

# Skier and Snowboarder Motivations and Knowledge Related to Voluntary Environmental Programs at an Alpine Ski Area

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**Abstract** Many alpine ski areas have recently adopted voluntary environmental programs (VEPs) such as using recycling, renewable energy, and biofuels to help reduce their environmental impacts. Studies have addressed the performance of these VEPs in mitigating environmental impacts of this industry, but little is known about visitor awareness and perceptions of these programs. This article addresses this knowledge gap by exploring skier and snowboarder knowledge of VEPs at a ski area and the influence of these programs on their motivations to visit this area currently and behavioral intentions to visit again in the future. Data were obtained from an onsite survey at the Mt. Bachelor ski area in Oregon, USA ( $n = 429$ , 89.7% response rate). Few skiers and snowboarders were knowledgeable of VEPs at this area and fewer than 20% were motivated to visit on their current trip because of these programs. Other attributes such as scenery, snow conditions, and access were more important for influencing visitation. Up to 38% of skiers and snowboarders, however, intend to visit this ski area more often if it adopts and promotes more VEPs. Managers can use these results to inform communication and marketing of their environmental programs and performance to visitors. Additional implications for management and future research are discussed.

**Keywords** Motivations · Knowledge · Intentions · Environmental programs · Ski areas

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## Introduction

Following World War II, the ski industry experienced rapid growth in equipment technology and mountain access (e.g., snowmaking, chairlifts), mass marketing, and the number of alpine ski areas (Hudson 2000). Financial challenges, inconsistent demand, and changing demographics, however, have forced this industry to consolidate and change. Large alpine destination resorts catering to many visitors have become ubiquitous despite the total number of ski areas declining over the last few decades, especially in North America (Hudson 2000, 2004; Williams and others 2008). The number of ski areas operating in the United States (USA), for example, declined from 727 in 1984 to 472 in 2010 (Mulligan 2011). These areas not only grew in size and shrank in number, but activities such as snowboarding, snowmobiling, and heliskiing also emerged. Some ski areas diversified to accommodate these winter activities and also expanded operations into the summer for other activities such as mountain biking and hiking (Needham and others 2004).

Environmental issues have also influenced this industry. Ski areas use resources such as water for snowmaking, energy for operating chairlifts, and forests and wildlife habitat for recreation terrain. Impacts at these areas include air pollution from maintenance equipment, as well as erosion, habitat fragmentation, exotic species introduction, and clearcutting on ski slopes (Watson 1985; Puntieri 1991; Tsuyuzaki 1994). Environmental groups have pressured ski area managers to address these types of impacts (Needham and Rollins 2005). Some ski areas have taken steps to reduce their impacts by implementing voluntary environmental programs (VEPs), which are programs, codes, agreements, and commitments encouraging public, private, or nonprofit organizations to voluntarily reduce

their environmental impacts beyond requirements established by environmental regulatory systems (Carmin and others 2003). Researchers have investigated voluntary approaches to environmental management using terminology such as voluntary environmental initiatives (Christmann and Taylor 2002), voluntary environmental agreements (Brink 2002), and voluntary environmental regulations (Arora and Cason 1995). VEPs, however, have received the most attention in the literature when referring to voluntary initiatives of an organization or institution to improve its environmental performance (see Darnall and Carmin 2005; Borck and Coglianese 2009 for reviews). The term VEPs was not coined by one specific entity; instead it has been adopted to channel research, industry, and agency focus on these types of voluntary programs and initiatives (Borck and Coglianese 2009).

In 2000, the National Ski Areas Association (NSAA) created the Sustainable Slopes Charter in partnership with the Environmental Protection Agency, Forest Service, and other agencies. This charter is a voluntary initiative that creates a framework for ski areas to include a number of VEPs aimed at encouraging more environmental stewardship in the industry (Rivera and de Leon 2004). Examples of VEPs in this charter include water and energy conservation, waste and vegetation management, and wildlife habitat protection (NSAA 2009b). As of 2010, over 190 ski areas in the USA had endorsed the Sustainable Slopes Charter and adopted VEPs.

Studies have examined VEPs at ski areas relative to environmental performance (George 2003; Donohoe 2004; Rivera and de Leon 2004; Rivera and others 2006; Darnall and Sides 2008), interests served (Steelman and Rivera 2006), and manager perspectives and corporate motivations for involvement (Todd and Williams 1996; Bruce 2000; Carmin and others 2003; Blust 2004; de Leon and Rivera 2007). Comparatively little research, however, has examined what visitors such as skiers and snowboarders know about VEPs at ski areas and how these programs may influence their motivations to visit these areas. This article helps to address these knowledge gaps. Social trends to protect the environment have increased and competition among ski areas is high (Olsen and others 1992; Rivera and de Leon 2004), so understanding knowledge and motivations related to an alpine destination may enhance visitation and business growth.

### Conceptual Foundation

*Motivations* are internal or external factors that arouse and direct behavior (Iso-Ahola 1999), and leisure or recreation motivations are reasons for visiting an area or participating in an activity at a given time (Manfredo and others 1996). Motivations to visit an area *currently or on the present trip*

have received substantial attention in the literature. Iso-Ahola (1999) identified two dimensions of these motivations. The first dimension, “seeking,” involves motivations associated with searching for personal rewards from participation (e.g., challenge, competence). The second dimension is “escaping” or the desire to escape from other life experiences (e.g., to leave daily routines behind, escape pressures). The recreation experience preference (REP) scales are one of the most common measures of these motivations and include more than 300 social psychological motivations that can be grouped into fewer broad domains (e.g., exercise, exploration, be with similar people, escape; Manfredo and others 1996). Most of these motivations are internal forces that “push” people to visit a particular area or engage in a specific activity (e.g., escape, relax, adventure, stress relief, challenge). There are also, however, external motivations or attributes that “pull” or attract people to an activity or destination such as ease of access, activities offered, reputation, and scenery (Dann 1981). Motivations that pull individuals to an area tend to be related to features of the destination, whereas push factors tend to be internal cognitions that can be independent from such features. This push–pull framework is one approach for explaining motivations of why people visit an area on their current trip (Dann 1981; Manning 1999).

