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GROWING SEASON LENGTH AND SOIL MICROBES INFLUENCE THE PERFORMANCE OF A GENERALIST BUNCHGRASS BEYOND ITS CURRENT RANGE

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Study Description

We manipulated microbes and snowmelt in a transplant experiment in the Rocky Mountains to investigate the role of soil microbial communities and growing season length in plant range shifts. We identified negative effects of short and long growing seasons on the survival of the common alpine bunchgrass *Deschampsia cespitosa*, suggesting an optimal growing season length for plant survival that balances time for growth with soil moisture levels. Growing season length and microbes interacted to affect plant survival and growth; microbial community composition increased in importance in suboptimal growing season lengths. Plants grown with microbes from unvegetated soils grew as well or better than plants grown with microbes from vegetated soils.

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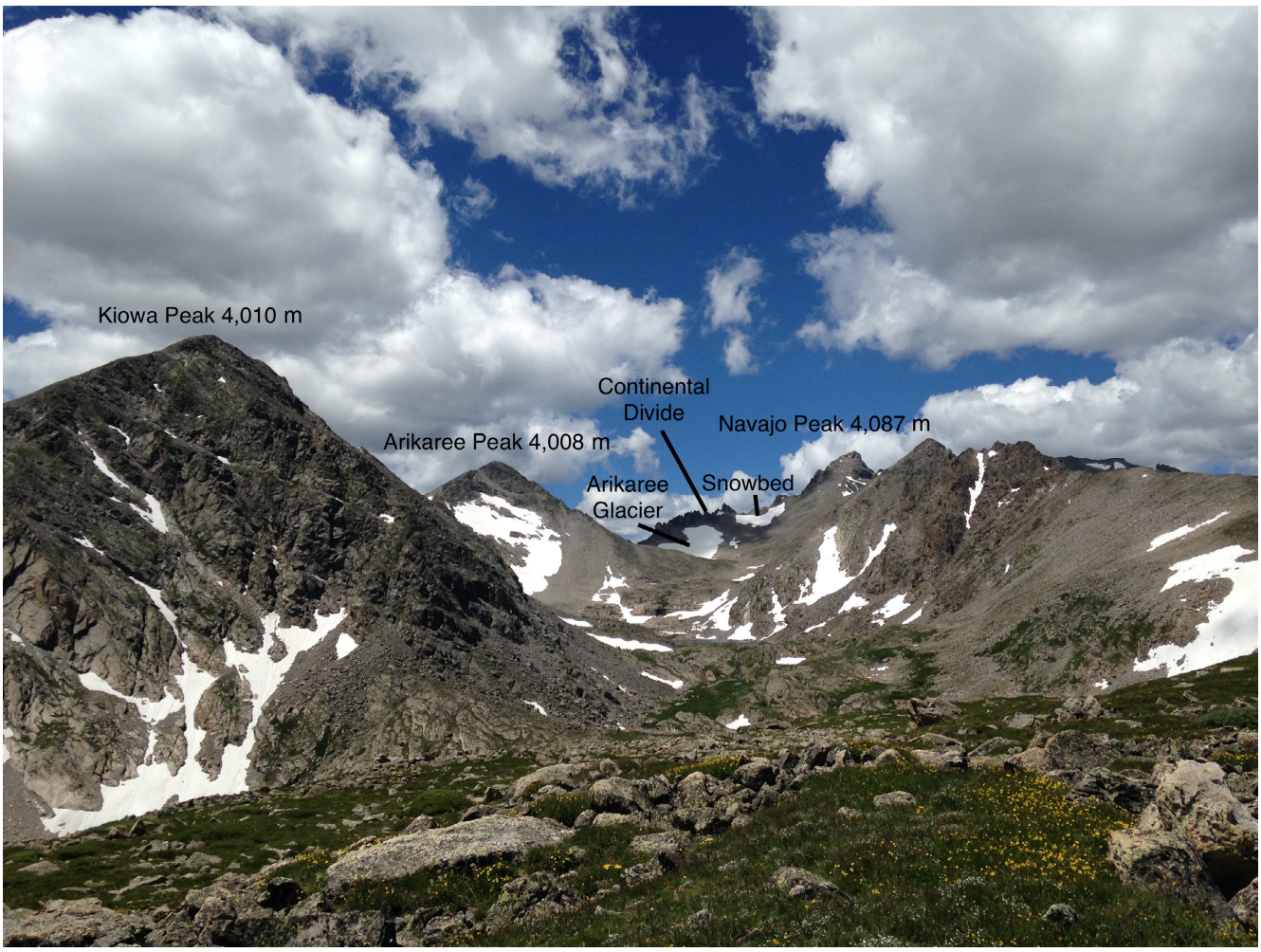


Photo 1. View of the Green Lakes Valley in the Front Range of the Rocky Mountains, Colorado. The valley is adjacent to Niwot Ridge, home of a Long Term Ecological Research Site. The transplant experiment occurred at the snowbed site. Photo credit: Cliff Bueno de Mesquita.

