

Ski Resort Sustainability: Evaluating environmental
programs at ski resorts partnered with the NSAA Sustainable
Slopes Program

Thesis

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GREEN MOUNTAIN COLLEGE

MASTERS THESIS

Masters of Science in Environmental Studies

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Thesis Title Ski Resort Sustainability: Evaluating environmental programs at ski resorts partnered with the NSAA Sustainable Slopes Program

This thesis is submitted in partial fulfillment of the requirements for the degree of Masters of Science in Environmental Studies at Green Mountain College.

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Acknowledgments

In completion of this project I would like to thank my Thesis Advisor Kirk Kardashian and Thesis Coordinator Mark Jordan. Their insight, patience, and dedication in assisting me with this project was extremely helpful and much appreciated.

In addition, I am grateful to our Program Director, Jim Harding, who helped me find a way to connect my passion for skiing and my graduate studies. Having the opportunity to complete an Independent Study and Practicum at two separate ski resorts was not only fun, but also provided direct hands on experience related to this project. A special thanks to Onno Wieringa of Alta Ski Area and Rob Apple of Stowe Mountain Resort, both of whom allowed me the opportunity to be an integral part of these various projects.

Lastly I want to thank my wife Anna. Her encouragement and patience through multiple drafts as well as other associated papers was extremely helpful. Anna your work ethic inspired me to pursue my M.S.

Abstract

The Sustainable Slopes Program (SSP), created in 2000 and amended to its current version in 2005, forged a framework for implementing sustainability in ski resort operations (NSAA, 2000). While the document is a positive step toward environmental awareness in ski resort management, it lacks accountability, and only provides guiding principles for resorts in achieving these goals.

The SSP is a voluntary program with no legal binding or third party oversight, yet participating resorts can claim to be environmental stewards simply by joining the program. Understanding environmental solutions that ski areas are actually implementing is the foundation for future evaluation of “green” initiatives. By examining environmental programs at current participating resorts through the principles of Sustainable Slopes Program, their sustainability efforts may become clearer and build a foundation for others to strive for.

This project used a proprietary Ski Resort Sustainability Survey (Survey) to compare current environmental initiatives at major ski resorts in the United States that have partnered with the National Ski Area Associations (NSAA) Sustainable Slopes Charter. I examined sustainability programs at resorts through all principles highlighted in the Sustainable Slopes Program. The resorts were evaluated based on their survey results, focal resort analysis, and literature review.

Based on the survey, resorts averaged a score of 30.5 out of 38 total sustainability points. The top three resorts surveyed were Stowe Mountain

Resort - VT (36), Aspen Skiing Company - CO (35), and Squaw Valley - CA (34.6). The two lowest ranking resorts surveyed were Okemo - VT (22.6), and Bolton Valley - VT (20.6). The survey highlighted examples of excellence in achieving sustainability, as in the case of Aspen and Stowe. Additionally, the survey found underlying discrepancies in the program, with Bolton Valley scoring the lowest score while also being the recipient of the NSAA Silver Eagle Award.

Introduction

Skiing and respect for the environment go hand in hand. Without the natural features of mountains we would have no slopes, and without cold temperatures and snow there would be nothing to ski on. The National Ski Area Association (NSAA), the trade association for alpine ski resorts, created the Sustainable Slopes Program (SSP) in 2000 to highlight this relationship (NSAA, 2000). The SSP, last amended in 2005, was the association's vision to establish a framework for implementing sustainability solutions in resort operations. The programs highlighted in the Sustainable Slopes Charter include: Planning/Design/Construction, Operations – Water Use, Energy Conservation and Clean Energy, Waste Management, Fish and Wildlife, Forest and Vegetative Management, Wetlands & Riparian Areas, Air Quality, Visual Quality, Transportation, and Education & Outreach. The NSAA recognizes that it is imperative that ski areas manage their businesses in ways that demonstrates a commitment to environmental protection and stewardship in addition to catering to their clientele.

Naturally, ski resorts have to think about their environmental impact specifically when considering warmer temperatures due to increases in carbon emissions. A warming climate could have direct implications to the ski industry. According to a study conducted by The University of Colorado and Stratus Consulting Inc., "business as usual," with respect to CO₂ emissions would elevate average temperatures and raise snow elevation lines. Williams and Lazar identify that with current CO₂ emission rates average temperatures in Aspen, CO and Park City, UT will rise 4 degrees F by 2030, and 8.6 degrees F (Aspen) and 10.4 degrees F (Park City) by the year

2100 (UC Boulder, 2008). Furthermore, the rises in temperatures would raise the snow elevation line by 2,400 feet in Aspen and Park City, ultimately shortening the ski season by the year 2030 (UC Boulder, 2008).

The ski industry is valued around \$3 billion dollars in addition to the tens of thousand resort employees, and 11.5 million skiers and snowboarders (NSAA, 2009). Not even taking into consideration winter sports equipment, apparel companies, and local tourism dollars generated from ski towns, it is easy to see how large the ski industry is and the potential implications a warming climate may have on the winter sports industry.

The Sustainable Slopes Charter aligned a common vision in developing a framework for sustainability in resort operations, though many resorts find themselves caught in a crossfire between environmental conservation and resort development. A 2006 report found that the SSP “provides no third-party oversight, no specific performance standards, and no sanctions for poor performance” (Rivera and de Leon, 2006). Rivera and de Leon further stated that participating resorts can improve their image without going beyond current environmental laws and regulations. Since the program lacks accountability, the SSP has been criticized by these researchers and the Ski Area Citizens Coalition as a “green washing” scheme (Rivera, de Leon, 2004).

Given the nature of the SSP, these accusations do have some merit. The NSAA clearly states in the charter that, “these principles are voluntary and are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defenses, or otherwise affect the legal position of any

endorsing company, and are not intended to be used against an endorser in any legal proceeding for any purpose” (NSAA-SSP, 2005).

By design the SSP holds no legal binding to any participating resort. Therefore, it is clear that NSAA is not mandating change, but relying upon the will of the resorts to do the right thing. Environmental groups like the Ski Area Citizens Coalition fear that The Sustainable Slopes Program is simply a resort marketing tool. The lack of accountability may result in ski resorts not following through with their commitment, especially when torn between environmental programs and profit making.

Recently, profit making has become a major concern for ski areas, especially for those with lackluster amenities or snow. Prior to the housing crisis, ski resorts had been transforming into four-season destination resorts. Using real estate sales to fund development and jumpstart their stale profits, resorts changed their focus from skiing to luxury amenities. Utilizing strategic marketing and resort development, ski areas that relied on lower yield revenues such as season passes were looking to real estate to fund operations (Palmeri, 2003). According to Hudson and Palmeri, “in recent years, over 50 percent of industry revenues have originated from these new businesses” (Hudson, 2000; Palmeri, 2003). Since resorts were relying on these new businesses, environmental groups feared that they would exaggerate their efforts with hopes of gaining public support for development.

With public concern increasing over the SSP’s lack of accountability, independent conservationists have launched their own certification system:

the Ski Area Environmental Scorecard (Berwyn, 2005). The scorecard, developed by the Ski Areas Citizen Coalition (SACC), grades resorts in a similar way to an academic report card, applying grades from A through F based on the “the impact of resort-related developments on wetlands, forests and wildlife habitat” (Berwyn, 2005). SACC claims to be the only independent tool to assess ski resorts’ operations, and is run by staff and volunteers who are skiers/riders. The Ski Area Citizen Coalition’s mission is to “ensure that ski area management decisions, either by the Forest Service, the ski companies, or local governments, are responsive to the needs of real environmental protection, local communities, and the skiing public” (SAAC, 2008).

While some ski areas are pushing ahead with environmental solutions, such as Aspen Skiing Company, the SACC has recognized the gap in implementing change and the need for independent oversight. Resorts that partnered through the NSAA - forming the Sustainable Slopes Program - have established a framework for these solutions, “through voluntary environmental programs as alternatives to environmental policy instruments” (Rivera & de Leon, 2006). In response, the Ski Area Citizens Coalition has tried to make ski resorts more accountable for their environmental impact, by issuing report cards on a yearly basis.

Ski resorts must increase their sustainability in operations — their business depends on it. However, even as more resorts are joining the NSAA charter, environmental programs are still limited at many ski resorts. If resorts are to increase their sustainability within operations, they need to

create solutions rather than sign on to a charter, which only has “options for getting there,” and lacks third-party oversight and sanctions to remedy poor performance.

In this project I evaluated environmental initiatives at selected major ski resorts that are partnered with the SSP. Through a comparison of resorts using current data from the NSAA, “The Green Room” – NSAA environmental database, related journal articles, and a proprietary survey, I have defined how well different ski resorts are progressing with their proposed environmental solutions. Furthermore, I compared their progress with the major principles highlighted in the Sustainable Slopes Charter.

With this research project, resorts will be able to view the results and discrepancies currently existing within the industry, as well as the potential for environmental solutions they can implement at their home resort. My data collection provides a reference for future “green” initiative implementation at ski resorts, and will identify principles of the SSP that may need future attention. The Sustainable Slopes Charter offers valuable principles and “options for getting there.” This project highlights if the resorts selected are in fact accomplishing what they set out to achieve, in concordance with the current SSP.

Methods

I collected data through a literature review consisting of: "The Green Room" of the National Ski Areas Association. Selected resorts were sent a Ski Resort Sustainability Survey (Appendix A). Scientific journals and local community news surrounding resorts were also used to provide additional insight; specifically, these sources were utilized for information regarding resort development and their impact on local ecosystems.

The goal of the Survey was to determine what the resort is accomplishing in its current environmental plans, future goals, and how it directly relates to the Sustainable Slopes Program. The Survey was organized into focused areas identical to those of the SSP. Each question was derived from the principles and "options for getting there" as highlighted in each related category so that the results of the survey directly relate to the Sustainable Slopes Program.

The Survey was submitted online through *Survey Monkey* and was sent electronically via email to the Environmental Manager or General Manager of the resorts selected.

I chose ten resorts that participate in the NSAA Sustainable Slopes program to examine based on their unique characteristics, diverse geography, and the ability to provide four-season operations (resorts chosen are listed in Appendix B). The NSAA states that, "some smaller areas that endorse these principles may be limited in their ability to make progress in all the areas addressed" (NSAA, 2005). To increase my sample size I selected 20 additional resorts to participate in the survey from a stratified random sample. After categorizing resorts into geographic regions to avoid a

cluster of selections (Pacific, Rockies, Wasatch, New England), I assigned each resort a numerical identification and used the randomization/sort function in Microsoft Excel to randomly select the additional resorts.

Through survey and literature analysis, I compared resorts individually based on their performance and evaluation regarding the Sustainable Slopes Program. I concluded by identifying trends across the industry and compared the resorts to how well they are meeting the principles as highlighted in the Sustainable Slopes Program.

To quantify my measurements, a points system was devised that correlated directly to survey question answers. The Survey was designed to match the principles and “options for getting there,” as highlighted in the SSP. Each question was valued at one point each and followed a yes/no format with options to allow resorts to provide examples.

For example, Section One (Planning, Design, and Construction) had 6 questions; if the selected resort responded positively to each question it was awarded 6 points. The Survey consisted of a maximum of 38 possible points and is broken down below:

Planning, Design, and Construction: 6 Possible Points.

Operations – Water Use: 6 Possible Points (question 5 was worth 1 total point or fractions of 5 since there were 5 possible answers).

Energy Conservation and Clean Energy: 4 Possible Points.

Waste Management: 3 Possible Points.

Fish and Wildlife: 3 Possible Points.

Forest and Vegetative Management: 4 Possible Points.

Wetlands & Riparian Areas: 1 Possible Point.

Air Quality & Visual Quality: 4 Possible Points.

Transportation: 2 Possible Points.

Education & Outreach: 5 Possible Points.

Total: 38 Points.

The SSP designed each category with varying amounts of “options for getting there.” Therefore, when designing the survey I chose a small number of questions that provided an overview analysis of each section to avoiding redundancy and length.

For example, Energy Conservation and Clean Energy needed 4 questions (4 points) to accurately asses the resorts, while Wetlands & Riparian Areas required only one question (1 point) according to the SSP as outlined in their “options for getting there.”

Survey Results and Discussion

Based on survey results, the resort with the highest sustainability score was Stowe Mountain Resort (36), followed by Aspen Skiing Company (35) and Squaw Valley (34.6). The lowest scoring resort was Bolton Valley (20.6 pts). The average score among all resorts was 30.54 (SE=4.5).

Resort	Planning/Design	Operations	Energy Cons	Waste Manag.	Fish/Wild	Forest/Veget.	Wetlands	Visual/Air-Q	Transportation	Education
Stowe	5	6	4	3	3	4	1	4	2	4
Aspen	6	5	4	2	3	4	1	4	2	4
Squaw	5	5.6	4	2	3	4	1	4	2	4
Vail	5	5	4	3	3	3	1	3	1	5
Alta	4	6	2	3	2	4	1	4	2	5
Killington	4	5.8	4	2	3	3	1	4	2	4
Sugarbush	5	4.6	4	3	3	3	1	4	2	3
Stephens Pass	4	4.6	4	3	3	3	0	4	2	4
Grand Targhee	5	5.8	4	3	3	3	0	2	0	5
Jackson	4	5.8	4	2	2	4	1	2	2	4
Crystal	5	5	2	1	3	3	1	4	2	3
Whiteface	5	3.2	2	2	2	4	0	2	2	3
Okemo	5	4.6	1	2	2	3	1	2	1	1
Bolton	5	4.6	2	2	0	2	1	1	0	3
Total	67	71.6	45	33	35	47	11	44	22	52
Average	4.8	5.1	3.2	2.4	2.5	3.4	0.8	3.1	1.6	3.7
Standard Error	0.6	0.8	1.1	0.6	0.8	0.6	0.4	1.1	0.7	1.0

* Grand Targhee, Jackson Hole, and Stevens pass were all awarded points for the non/applicable answers regarding to snowmaking under Operations because they do not make snow.

