Potential Impacts of Climate Change for Western U.S. Ski Areas: Adaptation and Sustainability in the 21st Century

Brian Lazar [1] Mark Williams [2]

1 Stratus Consulting Inc., American Institute of Avalanche Research and Education, Boulder, CO, USA; 2 Institute of Arctic and Alpine Research, University of Colorado, Boulder, CO, USA

We evaluate how climate change resulting from increased greenhouse gas (GHG) emissions may affect snow coverage for two case studies: Aspen Mountain and Park City Mountain in the years 2030 and 2100. Snow coverage was evaluated using the Snowmelt Runoff Model. We estimated climate changes (temperature and precipitation) using MAGICC/SCENGEN and the output from five General Circulation Models. We bracketed potential climate changes by using the relatively low, midrange, and high GHG emissions scenarios known as B1, A1B, and A1FI.

By 2030, temperatures are estimated to increase 1.8 to 2.5°C at both Aspen Mountain and Park City Mountain. The length of the ski season is estimated to decrease by approximately 1 to 1.5 weeks at both ski areas, and the snowline is estimated at an elevation of 2,250 m, an increase of approximately 200 m from current conditions at both ski areas. In 2100, average annual temperatures are projected to increase 2.9 to 9.4°C at Aspen Mountain and 4.2 to 8.9°C at Park City Mountain. The snowline is estimated at an elevation of 2,800 to 2,900 m at both ski areas for the A1B and B1 scenarios in 2100, and 3,100 to 3,200 m for the A1FI scenario.