In the context of alpine ski areas, studies have found that motivations pushing people to visit these areas in the winter include excitement and thrill seeking, exercise, demonstrating skill and ability, relaxation, and achievement (Klenosky and others 1993; Holden 1999; Williams and others 1994). Research has also documented that attributes pulling winter visitors to these areas include terrain, snow conditions, number of runs, ticket prices, proximity, and lodging (Mills and others 1986; Klenosky and others 1993; Williams and others 1994; Richards 1996; Hudson and Shephard 1998; Alexandris and others 2007). The focus of this article and study is VEPs, which may serve as additional attributes that pull visitors to ski areas on their current trip. This article, therefore, examines the extent that these programs motivate people to visit a ski area and where these programs rank in importance compared to other reasons for visiting. This information is important because skiers and snowboarders have a broad diversity of motivations, and understanding this wide range of needs will allow ski area managers to accommodate their clientele. In addition, it will allow managers to understand the importance of VEPs in relation to other motivations for visiting and perhaps prioritize attributes that still accommodate the most important needs of visitors while using VEPs to mitigate environmental impacts (Holden 1998).

Motivations to visit an area or participate in an activity *in the future* are related to the concept of behavioral

intentions, and research has shown that an individual's future behavior can be predicted, in part, by his or her intention to perform that behavior (Fishbein and Ajzen 1981). In the context of alpine ski areas, Hudson and Ritchie (2001) found that most skiers reported that they would be more likely to visit a ski area in the future if it was environmentally responsible instead of an area not focusing on environmental performance. In addition, the majority of skiers intended to pay more to visit a ski area attempting to reduce its environmental impacts. This article builds on Hudson and Ritchie's (2001) study by examining skier and snowboarder intentions to visit a ski area in the future if the area increases its number of VEPs.

Although some skiers and snowboarders may be motivated to visit a ski area because of its participation in VEPs, this does not mean that they are knowledgeable of all VEPs at the area. *Knowledge* is a central component of information processing and decision making (Johnson and Russo 1984; Raju and others 1995; Vaske and others 2006). Studies examining recreationists' knowledge of environmental issues such as wildlife diseases (Vaske and others 2006), fossil fuel exploration (Teel and others 2006), and conservation behaviors such as catch and release fishing (Sutton and Ditton 2001; Hvenegaard 2002) have found that many recreationists are not highly knowledgeable of some environmental issues. Vaske and others (2006), for example, found that the largest proportion of hunters correctly answered only five or fewer questions out of nine questions about environmental issues associated with wildlife diseases. In the context of ski areas, Holden (2000) reported that the majority of skiers were appreciative of the aesthetics of their surroundings at these areas, but their knowledge about ecosystems and impacts on natural resources at ski areas was low with less than 30% being aware of environmental impacts at these areas. Similarly, Hudson and Ritchie (2001) also found a general lack of knowledge and even confusion among skiers about environmental issues associated with this activity at ski areas.

Little is known, however, about skier and snowboarder knowledge of specific VEPs at ski areas, which may influence their motivations to visit these areas. Those who already know about VEPs at an area may visit partially because of these programs. Alternatively, others may be motivated to visit places because of these types of programs, so they might specifically seek information to learn about and become knowledgeable of programs at a particular area. Studies have identified ski area attributes that are important to visitors, but this does not mean that users are aware of every attribute at an area (Carmichael 1996; Richards 1996). Unlike well-known attributes such as terrain and chairlifts, VEPs are a relatively new phenomenon at ski areas, so it is important to examine what skiers and snowboarders know about these programs. Understanding

how much these users know about VEPs provides information that may allow ski area managers to assess the effectiveness of their marketing of environmental programs and performance.

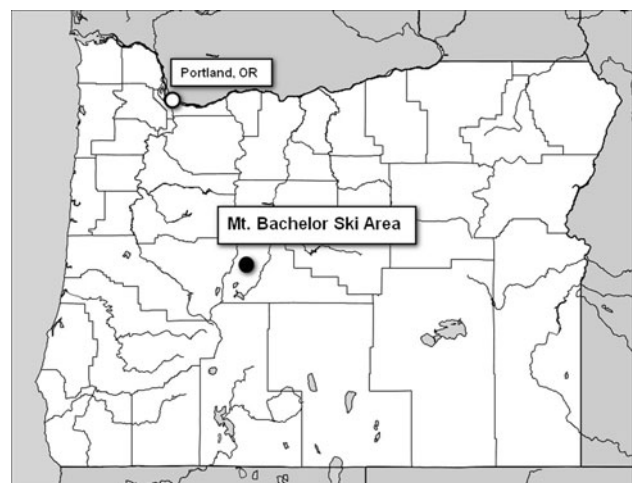
This article is exploratory and addresses four research questions related to VEPs at alpine ski areas. First, how much do skiers and snowboarders know about VEPs at a ski area? Second, to what extent do these VEPs influence skier and snowboarder motivations to visit on their current trip? Third, where do VEPs rank in importance compared to other motivations for visiting (e.g., proximity, terrain, snow conditions)? Fourth, to what extent would skiers and snowboarders intend to visit more often in the future if there are more VEPs at a ski area?

## Methods

### Study Site and Context

Data were collected at the Mt. Bachelor ski area in Oregon, USA for two main reasons (Fig. 1). First, this ski area is one of the largest in the USA, has over 350 inches of snow most winters, and its summit of 9,065 feet is the highest of all ski areas in the US Pacific Northwest creating a vertical drop of over 3,000 feet. Mt. Bachelor's seven express chairlifts provide access to over 3,500 acres of terrain and more than 70 ski runs. This ski area receives over 500,000 skier and snowboarder visits every winter, allowing the ability to obtain a large sample of respondents. Mt. Bachelor is located 22 miles from the city of Bend and its population of over 80,000 residents.