Table 1. Survey results, average, and standard error for each resort.

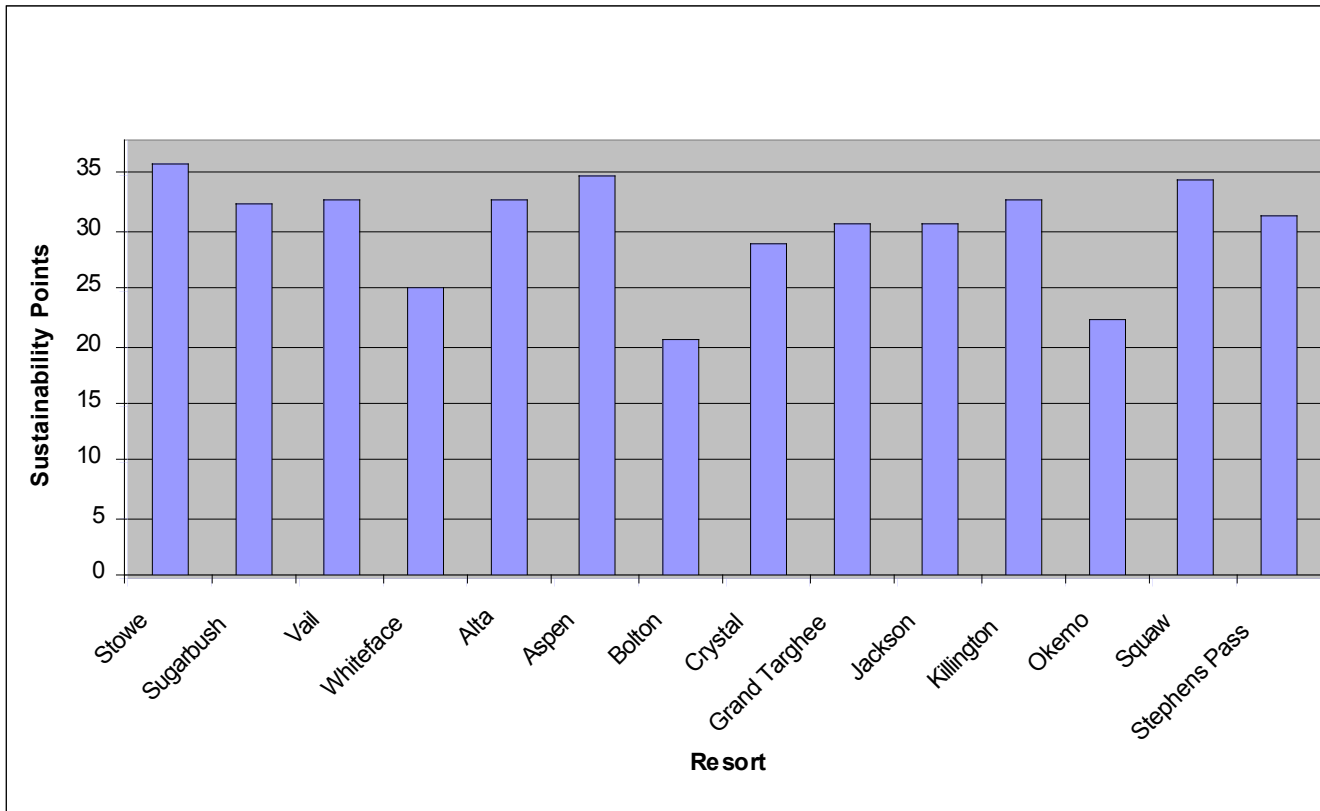


Figure 1. Total sustainability score for each resort.

Resorts participated in the survey on a voluntary basis. The only confirmations of results were with Stowe Mountain Resort (the resort where I completed my practicum). While this analysis highlights the range of varying environmental programs throughout the country, and rates resorts according to their sustainability programs, there were additional characteristics worth noting.

Many resorts on the west coast do not rely on snowmaking, therefore it was interesting to learn that 80 percent of the resorts surveyed optimize effectiveness of water use in snowmaking operations. Perhaps this was due to the fact that 6 of the 15 resorts surveyed are located on the East Coast, or the fact that snowmaking is expensive and thus efficient snowmaking is not only an environmental incentive, but also an economical one. Furthermore, relating to water use, only 40 percent of the resorts surveyed have mechanisms in place to recapture snowmelt and run-off for re-use. This is a potential shortcoming among the resorts, since it would only make sense to trap and control run-off for snowmaking, as well as for erosion/sediment control. Encouraging however is that 66.7 percent of the resorts surveyed exceed requirements governing water quality.

Auden Schendler, VP of Sustainability at Aspen Skiing Company, states in *Getting Green Done*, "by virtue of living in a carbon based economy, none of us can say anything about emissions reductions without being hypocrites ourselves" (Schendler, 2009). With that in mind, it is imperative for resorts to understand that while many of their environmental programs may be excellent, they must begin to lessen their energy demands to decrease their

carbon footprint. While 86.6 percent of the resorts surveyed have conducted an energy audit, only 66.7 percent have energy management plans that address their energy goals and baseline energy use for resort operations. Considering resorts are committing to sustainability in operations, this is a statistic that should be closer to 100 percent since resorts need to know their baseline before they attempt to decrease their energy use. Furthermore, only 78.6 percent of resorts surveyed have taken measures to reduce resort operations related to air pollution and greenhouse gas emissions, and only 71 percent are partnered with NSAA's "Keep Winter Cool" campaign. "Keep Winter Cool," is a partnership between the National Resources Defense Council and the NSAA whose mission is to "raise visibility and public understanding of global warming and spotlight opportunities that exist right now to start fixing the problem (global warming)" (NSAA, 2009).

With respect to Energy Conservation and Waste Management, 73 percent of resorts receive utilities from Renewable Energy Sources, and 93 percent have comprehensive recycling programs. Furthermore 100 percent of the resorts surveyed purchase recycled products from vendors.

In response to mountain vegetation, 93.3 percent of the resorts surveyed have vegetative plans that manage the effects the resort has on the forest and vegetation. These programs include initiatives that minimize the impacts to local fish and wildlife, and efforts to improve/maintain habitat (73.3 percent).

Resorts are also responding to the need for specific attention to their environmental programs. 93 percent of the resorts surveyed dedicate

specific personnel to deal with their environmental programs. Additionally, almost 80 percent of resorts train employees on the resorts' initiatives and provide commuter incentive plans for employees/guests to ease congestion and transportation to the mountain.

Environmental education is probably the biggest factor lacking at the resorts surveyed. When asked if their ski resort has an environmental center, 71 percent of the resorts responded "no" – (Alta, Grand Targhee, and Vail were the only resorts with official environmental centers, and Stowe stated that a center is under development). As Schendler states in *Getting Green Done*, environmental programs "incentivizes others to go green." By implementing environmental programs and educating their guests, ski resorts can go beyond the reach of their own environmental programs. This would allow them to educate their guests on the broader environmental, conservation, and sustainability model in addition to incentivizing other resorts to participate in sustainability programs. While a ski resort's environmental stewardship may seem small amongst the broader environmental movement, the ability to create lasting change is there, and as noted earlier environmental protection is in the best interest of ski resorts i.e. the Park City and Aspen study conducted by UC Boulder, 2008. Hopefully, more resorts will begin to educate their guests on how the ski resort interacts with the mountain environment, as well as to emphasize the importance of sustainability, measures the resort is taking, and how recreational skiers can help.

The main component of environmental centers at ski resorts is to act as the central hub of environmental-related topics. They educate their guests through printed material such as monthly newsletters or field experiences. For example, Alta created the Alta Environmental Center in 2008 to improve sustainability practices across departments, support research and collaborate with outside partners, and to communicate their programs with their skiers (Alta, 2011). Mad River Glen, a co-op resort in Waitsfield, VT operates a naturalist program where guests are taken on walks through the woods to learn about the local environment and the ski area's relationship with it. Ideally, an environmental center at a ski resort may help to initiate environmental programs and outreach within the resort community.

Focal Resort Analysis

Aspen Skiing Company

Aspen Skiing Company (ASC), has been on the forefront of sustainability practices at ski resorts, and has emerged as the industry leader regarding their impressive programs and adoption of ISO 14001.

Since 1999, ASC has compiled a yearly Sustainability Report and has set goals for their future. By tracking the amount of CO₂ emitted, ASC isn't simply implementing programs, but are tracking if their practices are actually curbing the effects of climate change. In 1999, ASC emitted 31,605 tons of CO₂, and with the exception of a slight spike in 2006 (32,688) they have remained stable with a slight decrease – resulting in a 2010 use 30,295 tons of CO₂ emitted (Schendler, 2010). ASC has committed to reduce CO₂ emissions from 2000 levels by 10 percent in 2012, and 25 percent by 2020. They were also the first ski resort to develop climate change policy.

There are many other major programs that the resort has accomplished. For instance, ASC was the first resort to purchase renewable energy certificates and is currently in the process of considering a 1.5-1.7 megawatt wind farm atop Snowmass. They have also constructed the largest solar photovoltaic system in the ski industry, built 11 LEED certified buildings, and established an Environmental Foundation to fund projects (\$1.2 million already awarded). They were the first ski resort to join the Chicago Climate Exchange and have committed to legally binding annual reductions in their CO₂ emissions; "In 2001, ASC adopted a climate change policy that commits the company to proactively build green, improve energy

efficiency, support mass transport, account for emissions annually, and reduce 2010 emissions to 1999 levels” (ASC, 2008). In addition, ASC has taken stances regarding Federal cases such as *Mass V. EPA*, 549 U.S. 497 (2007), lobbied for climate action on Capitol Hill, and lastly constructed a small hydro-electric facility that uses water from their snowmaking pond (Schendler, 2008).

Aspen’s results regarding the Ski Resort Sustainability Survey resulted in a 35/38 total sustainability points. They stood alone by being the only resort with two LEED certified buildings (Gold and Platinum certification) and with their aggressive energy efficiency program as noted above. With regards to the survey, the resort only lacks a composting program, mechanisms for recapturing snowmelt, and an environmental center. Their environmental programs and leadership regarding the environmental movement within the ski industry are exemplary.

Alpine Meadows

Alpine Meadows, CA has established sustainability practices within resort operations, though they did not respond to the Survey.

Currently, the resort has established a storm water runoff mitigation plan through a partnership with the CA Department of Fish and Game and US Forest Service. The resort retrofitted their parking lots to divert storm water so that runoff does not reach the local rivers and lakes (NSAA, Green Room Database). Additionally Alpine Meadows has retrofitted their utilities with

compact fluorescent lights, installed room monitors for lighting, and are considering the installation of photovoltaic solar panels.

With regard to reducing carbon emissions, Alpine Meadows uses Biodiesel for their 7 resort buses, established a resort-wide recycling program, and has implemented a composting program. Alpine Meadows' compost decreases waste and prevents on-site erosion through application of compost to disturbed areas, which ultimately accelerates revegetation due to the natural process of using compost.

Lastly, the resort participates in local organizational efforts such as the Truckee Donner Land Trust and Truckee Trails Foundation to provide guests with "open space," trails, and information regarding their environment. Unfortunately Alpine's programs can not be compared to the resorts surveyed since they did not participate in the Ski Resort Sustainability Survey.

Alta

Alta has made a commitment to the environment by establishing The Alta Environmental Center. Though still in its infancy, the resort is striving to improve its sustainability practices through new resort initiatives and local partnerships. Alta wrote its first environmental report in 2003/2004, and now publishes two sustainability reports per year. Alta's current and previous efforts are numerous and are noteworthy given their lack of press.

This year, Alta completed their first energy baseline inventory. They have also continued their energy programs such as purchasing Renewable

Energy Credits and the purchasing of Cliff Bar Green Tags (212 sold in 2008 – offsetting 16.3 tons of GHG emissions). In addition, the resort replaced Watson Shelter - 2005 (a mid-mountain lodge) with a more energy efficient design. Alta also conducts a Green House Gas Emissions Inventory and while the 2009/2010 is still being tabulated, Alta's carbon footprint for 2008 was 7,764 tons of GHG emissions. Unfortunately, this was an increase of 500 tons from 2007, "though the percentage ratio of emissions by source remains similar to 2007" (Alta Sustainability Report, 2010).

In response to its unique high alpine vegetation, Alta has completed a "Revegetation Monitoring Program," and sets "to continue to plant native trees, shrubs, forbs in protocol to their Forest Management Plan" (Alta Green Actions, 2010). The resort has also completed waste management and resort-wide recycling programs, eliminated the use of chemical compound ice-melting products, has been a participant since 1998 in the UTA transit bus system for skiers (free for pass holders), provides an online forum for carpooling, launched a new Commuter Program to track transit use, and has partnered with organizations such as the NSAA "Keep Winter Cool" Campaign and Salt Lake City Idle Free Campaign (Alta Green Actions, 2010).

Alta scored a 33/38 on the Ski Resort Sustainability Survey. Their overall score was above the average, and it is clear that Alta is committed to furthering their sustainability programs and decreasing their production of GHG emissions. Furthermore the resort has encouraged research and education programs (Alta Research and Environmental Education Database

Project) to assist in developing future programs (i.e. my composting proposal, spring of 2009).

Bolton Valley

This past year, Bolton Valley received a lot of press by installing the country's second ski area wind turbine. Since the purchase of Bolton Valley by the local real-estate company Redstone LLC, Bolton has seen improvements in snowmaking and as noted above - in 2009 installed a wind turbine at the top of one of their lifts.

