

State of the Rockies Student Assistant Research Ecologist

All majors welcome. \$14.42 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.

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:

You will be helping to continue this study during the Phase II research period beginning block 6 2024 through block 6 2025.

Waldo Canyon upland montane Ponderosa pine forests 20 years later...

This is a year-long student employment position beginning spring of 2024 through spring of 2025. During Blocks 6-8 2024, 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).

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 2023-2024 research. Preliminary research results will be used for further investigation during year two of the project.

This position begins Block 6 2024 and ends Spring 2025.

How to apply:

Please visit Handshake during Block 5 to apply to this position.

Deadline to apply FEBRUARY 8, 2024 11:59 PM

Required application materials:

resume; cover letter; relevant coursework.

Essential Duties: Field data collection and data analysis

TIMELINE

Spring 2024

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

Field reconnaissance: Waldo Canyon, Aiken Reserve, 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 2024

Identify field sites in Burn Day 2 and lay field transects

Field data collection

GIS development

Field data input

Field trip to Gothic, CO Rocky Mountain Biological Lab and or CSU Gillette Museum

This is an 8-week summer internship. Start date: June 5-Aug 10, 2023 (appx dates).

8-week summer intern * 37 hours per week

Fall 2024

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 2025

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 Lab
- Interest in finding balance between human activity and the impact of human activity on the environment

Learning Competencies:

1) Work Ethic

- a. Consistently works energetically to accomplish tasks
- b. Takes responsibility for work that needs to get done
- c. Does the best job possible in all situations
- e. Does not carry out non-work activities during work

2) Time Management

- a. Uses time effectively while at work for maximum productivity
- b. Consistently meets all work deadlines unless unanticipated and unavoidable interruptions arise
- c. Takes on additional tasks and fits them into schedule when necessary

3) Work Quality

- a. Organize work/duties efficiently and effectively
- b. Prioritizes tasks appropriately
- c. Carries out work accurately
- d. Attention to detail
- e. Completes work on or ahead of schedule
- f. Responds to specific inquiries/requests in a timely manner

4) Professionalism/Customer Service

- a. Dress/presentation is appropriate to work position
- b. Arrives punctually for work and remain for entire scheduled time
- c. Does not miss scheduled work except in emergency circumstances
- d. Interacts professionally and courteously with supervisor (as relevant) and others

- e. Speaks with tact, composure, and diplomacy in all circumstances
- f. Monitors own performance and actively seeks feedback for improvement
- g. Supports others in behaving professionally
- h. Reliability is demonstrated with by showing commitment to work schedules and the needs of the department through consistent attendance

5) Initiative

- a. Works independently on tasks, problem-solving
- b. Asks for clarification or further information where necessary
- b. Resolves issues or potential issues proactively
- c. Acts resourcefully to accomplish job when supervisor is not available
- d. Continually learns new skills and information where relevant
- e. Uses mistakes to further own knowledge and competence

6) Technical Knowledge

- a. Uses general computer skills necessary to complete tasks
- b. Uses specific computer software (Excel, etc.) necessary to complete tasks
- c. Uses technical skills other than those related to computers (photocopying, etc) to complete tasks
- d. Uses technical academic knowledge (e.g. statistics) to complete tasks
- c. Learns and understands new programs and/or technologies to successfully accomplish assigned work duties

7) Problem-Solving

- a. Articulates nature of problem that needs to be solved
- b. Describes information/tools needed/available to solve problems
- c. Solves straightforward problems by working through them
- d. Solves challenging/ill-defined problems by applying sound reasoning,

critical thinking, creativity, analysis, etc.

e. Obtains, uses, and interprets facts and other information to solve problems

d. Follows established policies, procedures, and practices

8) Analysis

a. Reasons through complicated situations with incomplete information

b. Breaks problems or situations down into constituent parts

c. Explains how different parts related to each other

d. Draws implications from analysis

9) Ethical Behavior

a. Makes decision based on ethical standards rather than bias or potential gain

b. Takes action based on ethical standards rather than bias or potential gain

c. Articulates and exemplifies the core values of CC (honor, respect, and integrity) and is able to explain how they affect their position

d. Explains implications of CC core values (honor, respect, integrity) for work position and responsibilities

e. Conscientiously avoids conflicts between personal/private interests and CC responsibilities, including (but not limited to) confidential information, financial transactions, and personal relationships

10) Appreciation of Diversity

a. Listens to different perspective non-defensively and without anxiety

b. Learns from people of different backgrounds or perspectives

c. Works productively with people from different backgrounds, or with difference perspectives

d. Forges professional relationships with people of different backgrounds

or perspectives

For more information visit stateoftherockies.com or contact Cyndy Hines
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