Second, Mt. Bachelor has a history of adopting managerial and operational VEPs to reduce emissions and support environmental conservation. This ski area, for



**Fig. 1** Map of location of Mt. Bachelor in central Oregon, USA

example, purchases its power from renewable energy sources, actively uses recycling and waste reduction programs, and operates bio-fuel powered shuttles to transport guests and employees to and from the mountain (Mt Bachelor 2009). In 1994, Mt. Bachelor was the first ski area to win the prestigious Golden Eagle Award for environmental excellence presented by the National Ski Areas Association (NSAA 2009a). According to the environmental group, Ski Area Citizens Coalition (SACC), Mt. Bachelor ranked ninth among all ski areas in the nation for environmental stewardship based on results of the 2008–2009 Ski Area Environmental Scorecard (SACC 2009).

### Data Collection

Methods were similar to those in other studies of winter visitors at ski areas (Klenosky and others 1993; Ormiston and others 1998; Thapa and Graefe 2003; Vaske and others 2004). An onsite survey of adult skiers and snowboarders was conducted at the Mt. Bachelor ski area; employees and people under the age of 18 were not surveyed. Data were collected onsite using questionnaires administered from the middle of January to end of March 2010 during which sampling days were randomly selected with the number averaging five days per week. Sampling occurred from 11:30 a.m. to 3:00 p.m. in restaurant facilities on the mountain and at its base. On each sampling day, one of the three facilities (Pine Marten Lodge, West Village Lodge, Sunrise Lodge) was randomly selected for sampling and potential respondents were approached at these facilities using a systematic random sampling method where every fifth table was systematically selected after randomly choosing a starting table (Vaske 2008). At each table, the person in each household with the most recent birthday was asked to complete a questionnaire. If all individuals were from different households, they were each asked to complete questionnaires. If a person refused to participate, was under 18 years of age or an employee, or had already answered a questionnaire, a person at the next table was selected. Questionnaires took approximately 10 to 15 minutes to complete and after an onsite pilot test of the instrument, the final sample size was  $n = 429$  ( $n = 303$  skiers,  $n = 126$  snowboarders) with a response rate of 89.7%.

### Analysis Variables

Similar to approaches used by Vaske and others (2006), knowledge of VEPs was measured using a true/false format with 12 statements identifying VEPs that were occurring (e.g., “Mt. Bachelor has a recycling program”) and not occurring at this ski area (e.g., “Mt Bachelor has reintroduced native wildlife animals on the mountain”). Many of

these statements were based on lists of VEPs that were occurring at this ski area and these lists were provided on the ski area’s internet website and during discussions with this area’s managers. Responses were measured on 5-point scales of 1 “very certain this is false” to 5 “very certain this is true,” which were recoded to 0 “did not answer correctly” and 1 “answered correctly” for analysis purposes.

Motivations for visiting this area on the current trip were measured in the questionnaire with 37 pull items that were largely informed by previous studies (Klenosky and others 1993; Williams and others 1994; Carmichael 1996; Richards 1996; Alexandris and others 2007), but included additional items related to VEPs that were described on this ski area’s internet website and by this area’s managers. Respondents reported the extent that they disagreed or agreed that each reason motivated them to visit Mt. Bachelor on their current trip. Respondents were asked, for example, to reply to statements such as “I visited Mt. Bachelor today because the amount of snow” and “I visited Mt. Bachelor today because this ski area participates in recycling.” Responses were measured on 5-point scales of 1 “strongly disagree” to 5 “strongly agree.”

Another 14 questions measured the extent that respondents would intend to visit in the future if Mt. Bachelor promotes and increases its VEPs. Visitors were asked, for example, “how would you change how often you visit if Mt. Bachelor donated a portion of revenue to offset vehicle emissions?” Responses were measured on 5-point scales of 1 “visit much less often,” 2 “visit slightly less often,” 3 “visit about the same,” 4 “visit slightly more often,” and 5 “visit much more often,” and recoded to 0 “visit same or less” or 1 “visit more” for analysis purposes.

## Results

### Activity Group Profiles

In total, 56% of respondents were male and 44% were female. Approximately 60% of snowboarders were male and 57% of skiers were male, but this difference was not statistically significant,  $\chi^2 = 0.17$ ,  $P = .677$ ,  $\phi = .02$ . The average age of respondents was 39.8 years, but skiers were significantly older ( $M = 43.4$  years) than snowboarders ( $M = 30.5$  years),  $t = 11.43$ ,  $P < .001$ . The point-biserial correlation effect size of  $r_{pb} = .42$  suggests that this difference in age between activity groups was “large” (Cohen 1988) or “substantial” (Vaske 2008). Over 87% of respondents had visited Mt. Bachelor previously, whereas 13% were first time visitors on the day that they were surveyed. There was no significant difference in repeat visitation between skiers (88% had previously visited) and snowboarders (82% had visited),  $\chi^2 = 2.33$ ,  $P = .127$ ,

$\phi = .08$ . These characteristics are consistent with those reported by internal marketing and consulting studies of users at Mt. Bachelor, suggesting that the data are relatively representative of visitors.

**Knowledge of VEPs**

The first research question focuses on how much skiers and snowboarders know about VEPs at Mt. Bachelor. These visitors were most knowledgeable about recycling programs at this ski area, as 70% of skiers and 66% of snowboarders knew that it had a recycling program (Table 1). Less than half of respondents, however, answered the other questions about VEPs correctly. Only 27% of visitors, for example, were aware that Mt. Bachelor uses energy efficient lighting and only 24% knew that this ski area uses bio-diesel to fuel some of its vehicles. The fewest respondents (9%) knew that Mt. Bachelor had received awards for environmental conservation. There were no significant differences between skiers and snowboarders in their answers to 11 of the 12 questions,  $\chi^2 = 0.00$  to 2.61,  $P = .106$  to  $.999$ . Snowboarders (15%) were significantly more aware than skiers (7%) that Mt. Bachelor offers the purchase of a “green tag” to help offset car emissions,  $\chi^2 = 7.11$ ,  $P = .008$ . The phi effect size of  $\phi = .14$ , however, suggests that the strength of this difference was “minimal” (Vaske 2008) or “small” (Cohen 1988).