The wind turbine is the nation's second ski area wind turbine and provides 300,000 kilowatt hours annually to the resort (approximately the same power used by 20-25 Vermont homes), and utilized local partnerships with the Vermont Clean Energy Development Fund to fund the project. Bolton also recently upgraded their snowmaking efficiency in 2009, which included retrofitting older snowmaking gun models and purchasing more efficient snowmaking guns. President George Potter has also stated that "We are continuously looking at ways to improve our energy efficiency on a resort-wide basis and have been working with Efficiency Vermont to identify areas for improvement" (Bolton Valley 2009).

With slightly less information available to the public than the average resort, Bolton's response to the Ski Resort Sustainability Survey is a valuable way to gauge its overall sustainability measures beyond snowmaking and wind energy. Unfortunately Bolton scored the lowest of the 15 resorts surveyed with a score of 20.6/38.

Bolton Valley scored above average in Planning, Design, and Construction and was close to the average in Operations, though they were below average in every other category including Energy Conservation. Even though the resort has installed a wind turbine they have no automation systems in buildings to eliminate energy consumption and do not have an energy management plan that addresses energy goals or baseline energy usage for resort operation. Additionally, Bolton scored zero points in Fish and Wildlife, have no vegetative management plans, and given their proximity to Burlington have no incentive plans or resort transportation for employees or guests to reduce congestion and emissions to the mountain.

While it is disheartening to see a resort that received the NSAA Clif Bar Silver Eagle award score at the bottom of the group, it validates this survey and project, and provides a more in-depth look at what resorts are actually accomplishing in regards to sustainability.

Grand Targhee

In 2007 Grand Targhee became the first North American organization to carry out an in-depth inventory of greenhouse gas emissions through The Climate Registry (Grand Targhee, 2010). Grand Targhee's Sustainability Charter established programs such as a no idling campaign, a preferred purchasing program on recycled and environmentally friendly products, a resort naturalist program which includes participation in a regional Wolverine Monitoring Program, a community engagement program titled 'Targhee in the Community,' and established an environmental foundation in 2004 which

provides financial support to organizations within Teton Valley - to promote environmental stewardship (Grand Targhee, 2010).

While many of these programs may make most ski areas feel adequate in their accomplishments, Targhee has also set specific goals regarding the future of their Energy Efficiency and Waste Management. In 2009, through a partnership with a local utility company, Targhee conducted an energy audit, identified retro-fits and weatherization projects and immediately began work on them. The result in 2009 was a “14% reduction in usage below 2008 levels and 5% below the five-year average” (Grand Targhee, 2010). These reductions provided a savings of 220 metric tons of CO₂ below 2008 levels, which was beneficial to the effects of GHG on the environment, but also helped the bottom line with a cost savings of “approximately \$30,000 from the prior year and \$12,000 below the five-year average” (Grand Targhee, 2010).

In addition to its aggressive energy programs, in 2009 Targhee:

- Reduced its total waste stream by 14.6 tons or 16% from 2008 to 2009.
- Increased its diversion rate by 5% for a total diversion rate of 47%
- Saved 16.8 tons of CO₂ through reduction and recycling and 8% in fuel costs from reduced trips to the landfill.
- Saved approximately \$14,600 in landfill disposal fees through its recycling program for a net savings of \$2,500 after recycling operation expenses are assessed.

* Grand Targhee, 2010

Targhee is also investigating an on-site composting greenhouse where it can store food waste and produce soil for growing vegetables on-site.

Grand Targhee scored a 30.8/38 on the Ski Resort Sustainability Survey, which was on average. It scored high marks in Planning, Design, and

Construction, Operations, Energy, Waste Management, Fish and Wildlife, Forest and Vegetative, and Education, but lost by not having any transportation programs and a below average Visual and Air Quality score.

Keystone Resort

Unfortunately Keystone did not participate in the Ski Resort Sustainability Survey, so their environmental initiatives will not be objectively measured against the other ski resorts. Nonetheless Keystone has established a variety of environmental initiatives all of which are relevant to the SSP.

With regards to Energy use, in 2003 Keystone upgraded its snowmaking facilities resulting in a 25 percent increase in efficiency (Keystone - Energy, 2010). The resort also converted to compact fluorescent light bulbs and in 2004 converted a facility building (Ranch Homestead) from propane to solar power - the solar panels produce 2,400 watt-hours per day (Keystone - Energy, 2010).

The resort has also implemented a very impressive water-use plan regarding its laundry facilities. Keystone's laundry facilities use "9/10 of a gallon of water per pound, rather than 2.5 gallons of water per pound in traditional washers" (Keystone - Energy, 2010). Additionally, in 2004 Keystone added a water conditioning system that reduced water use by an additional 20 percent and chemical use by 30 percent. These upgrades to the Keystone laundry services save Keystone over 11 million gallons of water annually. (Keystone - Energy, 2010).

Within The Keystone Lodge there has also been aggressive water saving programs, and the lodge has reduced their toilets from 3.5 gallons per flush to 1.6 gallons per flush, bathroom faucets from 5 gallon per minute (gpm) to 2 gpm, and showerheads from 7gpm to 2.5gpm. These reductions are estimated to save Keystone 117 gallons of water per room day. (Keystone – Energy, 2010).

Aside from its impressive water resource programs, Keystone has its own personal recycling truck which allows them to include condos, offices, and local restaurants into their program as well as providing waste, recycling, and composting services for other local establishments. In 2005 and 2006 Keystone recycled 1,300 tons of material per year (Keystone, 2010), and has established a high altitude composting program in which the resort currently diverts 3 tons of waste per month (Keystone – Waste, 2010). The resort also has programs to divert used toner cartridges from printers, and to re-use signs, uniforms, and building materials.

Mammoth Mountain Ski Area

This past season Mammoth Mountain Ski Area (MMSA) established the first recycled water program in the Eastern Sierra (MMSA – Sustainable Dev., 2010). This program allows the resort's golf course to be irrigated with 100 percent recycled water and reduces potable water use by one-third (MMSA – Sustainable Dev., 2010).

In 2005, MMSA Mountain Operations Director – Clifford Mann and other organizations published a handbook regarding sediment source and

control, which highlights erosion control and watershed restoration projects and has partnered with local organizations to control soil erosion. The resort has also registered its carbon tracking with the Climate Registry, implemented education and outreach programs, and is currently working on reducing its energy needs to year 2000 levels or below. In addition, MMSA is continuing their recycling and sustainable product purchasing program.

(MMSA, 2010)

Unfortunately MMSA only responded through the Forest and Vegetative sections of the survey and though the resort has been contacted it did not respond again. It is worth noting that of a possible 26 points, it received 24 points. But in order to maintain data integrity, MMSA was left out of the overall resort analysis.

Stowe Mountain Resort

Stowe's recent environmental press came as a result of the Spruce Peak development at Stowe. Spruce Peak (across the road from the main mountain – Mt. Mansfield) is Stowe Mountain Resort's new base area development that consists of newly constructed base area facilities, the Stowe Mountain Lodge, mountainside housing, a championship golf course, and 2,000 acres of protected natural habitat. Many of the new facilities opened less than 2 years ago and consist of several restaurants, a lodge/spa, a connector lift to the main mountain, 38 home sites, a base lodge, a mountain club building, a golf course cottage, and a few shops.

Spruce Peak at Stowe has earned a reputation for constructing these developments with a sense of environmental stewardship. Recently Spruce Peak has earned distinct honors from Audubon International - a non-profit environmental organization headquartered in New York State. Through Audubon International, Spruce Peak at Stowe is the first mountain resort development in the United States to be a certified 'Green Community' and the first in Vermont to have its golf course designated as an Audubon 'Signature Sanctuary.' In designing these developments, the resort emphasized sustainability practices such as using only 35 acres of the natural landscape, using efficient lighting in new buildings, and new water and energy technologies to cut energy costs. Snowmaking improvements were also put in place, as well as improved water irrigation methods by using recycled storm water. The resort also expanded its recycling and composting programs.

Stowe Mountain Resort had the highest score on the Ski Resort Sustainability Survey with a 36/38. It scored one point higher than Aspen, and was only lacking in a LEED certified building and an environmental center – of which one is currently under development. Stowe's accomplishments are vast, and while Aspen's programs may garner more attention and national reach, Stowe is striving towards increased sustainability in many of its operations.

Stevens Pass

Stevens pass has divided their environmental programs into program areas much like the NSAA SSP: Wind Power, Sustainability, Recycling, Innovation, and Community. Furthermore, the resort has an energy off-set partnership with Bonneville Environmental Foundation and CLif Bar, which allowed the resort to purchase 5,300 third-party certified carbon credits per year, offsetting 3,475 tons of CO₂ annually or 6,950,000 pounds (Steven's Pass – Windpower, 2010). Additionally their offset programs work with the Ski Green Tag program – which is the same program Alta has utilized.

Regarding overall sustainability, Steven's has established programs such as on-mountain "spill plans" – to avoid spills to mountain vegetation, forest and revegetation plans surrounding new developments, conversion in 2008 to clean diesel and hybrid company vehicles, a no idling campaign, and a 10-year old commuter program for guests and employees. The resort also has implemented extensive water quality programs, and in 2004 received the NSAA Silver Eagle Award for excellence in water conservation.

Steven's Pass scored a 31.6/38 on the Ski Resort Sustainability Survey. This score is slightly above average in comparison with the other resorts surveyed. Regarding their Operations, Steven's Pass scored slightly under average by not having a way of recapturing snowmelt, though it does operate two parallel water systems at the resort in which "a non-potable supply feeds toilets, urinals, and fire sprinklers - while a separate fully-treated spring-fed supply connects to sinks and food operations" (Steven's Pass - Recycle, 2010). The resort also installed upgrades to its water

treatment plant, and in the in the past 3 years reduced the waste of potable (treated) water by over 1 million gallons/yr (Steven's Pass – Recycle, 2010).

The resort scored perfect marks in Energy Conservation, Waste Management, Fish and Wildlife, Visual and Air Quality, and Transportation with top scores in Forest & Vegetative Management (missing only a program that provides guests with the labeling of sensitive vegetation areas). While Steven's Pass did not score the one point in the Wetlands section, stating that the ski area does not have a program that minimizes impacts to wetlands and riparian areas, in 1996 the resort replaced a culvert with a natural creek bed when a new quad was installed. Regarding the Wetlands point on the survey, no points were awarded, but it is worth mentioning that they do not disregard this program area.

Lastly, the resort had top scores in Education, lacking only an environmental center - though the resort recently hired an environmental manager to steer its environmental programs.

Sundance Resort

Sundance Resort is actually fairly small given the size of most ski resorts in Utah, and is known mostly for its Sundance Preserve. The Sundance Preserve originally began with the purchase of a few acres by Robert Redford, though now the resort has conserved close to 3,000 acres.

Conserving surrounding terrain, the resort developed a ski area based on environmental conservation and artistic expression. Through the

Sundance Preserve, the resort implements local conservation programs and influences national change via conferences at the Redford Center.

Sundance did not participate in the Ski Resort Sustainability despite a phone call and email discussion, though it has established some programs which are listed on its website.

The resort has implemented a voluntary guest linen reuse and recycling program in its hotel rooms, and purchases “green” products for sale at the General Store. Also, guests who carpool with 4 or more members in their car receive a \$10 discount on lift-tickets. While these programs sound great for their public relations department, in reality they are fairly minor.

Sundance does recycle their glass, and re-uses it for an art glass blowing kiln located on-site. Additionally through their conservation of the Sundance Preserve they have worked to mitigate erosion and restore natural habitat, and have established environmental education programs which are operated by their naturalist staff.

Unfortunately Sundance did not respond to the Ski Resort Sustainability Survey so their programs can not be compared to other resorts.

Conclusion

The Ski Resort Sustainability Survey yielded an average score of 30.54/38 (SE=4.5) among the reviewed resorts. Stowe (36), Aspen (35), and Squaw Valley (34.6) were the top three resorts, with Whiteface (25.2), Okemo (22.6), and Bolton Valley (20.6) rounding out the bottom three.

Considering ski resorts' reliance on winter weather and the threat of global warming, ski resorts should continue to implement extensive sustainability programs. Auden Schendler highlights many of the challenges faced by ski resorts in achieving sustainability measures and a stable business model in his book *Getting Green Done*. One of the most important messages in his book regarding climate change, and one that directly relates to this project is "that to get the government leadership we need, corporations must become involved in climate policy at the highest level possible" (Schendler, 2009). Since the ski industry (a \$3 billion dollar industry) would face potential negative impacts if our climate warmed too much, ski corporations need to do everything possible to assist in this environmental issue. Aspen has been able to accomplish these goals, especially when considering their involvement in the Supreme Court Case *Mass V. EPA*, 549 U.S. 497 (2007), which allowed the EPA to regulate carbon dioxide as a pollutant under the Clean Air Act.

It is unlikely that every ski resort will develop a media presence and national pull like Aspen. What is important is that these on-the-ground measures or sustainability factors that relate to the Sustainable Slopes Charter lead to eventual policy change on a national level. As Schendler states, "before businesses can effectively lobby for government action on

climate, they need to have done something themselves or they lose their credibility and appear to be hypocrites” (Schendler, 2009).

In partnering with the NSAA Sustainable Slopes Program, ski resorts have recognized that it is imperative for them to align themselves with the environmental movement and implement sustainability programs. The “Keep Winter Cool” campaign also highlights this relationship. Though while the SSP program has resulted in resort accolades and accomplishments, the program is still voluntary and has no third-party oversight.

