

BUDGET JUSTIFICATION

Itemize Budget

I. Travel

Research Expedition I: June 15–June 25, 2020

Airfare: Roundtrip for Heeter and 2 field assistants

From Spokane, WA to Denver, CO economy tickets @ \$257/person770.00

Vehicle rental for research team: 10 days @ \$420/week.....600.00

Fuel380.00

Equipment and sample shipping.....350.00

Lodging: Camping 10 nights @\$15/night.....150.00

Food: 3 people for 10 days @ \$75.00/day (\$25/day for each person)750.00

Research Expedition II: July 1–July 10, 2021

Vehicle rental for Heeter and 2 field assistants: 10 days @ \$420/week.....600.00

Fuel.....500.00

Lodging: Camping 10 nights @\$15/night.....150.00

Food: 3 people for 10 days @ \$75.00/day (\$25/day for each person)750.00

Travel to Professional Conferences

2020 Annual Meeting of the Association of American Geographers, Denver, CO1000.00

2021 Annual Meeting of the Association of American Geographers,
Seattle, WA500.00

Total Travel\$6,500.00

II. Supplies

Haglof 3-Thread 28 inch complete increment borer 2 @ \$895.001790.00

Stihl MS 461 (18" bar) chain saw 1 @ \$1000.001000.00

Chainsaw PPE 2@ \$120.00.....240.00

True North chainsaw pack 1@ \$220.00.....220.00

1500 linear ft. wooden core mounts.....524.00

"Rite in the Rain" field notebooks 4 @ \$14.5058.00

900 count paper Artstraws 2 boxes @\$50.00.....100.00

Micro-grit (2000, 3000, 5000) sand paper 4 packs @17.00.....68.00

Total Supplies\$4,000.00

III. Publication Costs

Printing page cost associated with select journal(s)1500.00

Total Publication Costs ...\$1,500.00

IV. Indirect Costs (F&A): 47.5%.....\$5,700.00

TOTAL REQUESTED FUNDS\$17,700.00

Budget Narrative

This doctoral dissertation derives from initial work funded by internal funding contract from the University of Idaho to Dr. Grant Harley, and funding contract between the USFS Dixie and Fishlake National Forests and Dr. Grant Harley, which funded fieldwork in New Mexico, Utah, and Wyoming from summer of 2018 to summer of 2019. Analyses by Karen Heeter of Engelmann spruce samples collected on these previous field trips provide evidence that mid-latitude Engelmann spruce in the interior west US

exhibits substantial temperature sensitivity throughout the interior western US, making dissertation research resulting in multi-millennial temperature reconstructions for the entire region possible. The NSF grant has funding to provide support for additional field sampling in Wyoming in the summer of 2020, if necessary. The USFS contract includes support to pay undergraduate assistants who will work under Karen Heeter's supervision to help sand and prepare cross sections and increment cores from this project. However, the contract does not include funds for the additional field outside of Dixie and Fishlake National Forests in southern Utah that are required to complete the research objectives. We seek support through this Doctoral Dissertation Research Improvement grant for further fieldwork, limited laboratory supplies, and travel by Heeter to professional meetings to present the results of this research.

I. Travel

Funds requested for this dissertation research will allow for 20 days of fieldwork in Idaho, Montana, and Colorado. Fieldwork will be conducted as two, 10-day expeditions (summer 2020 and summer 2021). Karen Heeter is already familiar with the study area from the summer 2019 research expedition, and with two field assistants, she can collect the data (cross-sections and cores) required to complete this dissertation research. Vehicle rental, fuel (for rental vehicle and chainsaws), and food were calculated based on the actual cost of these items during the summer 2019 research expedition.

The itemized budget presented in this proposal includes a cost-efficient plan for needed assistance with research expenses. We budgeted for two undergraduate and/or graduate students to assist Heeter on each field expedition. A team of three individuals will be highly efficient at collecting remnant cross-sections and increment cores. When possible, we will bring different assistants from underrepresented groups on each expedition to maximize the number of motivated students who benefit from receiving research fieldwork training. Requested funds for travel expenses between Spokane, Washington and Denver, Colorado include round-trip airfare for Karen Heeter and two field assistants. Air travel will shorten the overall travel time and maximize the amount of time spent in the field for data collection. We also budgeted funds to ship field equipment (*e.g.* chainsaws, increment borers) to and from the study area and samples (*e.g.* fire-scarred cross sections and increment cores) from the study area to the University of Idaho. All samples will be shipped via FedEx Ground, the most cost-efficient method.

All study sites are easily accessible by foot from a road or established hiking trail. Karen Heeter and field assistants will either legally disperse camp or camp at a Forest Service paid campground while doing fieldwork. The travel budget also provides funds to cover most of the costs to attend academic conferences. Karen Heeter will present results from this project at the 2020 and 2021 annual meetings of the Association of American Geographers.

II. Supplies

The requested field equipment are items necessary for the collection of data required by this study. The increment borers, chain saws, and PPE will be used in many other dendrochronology projects by the ITRL. The increment borers will also be used in outreach activities associated with the University of Idaho's K-12 STEM Outreach program.