Overall knowledge of VEPs at this ski area was calculated by summing the number of correctly answered questions. The final knowledge score could range from a minimum of 0 (i.e., no questions answered correctly) to 12 (i.e., all correct). The highest score achieved, however, was

9 correct answers (i.e., 75% correctly answered) and only 1% of respondents answered this many questions correctly (Table 2). On average, respondents answered only 2.76 of the 12 questions correctly (i.e., 23% correctly answered) with the highest proportions answering no questions correctly (18%) or just two questions correctly (18%). There was no significant difference in average knowledge scores between skiers ( $M = 2.71$  correctly answered) and snowboarders ( $M = 2.86$  correct),  $t = 0.64$ ,  $P = .522$ ,  $r_{pb} = .03$ . Taken together, these results show that skiers

**Table 2** Total knowledge scores related to VEPs at Mt. Bachelor

Correct responses/total statements	Skiers	Snowboarders	Total
0/12	18	19	18
1/12	16	15	16
2/12	18	16	18
3/12	14	11	13
4/12	15	14	15
5/12	5	11	7
6/12	8	6	8
7/12	3	7	5
8/12	1	2	1
9/12	1	0	1
10/12	0	0	0
11/12	0	0	0
12/12	0	0	0
Mean	2.71	2.86	2.76

Cell entries are percentages (%) unless specified as means

No difference in mean knowledge between skiers and snowboarders,  $t = 0.64$ ,  $P = .522$ ,  $r_{pb} = .03$

**Table 1** Skier and snowboarder knowledge of voluntary environmental programs (VEPs) at Mt. Bachelor

VEP knowledge statements—are these true/false at Mt. Bachelor <sup>a</sup>	Correct response	Percent correct (%)			$\chi^2$ -value	P-value	$\phi$
		Skiers	Snowboarders	Total			
Has a recycling program	True	70	66	68	0.67	0.411	.04
Conserves water by never using snowmaking equipment	False	42	41	42	0.04	0.848	.01
Uses energy efficient lighting in facilities	True	28	23	27	1.13	0.289	.05
Provides incentives to visitors who carpool to this ski area	False	24	26	25	0.18	0.673	.02
Uses bio-diesel to fuel some of its vehicles	True	24	24	24	0.00	0.999	.00
Purchases all food related products from local suppliers	False	21	25	22	0.93	0.335	.05
Has reintroduced native wildlife animals on the mountain	False	20	16	20	1.10	0.294	.05
Promotes a “no vehicle idling” program in parking/drop off areas	True	10	15	12	2.61	0.106	.08
Purchases 100% of its power from renewable energy sources	True	11	11	11	0.02	0.901	.01
Donates 5% of ticket revenue to local environmental organizations	False	10	14	11	1.43	0.232	.06
Allows visitors to buy a “green tag” to help offset vehicle emissions	True	7	15	9	7.11	0.008	.14
Has won awards for environmental conservation	True	8	12	9	1.96	0.161	.07

<sup>a</sup> Responses originally measured on 5-point scales of 1 = very certain this is false to 5 = very certain this is true. Responses of 1 = very certain this is false and 2 = somewhat certain this is false were recoded as a “false” response, and 4 = somewhat certain this is true and 5 = very certain this is true were recoded as a “true” response. A response of 3 = unsure was coded as an incorrect response

and snowboarders were not highly knowledgeable of the VEPs at Mt. Bachelor.

#### Current Trip Motivations Related to VEPs

The second research question addresses the extent that VEPs influenced motivations to visit Mt. Bachelor on the current trip. A principal components exploratory factor analysis with varimax rotation reduced the 37 motivation items to eight broad factors explaining 72.3% of the variance in motivations for visiting, and all factor loadings exceeded .51 (Table 3). Factor analysis is a statistical technique for identifying a relatively small number of factors that represent relationships among sets of questionnaire variables. The distinctive characteristic of factor analysis is its data reduction capability, as it reveals whether any underlying patterns of relationships exist so that the data may be reduced to a smaller set of factors or components that account for interrelationships in the data (Vaske 2008). Membership of variables in a factor is partially based on factor loadings of each variable and these loadings should generally be greater than or equal to .40 with eigenvalues over 1.0 (Tabachnick and Fidell 1996). The first factor revealed by this statistical analysis contained eight items related to VEPs and environmental performance (e.g., “I visited Mt. Bachelor today because this ski area is committed to environmental conservation”) and the Cronbach alpha reliability coefficient for this factor was .97 (Table 4). Reliability refers to the consistency of responses across a set of variables measuring a single unobserved or latent concept or factor (Vaske 2008). An alpha value greater than or equal to approximately .60 indicates that variables are measuring the same factor and justifies combining them into a scale or index (Nunnally and Bernstein 1994; Vaske 2008).

The second factor consisted of eight items related to food and service (e.g., “I visited Mt. Bachelor today because the dining facilities;” alpha = .91), and the third factor contained six items related to chairlifts and ski runs or trails (e.g., “I visited Mt. Bachelor today because the variety of different runs/trails;” alpha = .88). Four items loaded on the fourth factor, which were related to scenery and nature (e.g., “I visited Mt. Bachelor today to view the natural scenery”), and yielded an alpha of .86. The fifth factor contained three items associated with mountain access (e.g., “I visited Mt. Bachelor today because the ease of chairlift access to the high alpine area;” alpha = .85) and the sixth factor contained four items related to advertising and events primarily for youth (e.g., “I visited Mt. Bachelor today because the terrain park/half pipe;” alpha = .72). The seventh factor consisted of two items about snow conditions (e.g., “I visited Mt. Bachelor today because the amount of snow;” alpha = .87) and the eighth

factor contained two items about lift lines and prices (e.g., “I visited Mt. Bachelor today because the lift ticket/pass prices;” alpha = .60). Deletion of any variable from its factor did not improve reliability and factor solutions and reliabilities did not substantially differ between skiers and snowboarders.

In total, 20% of respondents agreed that they were motivated to visit Mt. Bachelor on their current trip because of VEPs at this ski area (Table 5). Nineteen percent of respondents, for example, agreed that they visited because this ski area participates in recycling and 12% to 13% visited because of its use of renewable energy and methods for reducing emissions. Only 10% or fewer respondents visited because of this ski area’s use of energy efficient facilities, commitment to conservation, concern about effects of ski areas on climate change, environmental leadership in the ski industry, and receipt of awards for environmental conservation.