One example of how marketing and PR can embellish a resort’s environmental commitment is Bolton Valley, VT. As noted in the resort sub-chapter, Bolton Valley became the second ski area in the nation to install a 100kw wind turbine. Though when viewed as a whole, Bolton Valley’s environmental programs (as related to the program areas of the SSP) were reviewed poorly, and resulted in a 20.6/38 on the Ski Resort Sustainability Survey. Furthermore their ability to sell the NSAA on their green image resulted in the Silver Eagle Award. However it should be noted that Bolton is a locally owned resort, similar to Steven’s Pass, and these smaller resorts have less financial means compared to larger resorts such as Aspen. Therefore while it is ironic that Bolton scored the lowest on the survey and received the Silver Eagle Award; their ability to construct a wind-turbine being a small operation is commendable.

Through the survey, each resort was able to highlight program areas in which they are meeting the SSP’s “options for getting there.” In addition to the yes/no format of questions, resorts were given the opportunity to

expand upon their answers with examples of accomplishment, and furthermore were given an open ended conclusion to state any sustainability program that the survey may have missed. This allowed resorts an opportunity to list every environmental program in place and gave each resort a fair evaluation.

This project provided the third-party oversight of the Sustainable Slopes Program through the lens of the SSP, and documented how resorts are working towards their commitment to the program. Resorts were evaluated based upon their score on the Ski Resort Sustainability Survey, and focal resorts were further compared through a literature review which highlighted the resorts' environmental programs. Many of the focal resorts have established programs in water-use and erosion, energy conservation, and land use. Additionally several resorts have begun to inventory and attempt to curb their GHG. Aspen, Alta, Grand Targhee, Mammoth, and Steven's Pass all have current programs in place which monitors their GHG. Overall each resort investigated had several positive attributes and a major environmental program in place in relation to the SSP, and no resort was participating in the SSP without action. With regards to the survey, focal resorts receiving the highest marks also had the more impressive sustainability programs as well as press information.

The study identified that two of the top resorts regarding environmental programs are Stowe Mountain Resort and Aspen Skiing Company, one of which is also recognized as a top performer by the SACC. This project also identified several resorts that need to revisit their

environmental programs: Crystal, Whiteface, Okemo, and Bolton (based upon their below average score from the Ski Resort Sustainability Survey). Though these resorts scored the lowest in the survey, all four scored above 50 percent, and while they may be the lowest amongst this study each resort has made steps towards sustainability within their operations.

The Sustainable Slopes Program was amended in 2005 and is probably due for another amendment. The SSP is an excellent first step in promoting ski resort sustainability, but its lack of accountability and voluntary nature leaves gaps in an industry that is so heavily reliant on the environment. Each resort in this study has made steps to improve their sustainability and the SSP program provides excellent “options for getting there,” but the SSP needs to establish a new direction to promote their partnering resorts.

With further research and analysis, I envision the creation of a program that certifies ski resorts much like The Leadership in Energy and Environmental Design (LEED) program for buildings, in which ski areas would be awarded a certification level based on their environmental stewardship. This type of change would level the playing field and eliminate the “green washing” concept associated with resorts with strong marketing departments.

By establishing a certification system based upon the current principles of the SSP, the NSAA can then differentiate the levels of environmental commitment between the resorts. Following a certification system much like the LEED building program, resorts could be certified based upon their sustainability level and would become Platinum, Gold, Silver or Bronze

certified. This LEED model could be applied to the ski industry in a very similar fashion especially when considering the NSAA has already set much of the criteria as “options for getting there,” in the SSP. This study has shown that resorts are implementing environmental programs and striving to work within the guidelines as set forth in the SSP – even the lowest scoring resorts were above 50 percent in “options for getting there.” Though the voluntary basis of the SSP does not directly incentive resorts to go “green,” but rather benefits resorts with good marketing and PR.

A certification system will incentivize resorts to further develop sustainability programs, and as resorts increase their sustainability they can climb the ladder. Take the example of Bolton Valley – a resort that has invested in energy conservation, but still lacks the majority of sustainability programs that are being implemented elsewhere within the industry. Bolton Valley is a smaller 4 season resort when compared to Aspen and Stowe, and in some cases it can be unfair to compare them, though they still have invested in their environmental programs. With a certification system in place, Bolton would note that their sustainability score only provides a mediocre certification, and given their current investment in clean energy and efficient snowmaking, they would likely attempt to increase their marks and gain a higher certification. David Crowley, operator of Wachusett Mountain Ski Area and previous chairman of the NSAA states that “good environmental practice is good business practice, so you’re saving energy, helping save the environment, and saving money” (OnTheSnow, 2010). Economics will certainly play a role in a resort’s investment in environmental

programs, though it seems that more resorts are encouraged by environmental investment as it is better for their long term success especially given since as of 2010, 190 resorts are participating in the SSP (OnTheSnow, 2010).

The Sustainable Slopes Program is now ten years old. Its ability to promote environmental stewardship among ski resorts nationwide is an exceptional achievement. With updates to the current principles and program areas, and an upgrade to a certification based system, the SSP will be able to adapt to the growing concern that ski resorts need to increase their sustainability.

References

- Alta. (2011). Green Actions:
http://www.altaence.com/sustainability_actions.php
- Alta. (2011). Spring Sustainability Report:
http://www.altaence.com/pdf/AltaEnvironmentalReport_Spring_2010.pdf
- Aspen Snowmass. (2008). Environmental Policies and Management.
<http://www.aspensnowmass.com/environment/policies/default.cfm>
- Berwyn, B. (2005). Ski Areas' 'green' image not backed by action. High Country News, April 4 2005.
- Bolton Valley. (2010). Bolton Valley Receives Top Ski Industry Environmental Award:
http://winter.boltonvalley.com/news_events/news_and_media/page748/.
- Bolton Valley. (2009). Bolton Valley Adds Snowmaking Efficiency:
http://winter.boltonvalley.com/news_events/news_and_media/page602/.
- Briggs, J. (2000). Ski resorts and national forests: Rethinking forest service management practices for recreational use. *Boston College Environmental Affairs Law Review*, 28, 79–118.
- Catino, E. & Apple, R. (2009). Phase 3 of Audubon International Sustainable Communities Report for Stowe Mountain Resort.
- Clifford, H. (2002). *Downhill slide: Why the corporate ski industry is bad for skiing, ski towns, and the environment*. San Francisco: Sierra Club Books.
- Davies, T., & Cahill, S. (1999). *Environmental implications of the tourism industry*. Washington, DC: Resources for the Future.
- Dowell, G., Hart, S., & Young, B. (2000). Do corporate global environmental standards create or destroy market value? *Management Science*, 46, 1059–1074.
- Grand Targhee. (2010). Sustainability Charter:
<http://www.grandtarghee.com/the-mountain/environment/sustainability-charter/home.php>
- Hoffman, D. (2003). High Altitude Composting at a Ski Resort. *BIOCYCLE*. 44, 26-29.
- Hudson, S. (2000). *Snow business: A study of the international ski industry*. New York: Cassell.

Intergovernmental Panel on Climate Change. (2007). *Climate Change 2007: The physical science basis: working group I contribution to the Fourth Assessment Report of the IPCC*. Cambridge: Cambridge University Press.

Keystone. (2010). Energy and Water Use:
<http://www.keystoneressort.com/explore-keystone/environmental-initiatives/energy-and-water-use.aspx>

Keystone. (2010). Waste Management:
<http://www.keystoneressort.com/explore-keystone/environmental-initiatives/waste-management.aspx>

Mammoth Mountain Ski Area. (2010). Sustainable Development:
<http://www.mammothmountain.com/CorporateHome/Environment/SustainableDevelopment/>

Mammoth Mountain Ski Area. (2010). Continual Improvement:
<http://www.mammothmountain.com/CorporateHome/Environment/ContinualImprovement>

Mill, R. C. (2001). *Resorts Management and operation*. New York: Wiley & Sons.

National Resource Defense Council. (2005). *Global Warming Puts The Arctic on Thin Ice*. <http://www.nrdc.org/globalwarming/qthinice.asp>

National Ski Area Association (NSAA). (2009). Keep Winter Cool:
<http://www.keepwintercool.org/>.

National Ski Areas Association (NSAA). (2005). *Sustainable Slopes: The environmental charter for ski areas*. Denver: National Ski Areas Association.

National Ski Areas Association (NSAA), (2009). Talking Points on the 2008 SACC Report Card. <http://www.nsaa.org/nsaa/SACC-talking-points-2008.pdf>

National Ski Areas, The Green Room – The Ski Industry Environmental Database.
http://www.nsaa.org/nsaa/environment/the_greenroom/index.asp?mode=greenroom&topic=T07

Palmeri, C. (2003). An uphill battle on the slippery slopes: Can cheap tickets and snowboard “terrain” save the ski resorts? *Business Week*, Issue 3815, 44.

Rivera, J., de Leon, P. (2004). Is Greener Whiter? Voluntary Environmental Performance of Western Ski Areas. *Policy Studies Journal*. 32 (3), 417-437.

Rivera, J., de Leon, P., & Koerber, C. (2006). Is Greener Whiter Yet? The Sustainable Slopes Program after Five Years. *Policy Studies Journal -Urbana Then Carbondale*. 34 (2), 195-221.

Rivera, J. (2001). *Does it pay to green in the developing world? Participation in a Costa Rican Voluntary Environmental Program and its impact on hotel's competitive advantage*. Washington, DC: Academy of Management Best Paper Proceedings.

Rodger, L. (2010). Resorts Go Green, Preserve Environment While Saving Money. <http://www.onthesnow.com/news/a/13666/resorts-go-green-preserve-environment-while-saving-money>

Sachs, B. (2002). National perspective on mountain resorts and ecology. *Vermont Law Review*, 23(3), 515-542.

Ski Areas Citizens' Coalition (SAAC). (2002). *Environmental Score Card Reports*. <http://www.coloradowild.org/sacc.html>.

Schendler, A. (2010). ASC Sustainability Report: http://www.aspsnowmass.com/environment/images/2010_ASC_Sustainability_Report.pdf

Schendler, A. (2009). *Getting green done: Hard truths from the front lines of the sustainability revolution*. New York: PublicAffairs.

Schendler, A. (2008). The Big Green Lie –The Hope and the Hype. March/April 2008, Orion Magazine.

Steven's Pass. (2010). Reduce Reuse Recycle: <http://www.stevenspass.com/Stevens/the-mountain/environment-recycle.aspx>

Steven's Pass. (2010). Wind Power: <http://www.stevenspass.com/Stevens/the-mountain/environment-wind.aspx>

Appendix A – Ski Resort Sustainability Survey

1. Planning, Design, and Construction

*** 1. Ski Resort:**

*** 2. In the planning and developmental phase of operations. Does your ski area assess environmental concerns and address potential environmental restoration opportunities at the local and regional level?**

☐ Yes

☐ No

☐ Not Sure

*** 3. When designing new facilities or upgrading older facilities, does your ski area make water efficiency, energy efficiency, clean energy, and renewable materials priorities in the design?**

☐ Yes

☐ No

☐ If not all of these then which ones?

*** 4. When planning or upgrading current facilities, does your resort meet or exceed requirements to minimize impacts associated with construction?**

☐ No

☐ Yes, brief example

*** 5. Does your ski resort use high density development or clustering to reduce sprawl?**

☐ Yes

☐ No

*** 6. Does your ski area have a LEED certified building?**

☐ Yes

☐ No

☐ No, but currently one is proposed

*** 7. When planning new facilities, are local communities involved in the planning process?**

☐ Yes

☐ No

2. Operations

*** 1. Does your ski area optimize efficiency and effectiveness of water use in snowmaking operations?**

☐ No

☐ Yes

If Yes, briefly give an example

*** 2. Do snowmaking operations take into consideration nearby minimum stream flows and fish & wildlife resources?**

☐ Yes

☐ No

*** 3. At your resort, is there a reservoir or snowmaking pond to utilize water during low stream flow periods?**

☐ Yes

☐ No

*** 4. Does your resort have ways of recapturing snowmelt and run-off for re-use?**

☐ Yes

☐ No

*** 5. Are there facility mechanisms in place that optimize efficient water use? Select all that apply.**

☐ Low Flow Faucets

☐ Low Flow Toilets

☐ Waterless Urinals

☐ Composting Toilets

☐ Purchase Water efficient appliances

☐ None

*** 6. Does your ski area meet or exceed water quality requirements governing ski area operations?**

- ☐ Yes, Exceeds Requirements
- ☐ Meets Requirements
- ☐ No, Does Not Meet Requirements

3. Energy Conservation and Clean Energy

*** 1. Has your ski area recently conducted an energy audit?**

☐ No

☐ Yes

If Yes, when?

*** 2. Does the resort have an energy management plan that addresses energy goals and baseline energy usage for resort operation?**

☐ Yes

☐ No

*** 3. Are there automation systems such as light sensors, room sensors, etc, that reduce energy consumption in rooms that aren't occupied?**

☐ Yes

☐ No

*** 4. Does any portion of the resort's utilities derive from Renewable Energy Sources?**

☐ No

☐ Yes

If Yes, brief description

4. Waste Management

*** 1. Is there a comprehensive recycling program at your resort?**

☐ Yes

☐ No

*** 2. Do you purchase recycled products from vendors?**

☐ Yes

☐ No

*** 3. Is there a composting program at your resort?**

☐ No

☐ Yes

If Yes, Is the program within resort operations or open to general public?

