

## **Potential impacts of climate change for U.S. Wasatch Range ski areas: Projections for Park City Mountain Resort in 2030, 2050, and 2075.**

**Brian Lazar<sup>1,3</sup> Mark Williams<sup>2,4</sup>**

*1. Stratus Consulting Inc., Boulder, CO, USA; 2. Institute of Arctic and Alpine Research, Boulder, CO, USA; 3. American Institute for Avalanche Research and Education, Gunnison, CO, USA; 4. University of Colorado, Boulder, CO, USA*

We evaluate the potential impacts to snow coverage and depth from anthropogenic climate change at Park City Mountain Resort in 2030, 2050, and 2075. Snow coverage was evaluated using the Snowmelt Runoff Model, and snow depth was estimated empirically via the relationship to snow coverage. We estimated climate changes (temperature and precipitation) using MAGICC/SCENGEN and the output from seven General Circulation Models (GCMs) from the Intergovernmental Panel on Climate Change Fourth Assessment Report. This study uses current and improved GCM output to update previous projections in Park City. We bracketed potential climate changes by using the relatively low, midrange, and high GHG emissions scenarios: B1, A1B, and A1FI, respectively.

By 2030, temperatures are estimated to increase 1.1 to 2.1°C at Park City Mountain, and the length of the ski season is estimated to decrease by approximately one week due to earlier spring melt at the base area. In 2050, temperatures are estimated to increase 1.4 to 3.7°C, and skiing on or before Thanksgiving and after mid-March may not be possible at the ski area base. By 2075, temperatures are estimated to increase 1.9 to 6.1°C, and snowmelt is projected to occur periodically throughout the ski season. Skiing on or before Thanksgiving and after mid-March by 2075 is unlikely at the base area for all emission scenarios, and the snowline is estimated at an elevation of 2,450 m under the A1FI emission scenario, an increase of approximately 400 m from current conditions.