The highest proportions of visitors agreed that they visited Mt. Bachelor on their current trip because of the terrain (82%), variety of ski runs (82%), fresh air (82%), number of ski runs (78%), scenery (77%), and quality of snow (73%). The fewest visited because of childcare services (6%), retail shops (8%), advertising about this area (8%), and equipment rentals (9%). Importance of these issues in motivating people to visit Mt. Bachelor only differed significantly between skiers and snowboarders for four of the 37 items,  $\chi^2 = 4.23$  to 6.84,  $P = .040$  to  $.009$ . Effect sizes of these four items, however, ranged from only  $\phi = .10$  to  $.13$ , indicating that the strength of these differences was “minimal” (Vaske 2008) or “small” (Cohen 1988).

The third research question examines where VEPs rank in order of importance compared to other motivations for visiting the Mt. Bachelor ski area (e.g., snow, scenery, price, access). On average, the scenery and nature factor was most important to respondents ( $M = 3.82$ ), followed closely by snow conditions ( $M = 3.81$ ) and lifts and trails ( $M = 3.75$ ; Table 6). VEPs were the sixth most important motivating factor ( $M = 2.80$ ), ranking higher than only food and service ( $M = 2.55$ ) and advertising and events primarily for youth ( $M = 2.40$ ). Rankings did not statistically differ between skiers and snowboarders,  $t = 0.04$  to 1.78,  $P = .076$  to  $.966$ ,  $r_{pb} = .00$  to  $.09$ . Taken together, VEPs were not nearly as important as most other reasons for visiting, but they were more important than food and related services and facilities, and amenities mainly for youth.

#### Future Trip Intentions Related to VEPs

The fourth research question explores the extent that skiers and snowboarders would visit more often in the future if Mt. Bachelor promotes and increases its VEPs. In total, 25% to 39% of skiers and 23% to 38% of snowboarders

**Table 3** Exploratory factor analysis of skier and snowboarder motivations for visiting Mt. Bachelor

Motivation variables—I visited Mt. Bachelor today		Factor loadings <sup>a</sup>							
	Factor 1 VEPs and environment	Factor 2 food and service	Factor 3 lifts and trails	Factor 4 scenery and nature	Factor 5 mountain access	Factor 6 events for youth and advertising	Factor 7 snow conditions	Factor 8 lift lines and prices	
Because this ski area uses energy efficient facilities	0.91								
Because this ski area tries to reduce its emissions	0.90								
Because this ski area uses renewable energy	0.89								
Because this ski area has won awards for conservation	0.88								
Because this ski area is an environmental leader in the industry	0.87								
Because this ski area is committed to conservation	0.85								
Because this ski area participates in recycling	0.85								
Because this ski area is concerned about climate change	0.84								
Because of dining facilities		0.78							
Because of food/beverage		0.77							
Because of retail shops		0.76							
Because of ski patrol/safety		0.72							
Because of staff/service		0.70							
Because of equipment rentals		0.69							
Because of childcare services		0.67							
Because of ski school/lessons		0.66							
Because of variety of different runs/trails			0.89						
Because of number of runs/trails			0.87						
Because of this mountain's terrain			0.84						
Because of number of chairlifts			0.64						
Because of quality of chairlifts			0.57						
Because of trail grooming			0.51						
To view the natural scenery				0.85					
To be close to nature				0.83					
To enjoy the fresh air				0.82					
To experience a high alpine area				0.71					
Because of ease of access to the base of this ski area					0.84				
Because of ease of chairlift access to the high alpine area					0.78				
Because of availability of parking					0.69				
Because of terrain park/half pipe						0.66			
Because of special events (e.g., race, concert, competition)						0.62			
Because of public transportation to this ski area (e.g., bus)						0.60			
Because of advertising about this ski area (e.g., internet, tv)						0.58			

Table 3 continued

Motivation variables—I visited Mt. Bachelor today	Factor loadings <sup>a</sup>							
	Factor 1 VEPs and environment	Factor 2 food and service	Factor 3 lifts and trails	Factor 4 scenery and nature	Factor 5 mountain access	Factor 6 events for youth and advertising	Factor 7 snow conditions	Factor 8 lift lines and prices
Because of amount of snow							0.90	
Because of quality of snow							0.86	
Because of lift ticket/pass prices								0.68
Because of lift line length								0.67
Eigenvalue	6.89	4.88	3.77	2.84	2.62	2.30	1.76	1.62
Percent (%) of total variance explained <sup>b</sup>	18.63	13.18	10.18	7.67	7.07	6.41	4.75	4.37

<sup>a</sup> Principle components factor analysis with Varimax rotation. Only factors with eigenvalues greater than 1 and items with factor loadings greater than .40 were retained in the final factor structure. Items measured on 5-point scales of 1 = strongly disagree to 5 = strongly agree

<sup>b</sup> Cumulative variance explained = 72.30%

intend to visit Mt. Bachelor more often if more VEPs are adopted at this ski area (Table 7). The largest proportion of respondents intend to visit more often if Mt. Bachelor offers incentives to people who carpool to this ski area (e.g., parking closer to chairlifts, 38%), uses as many products as possible from local suppliers (38%), and does more to inform visitors of what the ski area is doing in terms of environmental conservation (37%). The fewest respondents intend to visit more often if Mt. Bachelor receives more environmental awards (24%) and recycles more (27%). There were no significant differences between skiers and snowboarders,  $\chi^2 = 0.01$  to 1.74,  $P = .187$  to .967,  $\phi = .00$  to .06. These results show that over one-third of respondents intend to visit more in the future if Mt. Bachelor adopts more VEPs.

## Discussion

This article examined recreationists' knowledge of VEPs at a ski area and the influence of these programs on their motivations and intentions to visit this area. Few skiers and snowboarders at the Mt. Bachelor ski area in Oregon were knowledgeable of VEPs at this area and less than 20% were motivated to visit because of these programs. Other attributes such as scenery, access, and snow conditions were significantly more important for influencing motivations to visit. Over one-third of skiers and snowboarders, however, intend to visit more in the future if Mt. Bachelor participates in more VEPs. These findings have implications for management and future research.