5. Fish and Wildlife

*** 1. Does your ski resort inventory and monitor fish and wildlife, particularly protected species?**

☐ Yes

☐ No

*** 2. Are there currently any programs in place that minimizes the impacts to fish and wildlife to improve/maintain habitat?**

☐ No

☐ Yes

If Yes, highlight a brief example

*** 3. Has your ski area created or restored habitat where appropriate, either on or off-site?**

☐ Yes

☐ No

6. Forest and Vegetative Management

*** 1. Does your resort have a vegetative plan that manages the effect the resort has on the forest and vegetation?**

- ☐ Yes
- ☐ No
- ☐ No, but in development

*** 2. When constructing new facilities, are areas revegetated with native species as quickly as possible to avoid disturbance?**

- ☐ Yes
- ☐ No

*** 3. Does your resort provide signage to inform guests of sensitive vegetation areas?**

- ☐ Yes
- ☐ No

*** 4. Does your resort manage the impact on the forest and vegetation to allow for a healthy mountain environment?**

- ☐ No
- ☐ Yes

If Yes, brief example of an initiative currently in place

7. Wetlands & Riparian Areas

*** 1. Has your ski area established plans to minimize impacts to wetlands and riparian areas, through restoration, creation, or mitigation?**

☐ Yes

☐ No

8. Air and Visual Quality

*** 1. Has the resort taken measures to reduce resort operations related to air pollution and greenhouse gas emissions?**

☐ No

☐ Yes

If Yes, give example

*** 2. Is your resort partnered with NSAA's Keep Winter Cool Program?**

☐ Yes

☐ No

*** 3. When considering development, does your ski resort design projects that emphasize the natural and aesthetic components of the landscape?**

☐ Yes

☐ No

*** 4. Are there any partnerships with local land conservation organizations that help protect open lands and viewsheds?**

☐ No

☐ Yes

If Yes, please describe one example

9. Transportation

*** 1. Are there currently any incentive plans for employees or guests to ease congestion and transportation to the mountain?**

☐ No

☐ Yes

If Yes, employees/guests or both?

*** 2. Does your ski area provide resort based transportation for all guests and employees?**

☐ Yes

☐ No

10. Education

*** 1. Does your ski area use the natural surroundings as a forum in promoting environmental education and increasing environmental awareness?**

☐ Yes

☐ No

*** 2. Currently are there any outreach programs that the resort participates in related to the environment?**

☐ No

☐ Yes

If Yes, please give an example or name of program

*** 3. Are employees trained and informed on the resort's initiatives in environmental stewardship?**

☐ Yes

☐ No

*** 4. Does your ski resort currently have an environmental center?**

☐ Yes

☐ No

☐ No, but one is under development.

*** 5. Does your resort dedicate personnel specifically to deal with the ski resort's environmental programs?**

☐ Yes

☐ No

6. Please describe any additional final comments that this survey may have missed regarding your resort's operations and the Sustainable Slopes Charter.

Appendix B – Focal Resorts and List of Surveyed Resorts.

Focal 10 resorts:

Aspen Skiing Company – Aspen, Colorado. Aspen consists of 5,303 acres of skiable terrain, and has been on the forefront of sustainable practices at ski resorts. By adopting “ISO 14001” —an internationally recognized standard that “objectively measures environmental performance, including record-keeping and compliance with the company’s own environmental protocols,” — Aspen has allowed itself to be audited by independent third-party organizations (Berwyn, 2005). By examining Aspen’s practices and how it has been fulfilling its partnership with the Sustainable Slopes Program, it will serve as an example on how resorts can achieve long lasting environmental stewardship in ski resort management. Contact: Auden Schendler (970) 925-1220, aschendler@aspensnowmass.com.

Alpine Meadows Ski Resort – Tahoe City, California. This resort consists of 2,400 acres. Its location on the fragile Lake Tahoe is what makes this resort interesting to examine for this project. Contact: Ed Lahr (530) 583-4232, edlahr@skialpine.com.

Alta Ski Area– Alta, Utah. Alta is known throughout the ski community as the powder Mecca in the United States. Alta has 2,200 skiable acres and receives 500 inches of snow per year, with some years well beyond that. The resort operates on public land (Wasatch National Forest), is in the

headwaters of one of Salt Lake City's primary water supply sources.

Contact: Onno Wieringa (801) 742-3333, onno@alta.com.

Bolton Valley - Bolton, Vermont. Bolton Valley Resort is a locally owned resort consisting of 165 skiable acres and is 25 minutes outside of Burlington, VT. The resort has undergone some major changes within the past year. Most notably, a wind turbine has been installed on the resort's ridge. Investigating how a local resort responds to the environmental movement will be interesting, especially given its relative lack of financial resources. Contact: Josh Arneson (802) 434-6814, jarneson@boltonvalley.com.

Grand Targhee Resort – Alta, Wyoming. Grand Targhee is a 3,000 acre resort just across Teton pass from Jackson Hole, Wyoming. The resort is located minutes from Teton National Park and Yellowstone National Park. The location of this resort makes for an ideal review on surrounding land use in ski resort operations given the proximity of these two national parks and adjacent federal land. Contact: Scott Pierpont (307) 353-2300, spierpont@grandtarghee.com.

Keystone Resort – Summit County, Keystone, Colorado. This resort consists of 3,148 acres and has established an array of initiatives acting as one of the leaders among the many ski resorts in Summit County. Contact: David November (970) 496-2316, dnovember@vailresorts.com.

Mammoth Mountain Ski Area – Mammoth Lakes, California. Mammoth Mountain is the largest ski resort near Los Angeles (3,500 acres), and the tallest in California. The Los Angeles Department of Water and

Power manages these watersheds, which is a main source of water for the LA communities. Additionally, Mammoth Lakes is a lava dome complex, a relatively young volcano according to USGS. Examining their environmental initiatives coupled with the geology of the area, will express how ski areas interact with changes in their mountain climate and geology. Contact: Rusty Gregory (760) 934-2571, rusty@mammoth-mtn.com.

Stowe Mountain Resort – Stowe, Vermont. Stowe Mountain Resort is a 485 skiable acre resort residing on Vermont's highest peak, Mount Mansfield. This mountain receives an average of 70 inches of precipitation, and its mountain-top includes fragile Arctic Tundra biota. The resort operates on state forest land and has recently gone through a multi million dollar development. Contact: Rob Apple (802) 253-3000, rapple@sprucepeak.com.

Stevens Pass Resort – Stevens Pass, Washington. Stevens pass is a locally owned resort and is also currently the first and only resort in the Pacific Northwest that has committed to offset 100% of its energy use. The resort consists of 1,125 skiable acres and is also one of the closest resorts to Seattle. Contact: John Meriwether (206) 812-4510, jmeriwether@stevenspass.com.

Sundance Resort – Provo, Utah. This resort is small for Utah (450 skiable acres) and is owned by actor Robert Redford. Conserving surrounding terrain, the resort diverged from the norm of creating a development of hotels and shops, and developed a ski area based on

environmental conservation and artistic expression. Contact: J. Czar. Email:
czarj@sundance-utah.com

20 additional resorts randomly selected for survey:

**Beaver Creek Resort, CO. Jim Funk (970) 754-9090
jfunk@vailresorts.com**

Big Sky Resort, MT. (406) 995-5000

**Brighton Ski Resort, UT. Zane R. Doyle (801) 532-4731
rdoyle@brightonresort.com**

**Cannon Mountain, NH. Lorri Souza (603) 823-8800
lsouza@dred.state.nh.us**

**Crystal Mountain, Inc. WA. Bill Steel (360) 663-2265
bill@skicrystal.com**

**Heavenly Mountain Resort, NV. Andrew Strain (775) 586-7000
astrain@vailresorts.com**

**Jackson Hole Mountain Resort, WY. Jerry Blann 307-733-2292
jerry@jacksonhole.com**

**Killington Resort, VT Jeff Temple (802) 422-3333
jtemple@killington.com**

**Mt. Hood Meadows Ski Resort, OR. Heidi Logosz 503- 337-2222
hlogosz@skihood.com**

**Okemo Mountain Resort, VT. Bruce Schmidt (802) 228-4041
bschmidt@okemo.com**

**Park City Mountain Resort, UT. Brent Giles (435) 649-8111
brentg@pcski.com**

**Snowbird Ski & Summer Resort, UT. Jim Baker 801-933-2222
jbaker@snowbird.com**

**Sugarbush Resort, VT. Bob Ackland (802) 583-6300
backland@sugarbush.com**

**Squaw Valley USA, CA. Christine Horvath (530) 583-6985
chorvath@squaw.com**

**Taos Ski Valley, Inc. NM. Gordon Briner (505) 776-2291
gbb@skitaos.org**

**Telluride Ski & Golf Resort, CO. Deanna Belch (970) 728-6900
dbelch@tellurideskiresort.com**

**The Canyons Resort, UT. Dana Kent (435) 649-5400
dkent@thecanyons.com**

**The Summit At Snoqualmie, WA. Dan Brewster (425) 434-7669
dbrewster@summitI90.com**

**Vail Mountain, CO. Luke Cartin (303) 404-1800
lcartin@vailresorts.com**

Whiteface, NY. Jay Rand (518) 946-2223 jrand@whiteface.com

Appendix C – Sustainable Slopes Program Charter



SUSTAINABLE **SLOPES**

The environmental charter for ski areas

FOREWORD

As a society, we find ourselves needing more than ever to escape every day pressures by heading for the outdoors. With that increasing demand comes impacts and a number of emerging environmental concerns that must be addressed proactively. The ski industry adopted this Environmental Charter in 2000 as a framework for sustainability in our operations. We are revising it today to renew our commitment to responsible stewardship and foster improved environmental performance industry-wide.

The premier alpine recreation sites we have today were made possible through the vision, pioneering spirit and hard work of our industry's founders. The value of those efforts holds today, as resorts are showcases of quality recreation opportunities for skiers, snowboarders, and countless summer guests as well. Although many forces may draw us to the slopes—the thrill and excitement of sliding down a mountain, the chance to reconnect with family and friends—we can never underestimate the value of the natural surroundings in renewing the human spirit. We respect the natural settings that we call home and hope that through our current efforts, we will preserve this same experience for future generations to enjoy.

—Michael Berry, National Ski Areas Association President

December 2005

INTRODUCTION

2005 marks the five-year anniversary for Sustainable Slopes and the first revision to the Environmental Charter. This revision ensures that our Principles are current and reflect the latest technology and best management practices to foster continuing improvement in environmental performance. It also acknowledges and incorporates emerging resources available from our Partnering Organizations as well as specific new 'options for getting there' from endorsing resorts.

NSAA is the facilitator for this industry-led initiative to raise the collective environmental performance of the ski industry. In this role, partner and resort feedback remains critical to the success of Sustainable Slopes. We always welcome your input.

ENVIRONMENTAL VISION STATEMENT

To be leaders among outdoor recreation providers by managing our businesses in a way that demonstrates our commitment to environmental protection and stewardship while meeting public expectations.

ENVIRONMENTAL MISSION STATEMENT

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.

PARTNERING ORGANIZATIONS

The Partnering Organizations listed below support the industry's development of the Principles and are committed to working with the industry on their particular areas of expertise and interest.

Bonneville Environmental Foundation

Colorado Department of Public Health & Environment

Conservation Law Foundation

U.S. Department of Energy

U.S. Environmental Protection Agency

USDA Forest Service

Leave No Trace Inc.

The Mountain Institute

National Fish & Wildlife Foundation

National Park Service Concession Program

New York State Department of Environmental Conservation

Teton County, Wyoming

Trust For Public Land

Wildlife Habitat Council

PARTICIPATING ORGANIZATIONS

We thank the following organizations for providing input on the Principles and sharing their unique perspectives. Participation does not imply that these individuals or organizations support the Principles.

The Alford Design Group, Inc.	ORCA – Trade Association of the Outdoor Industry
Bonneville Environmental Foundation	Pacific Northwest Ski Areas Association
The Brendle Group	Park City Municipal Corporation
Cirrus Ecological Solutions	Pioneer Environmental Services, Inc.
Citizens Allied for Responsible Growth	Outward Bound USA
Colorado Department of Public Health & Environment	Salt Lake Organizing Committee for the Olympic Winter Games of 2002
Colorado Mountain College – Ski Area Operations	S.E. Group
Colorado Ski Country USA	Sierra Club – Utah
Conservation Law Foundation	Sierra Club – West Virginia
Economics Research Associates	Ski Areas of New York
Environmental Defense	SKI Magazine
Green Mountain Club	Ski Maine Association
The Grosword Ski Company	The Citizens Committee to Save Our Canyons
Innovation Works	Surfrider Foundation/Snowrider
Interior West Center	Teton County, Wyoming
Jack Johnson Company	Town of Mammoth Lakes
Kimley-Horn & Associates, Inc.	Trout Unlimited – Colorado Chapter
Leave No Trace Inc.	Trout Unlimited – Oregon Chapter
Lyndon State College	Trout Unlimited – Utah Chapter
The Mountain Institute	Trust for Public Land
National Environmental Trust	University of Colorado – Center for Sustainable Tourism
National Fish and Wildlife Foundation	U.S. Department of Energy
National Park Service	U.S. Environmental Protection Agency
Natural Resources Defense Council	U.S. Forest Service
The Nature Conservancy	Vermont Natural Resources Council
Normandeau Associates	Vermont Ski Areas Association
North Fork Preservation Alliance/Sundance Resort	
Northwest Colorado Council of Governments Q/Q Committee	

ENVIRONMENTAL CHARTER FOR SKI AREAS

Preamble

OUR VALUES

- Like their guests, ski area operators and employees enjoy the outdoors and appreciate the alpine environment as their home. A strong environmental ethic underlies our operations, makes us stewards of the natural surroundings, and is the basis for our commitment to constant improvement in environmental conditions.
- The recreation opportunities that ski areas provide contribute to improving the quality of life for millions of people each year, and the natural surroundings greatly enhance those experiences. In providing quality, outdoor recreation opportunities, we strive to balance human needs with ecosystem protection.
- Ski areas are well suited to accommodate large numbers of visitors because of their infrastructure and expertise in managing the impacts associated with those visits. By providing facilities for concentrated outdoor recreation in limited geographic areas, ski areas help limit dispersed impacts in more remote, wild areas.
- Ski areas operate within, and are dependent on, natural systems including ecological, climatic and hydrological systems. These dynamic systems can affect our operations, just as we affect them. We are committed to working with stakeholders to help understand and sustain the diversity of functions and processes these systems support.
- In addition, ski areas operate within rural and wild landscapes that are valued for their scenic, cultural, and economic characteristics. We are committed to working with stakeholders to understand and help maintain those characteristics that make these landscapes unique.
- We are committed to actively addressing the long-term challenges presented by climate change. Although we are not a major source of greenhouse gas (GHG) emissions, many resorts across the country already are taking steps to reduce their own, limited GHG emissions in their operations. We adopted a climate change policy in 2002 and launched the “Keep Winter Cool” campaign in 2003 with our partner, the Natural Resources Defense Council (NRDC). Please see the attached Climate Change Policy for more information on our commitment and effort to fight global warming.