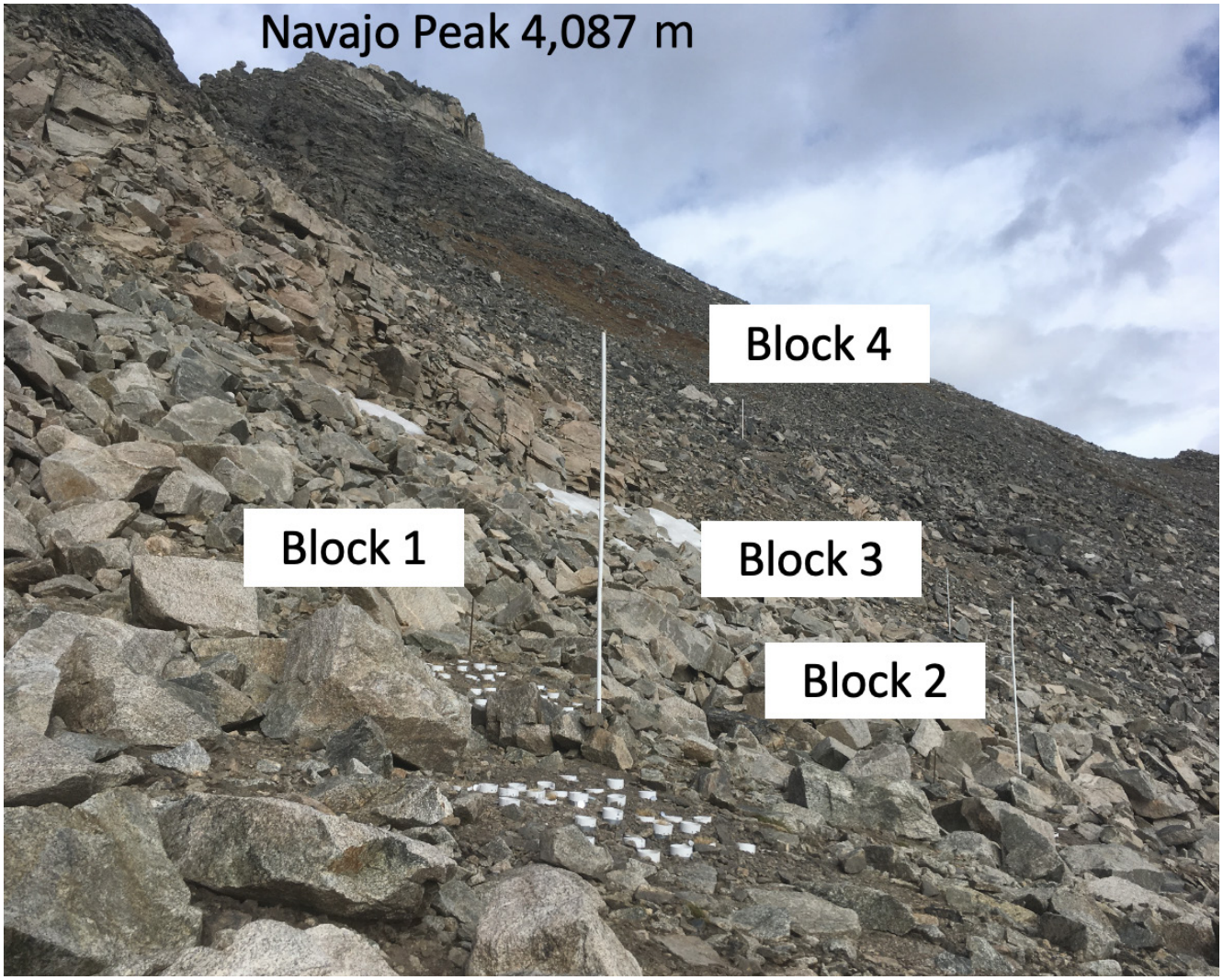


Photo 2. Close-up view of the transplant site on Navajo Peak, showing the distribution of the four experimental blocks, each of which contained a control plot and an early snowmelt plot. Photo credit: Cliff Bueno de Mesquita.



Photo 3. Researchers haul the transplants 3.25 miles (5.23 km) with 2000 ft (610 m) vertical elevation gain on a stretcher. From left to right: Cliff Bueno de Mesquita (hidden from behind Cliff is Kelsey Elwood), Jared Anderson-Huxley, Sam Sartwell. Photo credit: Jane Smith.

These photographs illustrate the article "Growing season length and soil microbes influence the performance of a generalist bunchgrass beyond its current range" by Clifton P. Bueno de Mesquita, Samuel A. Sartwell, Steven K. Schmidt, Katharine N. Suding published in *Ecology*. https://doi.org/10.1002/ecy.3095