## Management Implications

From a management perspective, several factors may have contributed to skiers and snowboarders not being highly knowledgeable of VEPs. These programs are relatively new at ski areas and users may not be aware of environmental issues at these areas. Although Mt. Bachelor has several VEPs and provides information about these on its internet website and other outlets (e.g., a few on-mountain signs), it is not as conspicuous as information about other attributes such as scenery, snow conditions, and the number of chairlifts and other amenities. Obscurity of information about VEPs may have prevented many visitors from learning about these programs. It is worthwhile noting, however, that up to 70% of respondents knew that this ski area had a recycling program, whereas less than half were aware of other VEPs that were occurring at this area. Recycling containers are prominent in this ski area's restaurant facilities and chairlift lines, this topic is listed first on this area's internet website devoted to its environmental programs, and brochures and maps include messages



**Table 4** Reliability analysis of skier and snowboarder motivations for visiting Mt. Bachelor

Motivation factors and variables—I visited Mt. Bachelor today	Item total correlation	Alpha if deleted	Cronbach alpha
Factor 1: VEPs and environment			0.97
Because this ski area uses energy efficient facilities	0.93	0.97	
Because this ski area tries to reduce its emissions	0.91	0.97	
Because this ski area uses renewable energy	0.88	0.97	
Because this ski area has won awards for conservation	0.91	0.97	
Because this ski area is an environmental leader in the industry	0.90	0.97	
Because this ski area is committed to conservation	0.89	0.97	
Because this ski area participates in recycling	0.84	0.97	
Because this ski area is concerned about climate change	0.85	0.97	
Factor 2: Food and service			0.91
Because of dining facilities	0.74	0.89	
Because of food/beverage	0.73	0.89	
Because of retail shops	0.80	0.89	
Because of ski patrol/safety	0.69	0.90	
Because of staff/service	0.68	0.90	
Because of equipment rentals	0.71	0.90	
Because of childcare services	0.66	0.90	
Because of ski school/lessons	0.63	0.90	
Factor 3: Lifts and trails			0.88
Because of variety of different runs/trails	0.74	0.84	
Because of number of runs/trails	0.76	0.83	
Because of this mountain's terrain	0.68	0.84	
Because of number of chairlifts	0.71	0.84	
Because of quality of chairlifts	0.65	0.85	
Because of trail grooming	0.52	0.88	
Factor 4: Scenery and nature			0.86
To view the natural scenery	0.75	0.80	
To be close to nature	0.75	0.79	
To enjoy the fresh air	0.68	0.83	
To experience a high alpine area	0.63	0.85	
Factor 5: Mountain access			0.85
Because of ease of access to the base of this ski area	0.78	0.73	
Because of ease of chairlift access to the high alpine area	0.70	0.80	
Because of availability of parking	0.67	0.83	
Factor 6: Events for youth and advertising			0.72
Because of terrain park/half pipe	0.44	0.70	
Because of special events (e.g., race, concert, competition)	0.52	0.65	
Because of public transportation to this ski area (e.g., bus)	0.51	0.65	
Because of advertising about this ski area (e.g., internet, tv)	0.55	0.63	
Factor 7: Snow conditions			0.87
Because of amount of snow	0.78	–	
Because of quality of snow	0.78	–	
Factor 8: Lift lines and prices			0.60
Because of ticket/pass prices	0.41	–	
Because of lift line length	0.41	–	

**Table 5** Skier and snowboarder agreement with motivations for visiting Mt. Bachelor

Motivation factors and variables—I visited Mt. Bachelor today	Percent agree (%)			$\chi^2$ -value	P-value	$\phi$
	Skiers	Snowboarders	Total			
<b>Factor 1: VEPs and environment</b>						
Because this ski area participates in recycling	15	27	19	6.84	0.009	0.13
Because this ski area uses renewable energy	10	19	13	6.78	0.009	0.13
Because this ski area tries to reduce its emissions	10	15	12	1.39	0.238	0.06
Because this ski area uses energy efficient facilities	8	15	10	4.23	0.040	0.10
Because this ski area is committed to conservation	8	15	10	3.39	0.066	0.09
Because this ski area is concerned about climate change	9	11	10	0.62	0.431	0.04
Because this ski area is an environmental leader in the industry	7	13	9	3.52	0.061	0.09
Because this ski area has won awards for conservation	5	10	7	2.46	0.117	0.08
Total	20	24	20	1.38	0.240	0.06
<b>Factor 2: Food and service</b>						
Because of dining facilities	17	24	19	2.47	0.116	0.08
Because of ski patrol/safety	19	19	19	0.00	0.982	0.00
Because of staff/service	17	24	19	2.74	0.098	0.08
Because of food/beverage	16	21	17	1.89	0.169	0.07
Because of ski school/lessons	13	15	13	0.66	0.418	0.04
Because of equipment rentals	8	10	9	0.18	0.673	0.02
Because of retail shops	8	7	8	0.02	0.887	0.01
Because of childcare services	6	5	6	0.24	0.622	0.02
Total	20	24	21	1.03	0.310	0.05
<b>Factor 3: Lifts and trails</b>						
Because of variety of different runs/trails	82	82	82	0.02	0.903	0.01
Because of this mountain's terrain	82	82	82	0.04	0.851	0.01
Because of number of runs/trails	79	76	78	0.28	0.597	0.03
Because of number of chairlifts	60	57	59	0.25	0.620	0.02
Because of quality of chairlifts	57	53	56	0.62	0.430	0.04
Because of trail grooming	52	48	51	0.55	0.458	0.04
Total	83	85	84	0.13	0.721	0.02
<b>Factor 4: Scenery and nature</b>						
To enjoy the fresh air	83	77	82	1.90	0.168	0.07
To view the natural scenery	78	73	77	1.50	0.220	0.06
To be close to nature	62	61	62	0.09	0.759	0.02
To experience a high alpine area	63	61	62	0.28	0.599	0.03
Total	85	82	84	0.80	0.370	0.04
<b>Factor 5: Mountain access</b>						
Because of ease of access to the base of this ski area	61	61	61	0.02	0.896	0.01
Because of ease of chairlift access to the high alpine area	64	56	61	2.26	0.133	0.07
Because of availability of parking	49	43	47	1.08	0.300	0.05
Total	69	67	68	0.18	0.675	0.02
<b>Factor 6: Events for youth and advertising</b>						
Because of terrain park/half pipe	13	24	16	6.48	0.011	0.13
Because of public transportation to this ski area (e.g., bus)	11	15	12	1.14	0.285	0.05
Because of special events (e.g., race, concert, competition)	12	10	11	0.30	0.587	0.03
Because of advertising about this ski area (e.g., internet, tv)	8	7	8	0.02	0.880	0.01
Total	14	17	15	0.50	0.479	0.04
<b>Factor 7: Snow conditions</b>						
Because of quality of snow	73	73	73	0.02	0.885	0.01