- Along with environmental concerns, ski area operators are deeply concerned with the safety of our guests. We take safety into account in the design and operation of ski areas and in some situations need to place the highest priority on safety.

BACKGROUND ON THE PRINCIPLES

- The ski industry is composed of a diverse group of companies, varying in size, complexity, accessibility to resources, and geographic location. These Principles are meant to be a useful tool for all ski areas, from local ski hills to four season destination resorts, whether on public or private land. Our vision is to have all ski areas endorse these Principles and make a commitment to implementing them. Some smaller areas that endorse these Principles may be limited in their ability to make progress in all of the areas addressed.
- The Principles are voluntary and are meant to provide overall guidance for ski areas in achieving good environmental stewardship, not a list of requirements that must be applied in every situation. Recognition must be made that each ski area operates in a unique local environment or ecosystem and that development and operations may reflect these regional and operational differences. Each ski area must make its own decisions on achieving sustainable use of natural resources. While ski areas have the same goals, they can choose different options for getting there.
- The Principles are meant to go “beyond compliance” in those areas where improvements make environmental sense and are economically feasible. Ski areas should already be meeting all applicable federal, state, and local environmental laws and regulations. Through these Principles, we are striving to improve overall environmental performance, whether it be in the form of achieving efficiencies, sustaining resources or enhancing the public’s awareness of our special environment.
- The Principles encourage ski areas to adopt the “avoid, minimize, mitigate” approach to natural resource management. Avoidance should be the first consideration when outstanding natural resources or settings are at stake.

1 These Principles are voluntary and are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defenses, or otherwise affect the legal position of any endorsing company, and are not intended to be used against an endorser in any legal proceeding for any purpose. The “Options for Getting There” listed under each Principle are meant to serve as examples—not an exhaustive list. See the Green Room environmental database (www.nsaa.org) for more examples of the Principles in action.

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- The Principles recognize that ski areas have some unavoidable impacts. At the same time, ski areas strive to maintain the integrity of the environments in which they operate by contributing to the sense of place in mountain communities and being responsible stewards of natural resources.
 - The Principles are aimed at improving environmental performance at existing ski areas, and can serve as helpful guidance for planning new developments. The Principles cannot fully address when and where new ski area development should occur, as that issue should be addressed on the merits of each individual project and in consideration of the specific characteristics of a particular location. What might be beneficial development in one location could be inappropriate elsewhere.
 - Ski areas are concerned about the larger issues of growth and sustainable development in mountain communities. Key issues of community planning, such as protecting viewsheds, quality of life, and open space, are inherently linked to our business and the quality of experience of our guests. While the Principles cannot address fully some of the larger issues of growth in mountain communities, the ski industry is committed to working with stakeholders to make progress on these issues of concern to mountain communities. Many of the concepts in these Principles can provide leadership in confronting those issues.
 - The Principles were developed through a collaborative dialogue process where input and awareness, not necessarily consensus on every issue or by every group, was the goal. We revised the Principles in 2005 with input from Partnering Organizations, NSAA's Environmental Committee and others. The Principles represent the major areas of agreement for ski areas and Partnering Organizations.
 - These Principles are a collective step in demonstrating our commitment to environmental responsibility. We hope that this initiative will help us better engage our stakeholders in programs and projects to improve the environment.



ENVIRONMENTAL PRINCIPLES

VOLUNTARY ENVIRONMENTAL PRINCIPLES¹ FOR SKI AREA PLANNING, OPERATIONS AND OUTREACH

PLANNING, DESIGN AND CONSTRUCTION

In planning and designing trails, base areas and associated facilities, ski areas should explore ways of integrating our operations into natural systems and addressing short and long-term environmental impacts to natural resources. There may also be opportunities to address past disturbances from historical uses and mitigate unavoidable impacts from future disturbances.

Principles

- ◆ Engage local communities, environmental groups, government agencies and other stakeholders in up front and continuing dialogue on development plans and their implementation
- ◆ Assess environmental concerns and potential restoration opportunities at local and regional levels
- ◆ Plan, site and design trails, on-mountain facilities and base area developments in a manner that respects the natural setting and avoids, to the extent practical, outstanding natural resources
- ◆ Emphasize nature in the built environment of the ski area
- ◆ Make water efficiency, energy efficiency and clean energy use and materials efficiency priorities in the design of new facilities and upgrades to existing facilities
- ◆ Use high-density development or clustering to reduce sprawl, provide a sense of place, reduce the need for cars and enhance the pedestrian environment
- ◆ Meet or exceed requirements to minimize impacts associated with ski area construction

Options for getting there

- ✓ Engage stakeholders collaboratively on the siting of improvements and the analysis of alternatives
- ✓ Complement local architectural styles, scale, and existing infrastructure to enhance the visual environment and create a more authentic guest experience
- ✓ Respect outstanding natural resources and consider the physical “carrying capacity” of the local ecology in planning new projects
- ✓ Use simulation or computer modeling in planning to assist with analyzing the effects of proposals on key natural

- resources and viewsheds, such as visual modeling or GIS
- ✓ Design trails with less tree removal and vegetation disturbance, recognizing safety concerns
- ✓ Incorporate green building principles, such as using energy, water and material efficiency techniques and sustainable building practices
- ✓ Use long-life, low maintenance building materials and locally-sourced materials as available
- ✓ Include parks, open space and native landscaping in base area and building developments
- ✓ Seek opportunities for environmental enhancement and restoration
- ✓ Maximize alternate transportation modes in and around the base area
- ✓ Minimize road building where practical
- ✓ Develop and select best management practices (BMPs) for construction sites with stakeholder input
- ✓ Apply sound on-mountain construction practices, such as over-snow transport techniques, stormwater control, or phasing of activities to minimize disturbances to natural habitats
- ✓ Screen contractors, designers and consultants for environmental credentials
- ✓ Develop Sustainable Design Guidelines
- ✓ Seek LEED® (Leadership in Energy & Environmental Design) certification through the U.S. Green Building Council

OPERATIONS

In the day-to-day operation of ski areas and associated facilities, there are many opportunities for stewardship, conserving natural resources, and increasing efficiencies. Taking advantage of these opportunities will not only benefit the environment, but can also result in long-term cost savings.

WATER RESOURCES

Water is an important resource for ski areas as well as the surrounding natural environments and communities, and should be used as efficiently and effectively as possible.

WATER USE FOR SNOWMAKING

- ◆ Optimize efficiency and effectiveness of water use in snowmaking operations
- ◆ Conduct snowmaking operations in a manner that protects minimum stream flows and is sensitive to fish and wildlife resources (see Fish & Wildlife Principles on page 11).

Options for getting there

- ✓ Use appropriate, modern technology and equipment to optimize efficiency
- ✓ Inspect and monitor systems to reduce water loss
- ✓ Use reservoirs or ponds to store water for use during low flow times of the year and to maximize efficiency in the snowmaking process
- ✓ Work with local water users and suppliers to promote in-basin storage projects to offset low flow times of the year
- ✓ Install water storage facilities to recapture snowmelt runoff for reuse
- ✓ Inventory water resources and monitoring seasonal variations in stream flows
- ✓ Support and participate in research on the ecological impacts of snowmaking
- ✓ Re-use wastewater for snowmaking as appropriate
- ✓ Use computerized snowmaking equipment for improved effectiveness with respect to air compression and better efficiency with respect to water use
- ✓ Use dirt or other alternative methods for constructing terrain features to minimize water use

WATER USE IN FACILITIES

Principle

- ◆ Conserve water and optimize efficiency of water use in ski area facilities

Options for getting there

- ✓ Conduct water use audits and investigate methods and alternative technologies to reduce water consumption
- ✓ Install water efficient equipment in facilities such as low-flow faucets and toilets
- ✓ Install no-flow fixtures such as waterless urinals and composting toilets
- ✓ Participate in existing water conservation and linen and towel re-use programs for lodging such as EPA's WAVE® and Project Planet® programs
- ✓ Educate guests and employees about the benefits of water conservation

- ✓ Purchase and use of water efficient appliances such as dishwashers and clothes washers
- ✓ Avoid use of garbage disposals through composting
- ✓ Use ozone laundry systems

WATER USE FOR LANDSCAPING AND SUMMER ACTIVITIES

Principle

- ◆ Maximize efficiency in water use for landscaping and summer activities

Options for getting there

- ✓ Incorporate water efficiency BMPs in planning and design phases
- ✓ Plan summer uses in conjunction with winter uses to maximize the efficiency of necessary infrastructure
- ✓ Use drought-tolerant plants in landscaped areas
- ✓ Use native plant species where appropriate
- ✓ Use water efficient irrigation and recycling/reuse technologies
- ✓ Use soil amendments to increase water retention and reduce watering requirements
- ✓ Inspect and monitor systems to reduce water loss
- ✓ Water at appropriate times to minimize evaporation
- ✓ Educate employees about efficient water use and conservation
- ✓ Seek Audubon Cooperative Sanctuary System (ACSS) certification from Audubon International
- ✓ Use computerized irrigation equipment

WATER QUALITY MANAGEMENT

Principle

- ◆ Strive to exceed water quality-related requirements governing ski area operations

Options for getting there

- ✓ Participate in watershed planning, monitoring and restoration efforts
- ✓ Use appropriate erosion and sediment control practices such as water bars, revegetation and replanting
- ✓ Maintain stream vegetative buffers to improve natural filtration and protect habitat
- ✓ Apply state-of-the-art or other appropriate stormwater management techniques
- ✓ Employ stormwater mitigation to minimize and mitigate runoff and effluents
- ✓ Utilize oil/water separators in maintenance areas and garages

- ✓ Use environmentally sensitive deicing materials
- ✓ Encourage guests to follow Leave No Trace™ or similar principles of outdoor ethics

WASTEWATER MANAGEMENT

Principle

- ◆ Manage wastewater in a responsible manner

Options for getting there

- ✓ Plan for present and future wastewater needs with adjacent communities
- ✓ Use appropriate wastewater treatment technology or alternative BMPs to protect water quality
- ✓ Connect septic systems to municipal wastewater systems where appropriate
- ✓ Explore the use of decentralized or on-site treatment technologies where appropriate
- ✓ Reclaim wastewater for treatment
- ✓ Re-use treated wastewater or greywater where allowable for non-potable uses and appropriate applications
- ✓ Monitor wastewater quality
- ✓ Use Living Machines

ENERGY CONSERVATION AND CLEAN ENERGY

Ski areas can be leaders in implementing energy efficiency techniques and increasing the use of renewable energy within their operations to conserve natural resources, reduce pollution and greenhouse gases and reduce the potential impacts of climate change.

ENERGY USE FOR FACILITIES

Principles

- ◆ Reduce overall energy use in ski area facilities
- ◆ Use cleaner or renewable energy in ski area facilities
- ◆ Strive to exceed energy standards in new or retrofit projects

Options for getting there

- ✓ Audit current usage levels and target areas for improvement
- ✓ Establish seasonal baseline usage amounts and indicators (e.g., kWh/ft²)
- ✓ Develop an energy management plan that addresses short and long term energy goals, staffing, and schedules for new and retrofit projects

- ✓ Orient buildings and their windows to maximize natural light penetration, reduce the need for artificial lighting and facilitate solar heating and photovoltaic electricity generation
- ✓ Use solar heating or geothermal heat pumps for radiant heating
- ✓ Utilize building automation systems
- ✓ Use lighting controls systems, including timer controls and occupancy sensors
- ✓ Perform lighting retrofits to provide more energy efficient lamps and retrofit exit signs to use low watt bulbs
- ✓ Periodically recommission building heating, ventilating and air-conditioning systems, (e.g., calibrate thermostats and fine tune heating systems)
- ✓ Use peak demand mitigation, distributed, on-site power generation and storage, and real time monitoring of electricity use
- ✓ Work with utilities to manage demand and take advantage of cost sharing plans to implement energy savings
- ✓ Enter into load sharing agreements with utilities for peak demand times
- ✓ Partner with the U.S. Department of Energy and state energy and transportation departments to assist with energy savings and transit programs
- ✓ Participate in energy efficiency programs such as EPA/DOE's Energy Star™
- ✓ Educate employees, guests and other stakeholders about energy efficient practices and conservation
- ✓ Install high efficiency windows, ensure that all windows and doorways are properly sealed, and use insulation to prevent heating and cooling loss
- ✓ Minimize energy used to heat water by using low-flow showerheads, efficient laundry equipment, and linen and towel re-use programs
- ✓ Invest in cleaner or more efficient technologies for power generation, including wind, micro-hydro, geothermal, and solar power generation, fuel cells and natural gas turbines and generation from biomass residues and wastes
- ✓ Purchase renewable 'green power,' such as wind-generated power, from energy providers

