

Research Interests

Catherine Kleier

My research goals are to integrate plant ecology and environmental biology to answer meaningful questions about global change in human dominated ecosystems.

Plant physiological ecology mechanisms related to global change

Photosynthesis and water potential rates of plants tell about environmental adaptation. Additionally, these tools can show how plants respond to changes in their environment. Such processes can be investigated on a global level, such as CO₂ exchange and global carbon budgets, or they can be investigated on a smaller scale, such as water potential change over a season. Currently, I am working on a project where willow (*Salix* spp.) shrubs have been cut to provide access for ski trails. One of the questions in this project is to determine if shrubs in the cut areas show greater water stress because of increased sunlight. Such studies will show us how vulnerable these species might be to global change.

Environmental assessment of human dominated alpine and subalpine ecosystems

I collaborate with Dr. Christy Carello from Metropolitan State College of Denver on an environmental monitoring project. We provide environmental data to the City of Breckenridge on a suitable development plan for Cucumber Gulch, a local preserve. Part of this gulch is slated for development, including the installation of a new ski gondola. The City is using our data to understand the environmental impact of this development. Using these data, we are researching a possible link between avian and floral diversity, something that has rarely been reported in the literature. We are also testing different methods of biodiversity assessments that will be applicable to other subalpine resort areas.

Restoration of urban ecosystems

One of my interests is to improve the habitat of the human species. In the area of our campus, there are many weedy spots that have been degraded over time. Parts of my efforts are to determine the most cost effective and ecologically significant means to restore such areas. One of my first pilot projects is a native plant restoration to take place at Inspiration Point, which is a park located in NW Denver, CO.

Ecology and conservation biology of *Azorella compacta*

I will continue my research on *Azorella compacta*, a giant (> 2 m diameter) woody cushion plant in the Andes Mountains. *Azorella* is a remarkable plant considering that very small rosettes (< 1 cm) cover a plant that can amass a surface area of almost 10 meters. My past work has demonstrated growth rate, demography, and physiology of this plant. In future trips, I will evaluate experiments I set up to determine germination rates and microhabitat requirements for germination. These experiments will provide valuable information for the conservation of this unique species.