

State of the Rockies Student Assistant Research Ecologist

All majors welcome. \$13.65 an hour.

Intrigued by forest fires in the Rocky Mountain West? Interested in studying how western forests are responding to recent wildfires fueled by human-induced (i.e., land-use and resource extraction activities) climate change: warmer temperatures, decades of drought, and human manipulation of natural fire regimes? Want to know if an iconic native western tree species, Ponderosa pine (*Pinus ponderosa*), is successfully re-establishing (i.e., quantity; diverse age; stand structure) in these landscapes after more intense and more frequent fires? Want to learn about butterfly conservation?

The **State of the Rockies Project** is HIRING student research ecology assistants to help test the scientific ecological concepts and theories of US western forest succession in this demographic study of Ponderosa pine forest establishment following fire in the Rocky Mountains of southern Colorado. Apply your coursework knowledge and build your research, field science techniques, and quantitative analytical skills by helping to investigate and predict the “fate” of ancient Rocky Mountain West Ponderosa pine forest ecosystems.

Project Description and Job Duties:

The re-establishment of a Ponderosa pine forest: a multiple-scale twenty-year retrospect of The Waldo Canyon fire, Colorado

Scientists are concerned a Rocky Mountain dominant montane tree species, Ponderosa pine, will blink out in severely and extensively burned forest sites (Chang, 2021, Colorado State University). A hotter drier climate (i.e., changes in timing and amount of precipitation during the monsoon season, decrease in snowpack and duration – quicker and less (overall) runoff; quick deluge of snow melt; less available water) and the magnitude and intensity of the burn may have tipped the scale for this iconic species toward “extinction” in some parts of its range. [MORE](#)

Working in collaboration with CC’s State of the Rockies project, organismal biology and ecology department, IT/GIS department, and the art department, CC’s **State of the Rockies Student Research Ecology Assistants** will help answer the questions: “What is the ecological condition of the Waldo Canyon burn area after twenty years? Do we see the expected patterns of forest succession in Ponderosa pine dominant forests? What evidence can we find that may help us determine ecosystem function and health, (i.e., evidence of re-establishment (age diversity) of ponderosa pines; rich forest understory plant species; butterfly species presence/absence)? What processes might

be driving patterns of revegetation? What predictions can be made about the long-term survival of these forests and butterflies? How have riparian zones responded?

What to expect:

Phase I: Waldo Canyon upland montane Ponderosa pine forests 20 years later...

This is a year-long student employment position beginning spring of 2023 through spring of 2024. During Blocks 6-8 2023, students will review and discuss the literature on the natural history of the region and visit [Aiken Canyon Preserve](#) to observe the vegetation assemblage of the geologically and topographically similar landscape. We will meet regularly with OBE faculty research advisor(s), begin a GIS for the project, develop our hypothesis(es), and create our research sampling design. As opportunities arise, we will consult with Colorado Springs city officials, Rocky Mountain Biological Lab, US Forest Service, National Parks Service (Rocky Mountain National Park), and visit these places and Colorado State University's natural history museum. During the summer 2023 internship, students will travel by car to Waldo Canyon to collect and record field observations. The students will learn and implement field ecology sampling techniques (plot and distance sampling), learn and build GIS skills (i.e., mapping; space-time analyses), interact with scientists, city and government officials, museum curators, and begin an analysis of the data collected (e.g., evidence of re-establishment by stand demographics, presence absence of pollinator plants and butterfly species).

A direct comparison of Aiken Canyon and Waldo Canyon is limited given their geographic and elevational differences. Generalizations can be made between the two watersheds, one recently burned and one recently unburned). While visiting Aiken Canyon, students will investigate patterns of Ponderosa pine establishment and other forest dynamics (stand structure, species richness and diversity, etc.). Students will contemplate: What patterns of establishment of Ponderosa pines might we expect to find in the post-burn sites of Waldo Canyon? How have the assumed pre-burn conditions changed in the post-burn landscape under which this species establishes? Are necessary plant species for butterfly survival (namely the disappearing Apollo (*Parnassius*) and Nymph (*Cercyonis*) butterflies, once commonly seen in the Rocky Mountains), more likely to be found in the unburned landscape?

Questions we hope to answer:

What differences can we see among different burn sites in Waldo Canyon? Which sites seem more favorable to Ponderosa pine recovery? Why? Which sites offer favorable butterfly habitat? Why? What predictions and recommendations can we make about the future of these forests based on this study? Students will address these questions

using preliminary findings from summer 2023 research. Preliminary research results will be used for further investigation during year two of the project.

This position begins Block 6 2023 and ends Spring 2024.

How to apply:

Please visit Handshake during Block 4 W3 to apply to this position.

Deadline to apply FEBRUARY 1, 2023 11:59 PM

Required application materials:

resume; cover letter; relevant coursework.

TIMELINE

Spring 2023

Begin literature review: natural history and ecology of Colorado Rocky Mountain montane forests and butterflies.

Field reconnaissance: Aiken and Waldo Canyons, Rocky Mountain National Park, RMBL

Visit CSU Natural History Museum: butterfly research

Gather extant GIS coverages; aerial and remotely-sensed data.

Develop hypothesis(es) and sampling scheme

Identify field sites using GIS information, drone data, and ground-truthing

Connect with Colorado Springs city officials, utilities, and fire departments

9 weeks Blocks 6-8 (5-10) hours per week

Summer 2023

Identify field sites and lay field transects

Field data collection

GIS development

Field data input

Field trip to Gothic, CO Rocky Mountain Biological Lab

This is a 10-week summer internship. Start date: June 5-Aug 10, 2023 (appx dates).

10-week summer intern * 37 hours per week

Fall 2023

Continue field data input and begin statistical analysis

Complete GIS coverages and begin analyses

Present work on student-led project in SCoRE conference October 2023.

9 weeks Blocks 1-3 (5-10) hours per week)

Spring 2024

Present work on student-led project in SCoRE conference October 2024.

Write paper. Present work in State of the Rockies Conservation in the West + conservation colleagues annual meeting (November 2024).

9 weeks Blocks 5-7 (5-10) hours per week)

Preferred Qualifications:

- Adventurous spirit
- Natural sciences (e.g., biology; ecology) coursework
- ArcGIS basic skills (Matt Cooney's ArcGIS Half-block class—ideal qualification)
- Excellent written and verbal communication; strong work ethic; ability to work on a team and independently
- Statistics - R Laba
- Interest in finding balance between human activity and the impact of human activity on the environment

Essential Duties: Field data collection and data analysis

Learning Competencies:

- Work Ethic
- Time Management
- Work Quality
- Initiative
- Technical Knowledge
- Problem-Solving
- Analysis
- Ethical Behavior
- Appreciation of Diversity
- Communication Skills
- Teamwork

For more information visit stateoftherockies.com or contact Cyndy Hines chines@coloradocollege.edu