ENERGY USE FOR SNOWMAKING

Principles

- ◆ Reduce energy use in snowmaking operations
- ◆ Use cleaner energy in snowmaking operations

Options for getting there

- ✓ Use modern, high efficiency snow guns and air compressors for snowmaking operations
- ✓ Upgrade diesel motors or convert them to alternative clean energy generation sources
- ✓ Use real time controls, sensors and monitoring systems to optimize the system and reduce electrical demand
- ✓ Use on-mountain reservoirs and ponds to gravity feed snowmaking systems
- ✓ Use distributed, on-site power generation to avoid or reduce peak demands from the utility grid
- ✓ Purchase renewable 'green power' from energy providers
- ✓ Utilize variable speed drives on pumping systems

ENERGY USE FOR LIFTS

Principles

- ◆ Reduce energy use in lift operations
- ◆ Use cleaner energy in lift operations

Options for getting there

- ✓ Use modern, high efficiency motors
- ✓ Upgrade diesel motors or use alternative clean energy sources such as fuel cells, microturbines or biodiesel fuels
- ✓ Use renewable energy sources
- ✓ Purchase renewable 'green power' from energy providers

ENERGY USE FOR VEHICLE FLEETS

Principles

- ◆ Reduce fuel use in ski area vehicles
- ◆ Use cleaner fuel

Options for getting there

- ✓ Provide shuttles or transportation for guests and employees
- ✓ Adopt a company-wide vehicle idling time limit policy
- ✓ Use energy efficient vehicles
- ✓ Use alternative fuel such as biodiesels or hybrid electric engines in ski area fleet vehicles including shuttles, trucks, snowcats and loaders
- ✓ Conduct regular maintenance on fleet vehicles
- ✓ Convert ski area snowmobile fleet to 4-stroke engines

WASTE MANAGEMENT

The Principles below incorporate the "REDUCE, REUSE, RECYCLE" philosophy of waste management to help ensure materials are being used efficiently and disposed of only after consideration is given to reusing or recycling them. Reducing waste helps protect natural resources, reduce pollution, greenhouse gases and energy use by decreasing the need to produce new materials, and minimizes disposal costs.

WASTE REDUCTION

Principle

- ◆ Reduce waste produced at all ski area facilities

Options for getting there

- ✓ Conduct a waste stream audit to establish a baseline, identify material types and amounts of each, and track progress toward reduction
- ✓ Purchase recycled products
- ✓ Purchase products in bulk to minimize packaging materials
- ✓ Adopt a company-wide green purchasing policy
- ✓ Request vendors to provide "take-back" services for used products
- ✓ Deconstruct buildings and facilities
- ✓ Educate guests and employees about reducing waste amounts generated at the area and following Leave No Trace™ or similar principles such as "pack it in, pack it out"
- ✓ Develop a waste reduction plan

PRODUCT REUSE

Principle

- ◆ Reuse products and materials

Options for getting there

- ✓ Use washable or compostable tableware/silverware in cafeterias and lodges
- ✓ Encourage guests to reuse trail maps
- ✓ Compost food wastes, grass clippings, and woody debris for use in landscaping and revegetation or erosion control areas
- ✓ Explore opportunities for reusing products (e.g. building materials from deconstruction, lift parts and equipment, and office supplies)
- ✓ Join EPA's WasteWise® program

RECYCLING

Principle

- ◆ Increase the amount of materials recycled at ski areas

Options for getting there

- ✓ Make recycling easy and convenient for guests by offering containers and displaying signage in facilities and lodges
- ✓ Recycle mixed paper, cardboard, aluminum, glass, plastic, scrap metal and food service waste
- ✓ Deconstruct and recycle building materials as an alternative to landfilling
- ✓ Partner with local government and other businesses on recycling in remote communities where recycling programs are not readily available
- ✓ Encourage vendors to offer recycled material products for purchase
- ✓ Educate guests and train employees on recycling practices
- ✓ Adopt a green purchasing policy that sets purchasing specifications to favor recycled content
- ✓ Specify a portion of new construction materials to require recycled content
- ✓ Partner with community recycling groups to market available recyclables

POTENTIALLY HAZARDOUS WASTES

Principle

- ◆ Minimize the use of potentially hazardous materials, the generation of potentially hazardous wastes and the risk of them entering the environment

Options for getting there

- ✓ Safely store, segregate and properly dispose of potentially hazardous materials such as solvents, cleaning materials, pesticides and paints
- ✓ Collect and recycle waste products such as used motor oil, household appliance batteries, tires and unused solvents
- ✓ Reshelve and reuse partially used containers of paint, solvents, and other materials and properly dispose of empty containers
- ✓ Purchase non-hazardous products for use when effective
- ✓ Properly manage fuel storage and handling
- ✓ Maintain or upgrade equipment to prevent leaks
- ✓ Initiate programs to reduce the occurrence of accidental spills or releases

- ✓ Install sedimentation traps in parking lots
- ✓ Educate employees on the requirements for properly handling and cleaning up hazardous wastes
- ✓ Reclaim spent solvents
- ✓ Coordinate with local area emergency planning councils for response in case of a spill or release

FISH AND WILDLIFE

Ski areas operate within larger ecosystems and strive to be responsible stewards of fish and wildlife habitats. They need the cooperation of other landowners, managers, local communities and other stakeholders for an effective ecosystem management approach. There are measures ski areas can take to better understand, minimize, and mitigate impacts to fish and wildlife, and in some cases, enhance habitat, particularly for species of concern. The benefits of these measures include promoting biodiversity and the natural systems that attract guests to the mountain landscape.

Principle

- ◆ Minimize impacts to fish and wildlife and their habitat and maintain or improve habitat where possible

Options for getting there

- ✓ Support and participate in research of fish and wildlife populations and their interactions with ski areas
- ✓ Inventory and monitor fish and wildlife and their habitat, particularly protected species
- ✓ Use snowmaking storage ponds or reservoirs to store water for use during times of low stream flows to help protect aquatic habitat
- ✓ Conduct activities and construction with consideration of seasonal wildlife patterns and behavior
- ✓ Site and design trails and facilities to include gladed skiing areas and link ungladed areas to maintain blocks of forested corridors and inter-trail islands to reduce fragmentation
- ✓ Limit access to, or set aside, certain wildlife habitat areas
- ✓ Use wildlife-proof dumpsters or trash containers
- ✓ Create or restore habitat where appropriate, either on- or off-site
- ✓ Use land conservation techniques, such as land exchanges and conservation easements, as vehicles for consolidating or protecting important wildlife habitat
- ✓ Participate in ecosystem-wide approaches to wildlife management

- ✓ Provide wildlife education programs for employees, guests, and the local community such as the Leave No Trace™ Principles of respecting wildlife
- ✓ Achieve Audubon Cooperative Sanctuary System (ACSS) certification from Audubon International
- ✓ Participate in Wildlife Habitat Council's Habitat Certification/International Accreditation Program

FOREST AND VEGETATIVE MANAGEMENT

Ski areas recognize the importance of responsible stewardship in managing the forests and vegetation that support ecosystems and allow for public recreation opportunities. Sound forest and vegetative management can benefit fish and wildlife habitat, protect water quality and viewsheds, and reduce erosion, pollution, and greenhouse gases.

Principle

- ◆ Manage effects on forests and vegetation to allow for healthy forests and other mountain environments

Options for getting there

- ✓ Inventory and monitor forest and vegetative resources
- ✓ Adopt vegetative management plans
- ✓ Minimize the removal of trees through the careful siting and design of trails
- ✓ Use over-snow skidding to remove logs for new runs during times of sufficient snow cover
- ✓ Trim branches or top trees instead of removal where possible
- ✓ Use aerial logging where economically feasible
- ✓ Employ practices to control invasive or noxious weeds
- ✓ Remove dead and diseased trees, with consideration to habitat value, to promote healthy forests and public safety
- ✓ Revegetate roads that are no longer used
- ✓ Revegetate disturbed areas with native plant species and grasses, recognizing that faster growing, non-native species may be needed to address erosion
- ✓ Revegetate disturbed areas as quickly as possible following disturbance
- ✓ Limit disturbance to vegetation during summer activities
- ✓ Assess the role of forest stands in reducing greenhouse gases
- ✓ Provide signage informing guests of sensitive vegetation areas
- ✓ Use traffic control measures, such as rope fences, on areas

with limited snow coverage to protect sensitive vegetation and alpine tundra

- ✓ Reduce or eliminate snowcat and snowmobile access to sensitive areas with limited snow coverage
- ✓ Plant at appropriate times to minimize water use while optimizing growth
- ✓ Employ wild fire mitigation programs and involve local residents
- ✓ Use forest thinnings from fire mitigation and ecological restoration projects to build and furnish facilities

WETLANDS & RIPARIAN AREAS

Ski areas recognize that wetlands and riparian areas are crucial components of the alpine ecosystems in which they operate.

Principle

- ◆ Avoid or minimize impacts to wetlands and riparian areas, and offset unavoidable impacts with restoration, creation or other mitigation techniques

Options for getting there

- ✓ Inventory and monitor wetland and riparian areas
- ✓ Limit snowmaking and grooming equipment access to wetlands and riparian areas if snow cover is inadequate to protect them
- ✓ Limit access to wetlands, riparian areas and vernal pools if snow cover is inadequate to protect them
- ✓ Engage in restoration, remediation and protection projects
- ✓ Establish buffers and setbacks from wetland and riparian areas in summer
- ✓ Manage snow removal and storage to avoid impacting wetlands and riparian areas as feasible
- ✓ Support or participate in research on functions of wetland habitats and riparian areas
- ✓ Use trench boxes to minimize impacts to forested wetlands from construction of utility lines

AIR QUALITY

Ski area guests and operators value fresh air as an integral part of the skiing experience. Although there are many sources in and around the community that, combined, may compromise air quality, ski areas can do their share to help minimize impacts. Some of the many benefits of cleaner air and reduced air pollution include enhanced visibility and lessening human influences on climate change, which is of particular concern to ski areas.

Principles

- ◆ Minimize negative impacts to air quality
- ◆ Reduce operations-related air pollution and greenhouse gas emissions as feasible

Options for getting there

- ✓ Reduce air pollutants and greenhouse gas emissions from buildings, facilities and vehicles through clean energy and transportation-related measures identified in these Principles
- ✓ Use dust abatement methods for dirt roads during summer operations and construction
- ✓ Revegetate as appropriate to control dust
- ✓ Reduce the sanding and cindering of ski area roads by using alternative deicing materials
- ✓ Vacuum sweep paved parking lots and roads periodically
- ✓ Reduce burning of slash through chipping or other alternative uses
- ✓ Limit wood burning fireplaces or using cleaner burning woodstoves and fireplaces and install gas fireplaces
- ✓ Work with local and regional communities to reduce air quality impacts
- ✓ Purchase or support green energy

VISUAL QUALITY

Scenic values are critical to surrounding communities and guest experiences. Although ski area development is a part of the visual landscape in many mountain areas, it can be designed and maintained in a manner that complements the natural setting and makes the natural setting more accessible to guests. Where opportunities for collaboration exist, ski areas should work with appropriate partners in the protection of open lands that define the visual landscape in which their guests recreate.

Principles

- ◆ Create built environments that complement the natural surroundings
- ◆ Explore partnerships with land conservation organizations and other stakeholders that can help protect open lands and local viewsheds

Options for getting there

- ✓ Plan with landscape scenic values in mind
- ✓ Minimize ridgeline development where feasible
- ✓ Promote protection of open space elsewhere in the community to enhance regional viewsheds
- ✓ Apply local architectural styles and highlight natural features to minimize disruption of the visual environment and create a more authentic experience
- ✓ Use visual simulation modeling in siting, planning and design to assist in demonstrating visual effects of projects
- ✓ Design lifts and buildings to blend into the natural backdrop or complement the natural surroundings
- ✓ Construct trails to appear as natural openings
- ✓ Use non-reflective building products and earth tone colors on structures
- ✓ Plant trees or other vegetation to improve visual quality
- ✓ Incorporate low level lighting or directional lighting to reduce impacts of lights on the night sky while recognizing safety, security, and maintenance needs
- ✓ Keep parking areas free of debris and garbage
- ✓ Place existing and new utility lines underground to reduce visual impacts

TRANSPORTATION

Travel to and within ski areas has unavoidable impacts. Through transportation initiatives, ski areas can do their part to help ease congestion and impacts to air quality and improve the ski area experience. (See related topic of ski area vehicle fleets under Energy Principles.)

Principle

- ◆ Ease congestion and transportation concerns

Options for getting there

- ✓ Provide employee transportation benefits, including shuttles, bus passes or discounts, van pools, and ride-share incentives
- ✓ Provide and promote ski area guest transportation through shuttles or buses
- ✓ Offer and promote carpooling or HOV (high occupancy vehicle) incentives for guests such as discounts or preferred parking in proximity to lodges
- ✓ Offer and promote non-peak travel incentives for guests such as Sunday night stay discounts
- ✓ Increase density in base area development when appropriate to reduce the need for vehicle use
- ✓ Support and participate in transit initiatives in the community and region
- ✓ Work with travel agents to market and promote “car free” vacation packages

EDUCATION AND OUTREACH

Because of their setting in an outdoor, natural environment and the direct connection between that natural environment and the guest experience, ski areas have an excellent opportunity to take a leadership role in environmental education and in enhancing the environmental awareness of their guests, surrounding communities, and employees.