**Table 5** continued

Motivation factors and variables—I visited Mt. Bachelor today	Percent agree (%)			$\chi^2$ -value	P-value	$\phi$
	Skiers	Snowboarders	Total			
Because of amount of snow	69	69	69	0.01	0.944	0.00
Total	75	77	75	0.20	0.659	0.02
Factor 8: Lift lines and prices						
Because of lift line length	60	59	60	0.08	0.781	0.01
Because of ticket/pass prices	29	29	29	0.00	0.956	0.00
Total	48	46	47	0.16	0.689	0.02

**Table 6** Mean rank order of motivation factors for visiting Mt. Bachelor

Motivation factors	Skiers	Snowboarders	Total	t-value	P-value	$r_{pb}$
Scenery and nature	3.82	3.83	3.82	0.04	0.966	0.00
Snow conditions	3.80	3.83	3.81	0.29	0.772	0.02
Lifts and trails	3.77	3.71	3.75	0.83	0.409	0.04
Mountain access	3.57	3.43	3.53	1.74	0.082	0.09
Lift lines and prices	3.32	3.17	3.27	1.66	0.098	0.08
VEPs and environment	2.76	2.89	2.80	1.78	0.076	0.09
Food and service	2.57	2.50	2.55	0.71	0.476	0.04
Events for youth and advertising	2.36	2.48	2.40	1.43	0.154	0.07

<sup>a</sup> Cell entries are means for composite scales on 5-point scales of 1 = strongly disagree to 5 = strongly agree

Factors identified using principal components factor analysis from motivation items

encouraging guests to recycle when visiting. Managers, therefore, should consider increasing interpretive information about other VEPs to inform visitors about additional programs for reducing impacts. Managers could, for example, increase visibility of information about environmental performance on internet websites, on signs at ticket booths and on chairlifts, in interpretive displays at dining facilities, and in other promotional advertising. These actions may improve marketing of environmental performance, which may subsequently increase visitor knowledge of several VEPs and attract more people to a ski area.

Few skiers and snowboarders were also pulled to visit this ski area because of its VEPs, perhaps because most visitors were not highly knowledgeable of these programs and this may have hindered them from being motivated by these programs. Many skiers and snowboarders were influenced more strongly by other motivations that pulled them to the area (e.g., snow, scenery) and may have also been influenced by internal motivations that pushed them to the area (e.g., to get exercise, relieve stress) instead of motivations related to VEPs. Awareness of these factors motivating people to visit ski areas can assist managers in providing opportunities that cater to clients and ensure that guest satisfaction and resource conditions do not deteriorate.

Although most skiers and snowboarders were not highly knowledgeable of VEPs at Mt. Bachelor or motivated to visit this ski area on their current trip because of these

programs, a large number intend to visit more in the future if there are more of these environmental programs at this ski area. One-third of respondents also said that they would visit more often if this ski area simply does more to inform visitors of what the area is currently doing in terms of environmental conservation, suggesting that Mt. Bachelor may be in a position to increase visitation simply by doing more to promote its VEPs that are already underway. By expanding the number of VEPs (e.g., biodegradable supplies, local products, incentives for carpooling), managers may also be able to increase frequency of visitation and enhance their share of the competitive ski area market.

These VEPs may also reduce operational costs and increase profits (Carmin and others 2003). Mt. Bachelor, for example, recently expanded its VEPs by renovating the West Village Lodge to incorporate a sun room and air lock that reduce loss of heat energy and related costs. Although direct economic returns of VEPs motivate managers to implement some environmental programs, indirect economic benefits from increased revenue associated with higher visitation due to VEPs are often overlooked. Upgrades to facilities such as this sun room and air lock may not only directly reduce heating costs, but may also indirectly motivate people to visit a ski area using these types of energy efficient facilities instead of areas not taking these actions.

Results presented in this article may also assist Mt. Bachelor's efforts to continue as an environmental leader

**Table 7** Skier and snowboarder agreement with intentions to visit more often if there were more VEPs at Mt. Bachelor

VEP future visit—how would you change how often you visit if Mt. Bachelor	Percent (%) visit more often			$\chi^2$ -value	P-value	$\phi$
	Skiers	Snowboarders	Total			
Offered incentives to people who carpool (e.g., park closer to chairlifts)	38	38	38	0.01	0.967	0.00
Used as many products as possible from local suppliers	38	36	38	0.18	0.674	0.02
Did more to inform visitors of its environmental conservation programs	39	32	37	1.52	0.218	0.06
Offered food supplies that are more sustainable/biodegradable	36	30	34	1.44	0.230	0.06
Donated a portion of revenue to environmental organizations	34	30	33	0.57	0.449	0.04
Encouraged more people to use public transportation to this ski area	33	34	33	0.11	0.745	0.02
Used more energy efficient facilities	33	28	32	0.93	0.336	0.05
Was a top ranked ski area in environmental conservation	32	31	31	0.06	0.811	0.01
Used as many recycled products as possible	31	26	30	1.36	0.244	0.06
Did more to reduce their emissions	31	25	29	1.21	0.272	0.05
Donated a portion of revenue to offset vehicle emissions	30	26	29	0.43	0.512	0.03
Was more committed to environmental conservation	29	23	28	1.74	0.187	0.06
Increased their recycling program	28	25	27	0.55	0.460	0.04
Won more awards for environmental conservation	25	23	24	0.14	0.714	0.02

