higher support for environmental protection have stronger environmental groups and better capacity for implementation.

The somewhat shocking and disappointing results of the SSP made public by this investigation resulted in a lot of media coverage ranging from outright hostility to supportive with a range of views in between. Criticism centred on the fact that it was a ‘snapshot’ in time and exemplified the dilemmas of any start up programme. Criticism was also made of the SACC information. To counter these claims Rivera et al conducted another study in 2006 to investigate the SSP after five years. This would then counter the ‘start up’ programme argument and, to address the validity of the SACC information, they corroborated with the Golden Eagle Awards given annually to ski resorts in recognition of the environmental excellence. The Golden Eagle Awards are administered by the NSAA.

Between 2000 and 2004, the Golden Eagle awardees also received the SACC’s highest grade in four out of 5 cases suggesting a high correlation in the two independent viewpoints. They disaggregated the scores from the SACC to give a more balanced view. Again, they found that between 2001 and 2005 there was no evidence to conclude that adopting the SSP led to superior performance levels than non participants for all areas of environmental protection. This re-affirmed their previous conclusion of ‘greenwash’ and the ‘free rider’ notion since there is no independent checking or sanctions for lack of improvement. The only area where increased performance was noted was in natural resources conservation practices. Participants seem to predominantly adopt highly visible practices such as recycling or those that offer immediate short term benefits with small investments such as energy and water conservation. Publicly traded firms showed lower performance for expansion management. Larger ski areas showed lower performance for expansion management and natural resource protection. There were also lower performances for ski areas occupying federal land which was unexpected but possibly due to conflicting mandates.

So it can be seen that, unfortunately, the SSP has not resulted in improved performance and has not reduced tensions between the ski industry and environmental groups. The evidence shows that the challenge lies in implementation; voluntary programmes where ski resorts opt in with non binding obligations do not seem to be the way forward. Interestingly both Aspen and Vail, who have received much acclaim for the actions in the past couple of years, no longer participate in the Sustainable Slopes Programme. They

have developed their own policies and have adopted the ISO14001 accreditation, which is validated by an external body.

13 The Role of Other Intermediaries?

The Ski Club of Great Britain has recently developed its 'Green Resort Guide' aiming to "provide information about the eco-friendliness of ski resorts". With a membership of over 13,000 the Ski Club has broadly the same aims as when it was set up; encouraging newcomers to the sport, supporting British competition skiers, teaching new skills and safety, organising ski trips, providing reps in resorts and providing information on resorts worldwide. They hope that their 'Green Resort Guide' will "drive up standards in the industry by highlighting the resorts that are doing a lot to help preserve the environment, as well as those that aren't doing much at all." (Ski Club of Great Britain 2007). For each resort, the guide lists a simple yes/no answer for the following items: ISO14001 certification, recycling, green power, traffic reduction, properly managed sewage, climate policy and green building policy and then has a free text listing of the major initiatives. It stops short of giving scores or ranking resorts but aims to provide useful information for the skier when selecting their destination or for general information purposes. As they state "in our search to discover what individual resorts are doing to help minimise their impact on the environment, we often found the information hard to come by with a few worthy exceptions. And although it is difficult to compare the efforts of individual ski areas when there are so many different ways to make a difference, we have tried to find common ground for comparison." They aim to update the information continually.

The Ski Club obtained their information in association with Patrick Thorne, one of the world's leading snow sports writers and owner of Snow24, a database of information and statistics of over 6000 ski resorts worldwide. He has also published the similar information as the Ski Club as the Green Snow database on his website - www.saveoursnow.com. On his website he does in fact grade the resorts unlike the Ski Club. Increasing the prominence of such information on these type of websites arguably would raise awareness, however, perhaps a greater role lies with the tour operators.

It is only in the last few years that Responsible Tourism has entered the terminology of the mainstream tour operator, and in the first instances for all operators the initial focus is on internal operations and then working with existing suppliers to address invariably the environmental performance of accommodation. The Tour Operators Initiative defines "Effectively integrating sustainability into the tour operators' business means considering environmental, social and economic aspects throughout the process of developing a holiday package" and that one of the main responsibilities of tour operators is "providing customers with information on responsible behaviour and sustainability issues at their destinations". Many operators have begun to consider the provision of this information in their summer programmes; however it seems that their winter sports programmes have, in the main, been ignored up until now.

In a review of the key tour operators' brochures for the 2006/7 winter season there was no mention of Responsible Tourism or environmental information in the brochures of Thomson, Inghams, Crystal or First Choice. Neilson alone highlights responsible partners; accommodation suppliers who scored highly on the Federation of Tour Operators' self check questionnaire, and directs customers to its website for more information about its Responsible Tourism policy. None of them however provides any information to the consumer about the environmental policies of the destinations or addresses Responsible Tourism in ski resorts.

Swarbrooke and Horner (1999) describe the key determinants of tourist behaviour as including information in the media, disposable income, personal or friends' experiences, interest in particular issues or activities and advice from the industry, for example the tour operator or travel agent. It is arguable that tour operators, and indeed travel agents and the media have a key role in the dissemination of information about responsible skiing.

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