Principles

- ◆ Use the natural surroundings as a forum for promoting environmental education and increasing environmental sensitivity and awareness
- ◆ Develop outreach that enhances the relationship between the ski area and stakeholders to ultimately benefit the environment

Options for getting there

- ✓ Train employees and inform guests of all ages about the surrounding environment
- ✓ Promote the Environmental Code of the Slopes® and the Keep Winter Cool campaign (www.keepwintercool.org)
- ✓ Educate stakeholders about the Sustainable Slopes program
- ✓ Provide leadership and lobby on environmental concerns with particular importance to the alpine or mountain environment, such as climate change
- ✓ Dedicate personnel to environmental concerns and incorporate environmental performance measures and expectations into departmental goals
- ✓ Dedicate a portion of the ski area’s website to environmental excellence and Sustainable Slopes and contribute entries to the Green Room on-line environmental database
- ✓ Offer environmental education and awareness programs that provide on-mountain instruction and offer classroom information for use in schools
- ✓ Partner with local school systems, businesses and the public on initiatives and opportunities for protecting and enhancing the environment
- ✓ Display interpretive signs on forest resources, vegetative management and fish and wildlife
- ✓ Publicly address environmental considerations in stated company values, policies or mission statements
- ✓ Issue an annual environmental report or release annual environmental data
- ✓ Offer guests the opportunity to reduce their own environmental impacts associated with travel to and from the ski area by purchasing Cool Tags,™ mini Green Tags,™ or similar products
- ✓ Provide guests the opportunity to purchase green energy for their homes by partnering with local utilities
- ✓ Create funding mechanisms for environmental outreach projects, both in-house as well as in the community
- ✓ Encourage employees to participate in community environmental initiatives
- ✓ Ask guests their opinions about ski area environmental programs and initiatives and use their feedback to improve programs and guests’ experiences.

CLIMATE CHANGE POLICY

To collectively address the long-term challenges presented by climate change, resorts adopted a climate change policy in 2002. Although we are not a major source of warming pollutants, we are already taking steps to reduce our greenhouse gas (GHG) emissions in our operations. We also launched the Keep Winter Cool Program in 2003 along with our partner, the Natural Resources Defense Council (NRDC).

Through this policy, we aim to raise awareness of the potential impacts of climate change on our weather-dependent business and the winter recreation experience; reduce our own greenhouse gas emissions; and encourage others to take action as well. We are committed to working toward solutions that will keep both the environment and economy healthy and preserve quality of life. To this end, we will take the following actions:

- Educate the public and resort guests about the dependence of winter sports on natural ecosystems and the potential impacts of climate change on the winter recreation experience; educate guests on how they can help reduce GHG emissions.
- Raise policy maker awareness of the dependence of winter sports on natural ecosystems and the potential impacts of climate change on the winter recreation experience.
- Advocate the national reduction of GHG emissions through legislative, regulatory or voluntary measures.
- Support sound, science-based solutions to climate change, including the use of renewable energy technologies.
- Partner with appropriate organizations and agencies to assess opportunities to reduce resort emissions and increase energy efficiency; invest in new, more efficient products, practices and technologies; and measure our emission reductions.

ENVIRONMENTAL CODE OF THE SLOPES®

* Follow the Leave No Trace™ Principles of outdoor ethics when visiting ski areas

- **Dispose of waste properly:** Recycle your glass, plastics, aluminum and paper at resorts. Reuse trail maps on your next visit or recycle them rather than throwing them away. Never throw trash, cigarette butts or other items from the lifts.
- **Respect wildlife:** Observe trail closures, seasonal closures, and ski area boundaries. These closures are in place not only for your safety, but the well-being of plants and animals located in sensitive areas. In summer, stick to designated trails when hiking and biking to avoid disturbances to vegetation and wildlife.
- **Be considerate of other guests:** Respect other guests, protect the quality of their experience, and let nature's sounds prevail.

- * Carpool with friends and family or use transit to reduce warming pollutants as well as traffic and congestion.
- * Turn off the lights when leaving your room and reuse bath towels and linens to help conserve energy and water.
- * Use washable tableware and silverware in cafeterias and lodges instead of paper or plastics to help us reduce waste.
- * Take advantage of environmental or alpine education programs offered at ski areas to learn more about the surrounding environment and how to help protect it.
- * If you have kids, get them involved in environmental and alpine education programs at a young age.
- * Support "clean up days" or other environmental programs at your local ski area.
- * Provide feedback and let ski areas know how they can improve their environmental performance.

Visit www.nsaa.org for more information on Sustainable Slopes.

KEEP WINTER COOL™

WHAT SKIERS AND SNOWBOARDERS CAN DO TO HELP STOP CLIMATE CHANGE

* **MAKE A CLEAN GETAWAY**

When buying your next car, pick the least-polluting, most efficient vehicle that meets your needs. Maybe it's an innovative hybrid that combines a gasoline engine with electric motors (and never needs to be plugged in). Be on the lookout for new hybrid SUVs on the market.

* **DON'T BE A DRAG**

Take your ski rack off your car and replace your snow tires with your regular tires at the end of the season. Both could save you 6 percent at the pump. A tune-up could boost your miles per gallon anywhere from 4 to 40 percent. A new air filter could get you 10 percent more miles per gallon.

* **SHARE A RIDE**

When heading for the hills, carpool or take transit or shuttles to help reduce greenhouse gas (GHG) emissions associated with your travel.

* **BE AN EFFICIENT CONSUMER**

Believe it or not, picking the right appliances, air conditioners and computers can make a big difference in reducing pollution from power plants. So look for the most energy-efficient models. You might have to spend a bit more up front, but you'll save on electricity bills.

* **HAVE A BRIGHTER IDEA**

Those curly compact fluorescent light bulbs will lower your energy bills by about \$15 a year (more than \$60 over its lifetime). It will also keep half a ton of carbon dioxide out of the air. Ski resorts are using them by the hundreds! While compact fluorescents are more expensive than regular bulbs they last up to 10 times as long, too.

* **CONSIDER CLEANER ENERGY**

If you live in a state that lets you choose your power company, pick one that generates at least half its power from wind, solar energy or other clean sources. If you don't have the option to select a supplier yet, you might still be able to support renewable energy through an option on your electricity. Another way to help spur the renewable energy market and cut global warming pollution is to buy "wind certificates," "Green Tags"™ or "Cool Tags."™ They represent clean power you can add to the nation's energy grid in place of electricity from fossil fuels.

* **STAND UP AND BE COUNTED**

Contact your elected representatives and ask them to do more to reduce CO₂ emissions and keep winter cool for skiing and snowboarding.

* **SPREAD THE WORD**

Tell your liftmates, family and friends about the Keep Winter Cool campaign.

Keep Winter Cool is a partnership between NSAA and NRDC.
Visit www.keepwintercool.org for more information.

ENDORISING RESORTS

49 Degrees North Mountain Resort (WA)	Brighton Ski Resort (UT)	Grand Targhee Resort (WY)
Alpine Meadows Ski Resort (CA)	Bristol Mountain Winter Resort (NY)	Greek Peak Mountain Resort (NY)
Alta Ski Area (UT)	Brodie Mountain Resort (MA)	Gunstock Area (NH)
Alyeska Resort (AK)	Bromley Mountain Resort (VT)	Heavenly Mountain Resort (NV)
Angel Fire Resort (NM)	Brundage Mountain Resort (ID)	Hidden Valley Ski Area (MO)
Arapahoe Basin (CO)	Bryce Resort (VA)	Holiday Valley Resort (NY)
Arizona Snowbowl (AZ)	Buttermilk (CO)	Hoodoo Ski Area (OR)
Ascutney Mountain Resort (VT)	Camelback Ski Area (PA)	Hunter Mountain (NY)
Aspen Highlands (CO)	Cannon Mountain (NH)	Hyland Ski and Snowboard Area (MN)
Aspen Mountain (CO)	Cascade Mountain Ski & Snowboard Area (WI)	Jackson Hole Mountain Resort (WY)
Attitash (NH)	Cataloochee Ski Area (NC)	Jiminy Peak Mountain Resort (MA)
Balsams Wilderness (NH)	Copper (CO)	Keystone Resort (CO)
Bear Creek Mountain Resort (PA)	Cranmore Mountain Resort (NH)	Killington Resort (VT)
Bear Mountain Resort (CA)	Crested Butte Mountain Resort (CO)	Kirkwood Mountain Resort (CA)
Beaver Creek Resort (CO)	Crystal Mountain (MI)	Liberty Mountain Resort (PA)
Beaver Mountain Ski Area (UT)	Crystal Mountain, Inc. (WA)	Lookout Pass Ski Area (ID)
Belleayre Mountain (NY)	Dartmouth Skiway (NH)	Loon Mountain Recreation Corp. (NH)
Berthoud Powder Guides (CO)	Deer Valley Resort Company (UT)	Lost Trail Ski Area, Inc. (MT)
Big Mountain Resort (MT)	Devil's Head Resort & Convention Center (WI)	Loveland Ski Area (CO)
Big Sky Resort (MT)	Discovery Ski Area (MT)	Mammoth (CA)
Black Mountain Ski Area (NH)	Dodge Ridge Ski Area (CA)	Massanutten Ski Resort (VA)
Blacktail Mountain Ski Area (MT)	Durango Mountain Resort (CO)	Mission Ridge (WA)
Blue Mountain (ON)	Dyer Mountain Associates LLC (CA)	Mohawk Mountain (CT)
Bogus Basin Mountain Resort (ID)	Eaglecrest Ski Area (AK)	Monarch Ski and Snowboard Area (CO)
Bolton Valley Resort (VT)	Eldora Mountain Resort (CO)	Mont Orford Int'l Tourist Area (PQ)
Boreal Mountain Resort (CA)	Elk Ridge Ski & Outdoor Recreation Area (AZ)	Mont Ste-Marie Resort (PQ)
Boston Mills/Brandywine Ski Resort (OH)	Gore Mountain (NY)	Montana Snowbowl (MT)
Breckenridge Ski Resort (CO)		Mount Bohemia (MI)
Bretton Woods Mountain Resort (NH)		Mount Snow Resort (VT)
Bridger Bowl Ski Area (MT)		Mount Sunapee Resort (NH)

Mount Tone Ski Area (PA)	Shawnee Peak Ski Area (ME)	Sundance (UT)
Mount Washington Alpine Resort (BC)	Sierra Summit Mountain Resort (CA)	Sunday River Ski Resort (ME)
Mountain Creek (NJ)	Sierra-at-Tahoe Ski Resort (CA)	Sunlight Mountain Resort (CO)
Mountain High Resort (CA)	Ski Anthony Lakes (OR)	Swain Ski & Snowboard Center (NY)
Mt. Ashland (OR)	Ski Bluewood (WA)	Taos Ski Valley, Inc. (NM)
Mt. Bachelor, Inc. (OR)	Ski Cooper (CO)	Telluride Ski & Golf Resort (CO)
Mt. Hood Meadows Ski Resort (OR)	Ski Denton (PA)	Tenney Mountain Ski Area (NH)
Mt. Hood Skibowl (OR)	Ski Plattekill Mountain Resort (NY)	Terry Peak Ski Area (SD)
Mt. La Crosse (WI)	Ski Roundtop (PA)	The Canyons Resort (UT)
Mt. Rose - Ski Tahoe (NV)	Ski Snowstar Winter Sports Park (IL)	The Homestead (MI)
Mt. Shasta Board & Ski Park (CA)	Ski Wentworth (NS)	The Summit At Snoqualmie (WA)
Mt. Spokane Ski & Snowboard Park (WA)	Sleepy Hollow Sports Park, Inc. (IA)	The Temple Mountain Ski Area (NH)
Northstar-at-Tahoe (CA)	Smugglers' Notch Resort (VT)	Timberline Four Seasons Resort (WV)
Nub's Nob Ski Area (MI)	Snow Creek Ski Area (MO)	Timberline Lodge & Ski Area (OR)
Okemo Mountain Resort (VT)	Snow Summit Mountain Resort (CA)	Tremblant (PQ)
Otis Ridge (MA)	Snowbasin, A Sun Valley Resort (UT)	Triple M-Mystical Mountain (NM)
Panorama Mountain Village (BC)	Snowbird Ski & Summer Resort (UT)	Vail Mountain (CO)
Paoli Peaks, Inc. (IN)	Snowmass (CO)	Wachusett Mountain Ski Area (MA)
Park City Mountain Resort (UT)	Snowshoe (WV)	Waterville Valley Resort (NH)
Pats Peak (NH)	Soda Springs Ski Area (CA)	Welch Village Ski Area, Inc. (MN)
Pebble Creek Ski Area (ID)	Solitude Mountain Resort (UT)	Whistler Blackcomb (BC)
Peek 'n Peak Resort & Conference Center (NY)	SolVista Basin (CO)	White Pass Ski Area (WA)
Pelican Powder Cats (OR)	Spirit Mtn. Recreation Area (MN)	Whiteface (NY)
Pomerelle Mountain Resort (ID)	Squaw Valley USA (CA)	Whitetail Mountain Resort (PA)
Powder Ridge Ski Area (MN)	Steamboat Ski & Resort (CO)	Wildcat Mountain Ski Area & Summer Gondola (NH)
Powder Ridge Ski Area (CT)	Stevens Pass (WA)	Willamette Pass Ski Corp. (OR)
Powderhorn Resort (CO)	Stowe Mountain Resort (VT)	Windham Mountain (NY)
Red Lodge Mountain Resort (MT)	Stratton (VT)	Winter Park (CO)
Red River Ski Area, Inc. (NM)	Sugar Bowl Resort (CA)	Wintergreen Resort (VA)
Saddleback Inc. (ME)	Sugarbush Resort (VT)	Wisp at Deep Creek Mountain Resort (MD)
Seven Springs Mountain Resort (PA)	Sugarloaf/USA (ME)	Wolf Creek Ski Area (CO)
	Sunburst Ski Area (WI)	