in the ski area industry. Many ski areas in the western USA are located on land that is leased from federal agencies, which allows managers to use the land for business operations without direct ownership. In total, 90% of ski areas in the western states are located on federally owned land (Rivera and de Leon 2004). Located in the Deschutes National Forest, Mt. Bachelor operates on public lands under agreement with the U.S. Forest Service, which should make environmental stewardship a priority. By implementing VEPs that are beyond federal environmental regulations, Mt. Bachelor sets an example in the industry by showing their respect for public lands and concern for natural resources. Mt. Bachelor may be able to maintain and enhance their progressive and competitive status by implementing more VEPs such as increasing public transportation to reduce emissions, developing onsite renewable energy infrastructure to reduce grid dependence, and providing more extensive recycling and composting facilities. These efforts may allow Mt. Bachelor to remain competitive with other environmental leaders in the industry such as Squaw Valley and Sugar Bowl in California, Aspen in Colorado, and Park City and Sundance in Utah (Ski Area Citizens Coalition (SACC) 2009).

These findings may also be useful to other ski areas, as well as recreation managers outside the industry. Freeride mountain bike parks, fishing lodges, and whitewater parks, for example, may benefit because similar to ski areas, they are managed by private companies, rely on natural resources, and often operate on public land. Given that managers are challenged to conserve resources while continuing to provide quality opportunities, adopting and promoting VEPs may allow them to balance resource management goals while continuing to attract clients.

## Research Implications

From a research perspective, trends in outdoor recreation may be influenced by environmental impacts, climate change, and conservation efforts. Studies have examined biophysical impacts of recreation (see Leung and Marion 2000 for a review). Researchers, for example, have investigated impacts of recreation on vegetation, soil, water, and wildlife at alpine ski areas (Watson 1985; Puntieri 1991; Tsuyuzaki 1994). On a broader scale, studies have also investigated how climate change may affect visitation and other characteristics at ski areas (Scott and others 2003; Scott 2006; Moen and Fredman 2007). Comparatively little research, however, has examined the influence of environmental impacts, climate change, and conservation efforts and programs on recreationists. This article helps to address this knowledge gap by examining the influence of conservation efforts such as VEPs on skier and snowboarder knowledge, motivations, and behavior. Researchers are encouraged to continue investigating these emerging trends that are influenced by changing environments on both local and global scales.

This research also contributes to understanding skier and snowboarder motivations and intentions. Most studies of recreation activity groups have focused on internal factors that push people to visit places such as ski areas (Manfredo and others 1996; Manning 1999) partially because, as Dann (1981) suggested, an individual's decision to visit a destination is a result of a prior need for travel and push factors are often antecedent to pull factors (Fluker and Turner 2000). This article, however, showed that there are many factors that also pull visitors to ski areas and found similar results to other studies where the setting aspects (e.g., snow

conditions, ski runs, scenery, terrain) were considered to be much more important reasons for visiting than facilities and services (e.g., food, lodging, chairlift access; Mills and others 1986; Klenosky and others 1993; Williams and others 1994; Hudson and Shephard 1998; Alexandris and others 2007). This article also built on Carmichael's (1996) work by expanding traditional ski area attributes to encompass newly emerging attributes such as those related to environmental conservation and related programs (i.e., VEPs). In tourism research, environmental programs have been identified as attributes influencing motivations. Chan and Baum (2007), for example, found that attributes related to conservation and natural resources influenced factors that pulled visitors to a destination. More research is needed to examine how environmental attributes in general and VEPs in particular influence visitor motivations at ski areas and in other contexts.

Results showed that most skiers and snowboarders were not highly knowledgeable of VEPs at the Mt. Bachelor ski area, but would visit more often in the future if there were more of these types of programs at this area. This low knowledge of VEPs supports other studies showing that many recreationists, including those at alpine ski areas, are not highly knowledgeable or aware of some environmental issues and conservation programs (e.g., Holden 2000; Hudson and Ritchie 2001; Hvenegaard 2002; Vaske and others 2006). Results also support previous studies showing that ski area visitors would be more likely to visit an area in the future that is environmentally responsible (Hudson and Ritchie 2001). Intentions to visit more often in the future because of VEPs, however, may have been influenced by the questions used to measure knowledge, as the questionnaire items may have acted as a vehicle to inform and educate respondents about VEPs at Mt. Bachelor. In addition, respondents may have reacted to statements because of social pressures to conform to a desired social condition. This social desirability bias (Fisher 1993) may have caused some skiers and snowboarders to say that they would visit more often if there were more VEPs simply to avoid any possible embarrassment and convey a favorable image. More research is needed to determine the extent that these types of bias exist when measuring behavioral intentions related to environmental conservation programs.

This research also contributes to the benefits based management approach in recreation, which suggests that benefits from recreation may be personal (e.g., enhance self-esteem of the recreationist), societal (e.g., lower crime rate), economic (e.g., lower health care costs), and environmental (e.g., more public commitment to conservation; Manning 1999). A recreation benefit involves the attainment of an improved condition or prevention of an unwanted condition (Manning 1999). In the context of this study, VEPs may be conceptualized as an environmental benefit because visitors

at Mt. Bachelor are supporting a business engaging in conservation efforts, which may subsequently benefit the environment. Using a benefits based approach, managers can identify benefits sought by visitors, design facilities and services to accommodate these benefits, and then measure the extent that these benefits are realized (Manning 1999). The Mt. Bachelor ski area manages for environmental benefits by adopting and implementing VEPs, but little is known about whether visitors realize these benefits. This study provides a first step in addressing this issue by examining skier and snowboarder knowledge of VEPs and how these programs influence motivations to visit, but more research is needed to examine whether visitors realize the benefits of VEPs before applying a benefits based approach to ski area management.

Finally, this article is exploratory and should be viewed as a starting point for examining skier and snowboarder knowledge and motivations related to VEPs at alpine ski areas. Findings are limited to one ski area and may not generalize to all areas with VEPs. Future research should consider comparing responses to VEPs across multiple ski areas, and applicability of results from this study to other activities, ski areas, and commercial settings remains a topic for further empirical investigation.

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