

## IDAHOVIEW 2023 - 2024 ACTIVITIES

Thermal refugia in streams are essential for the survival of coldwater fish species such as Redband trout (*Oncorhynchus mykiss*). Heterogeneity in stream temperature is caused by changes in daytime warming and cooling effects from cliff walls and riparian vegetation, and changes over the season from variations in sun angle. Thermal models have the potential to demonstrate how stream temperature changes spatially throughout the day and over time. In the late summer of 2022 we surveyed a 500 m reach of Little Jacks Creek, Idaho once an hour for 24 hours using an uncrewed aerial system (UAS) with a thermal infrared (TIR) sensor and in-stream water temperature loggers to capture hourly thermal spatial heterogeneity (Figure 1).

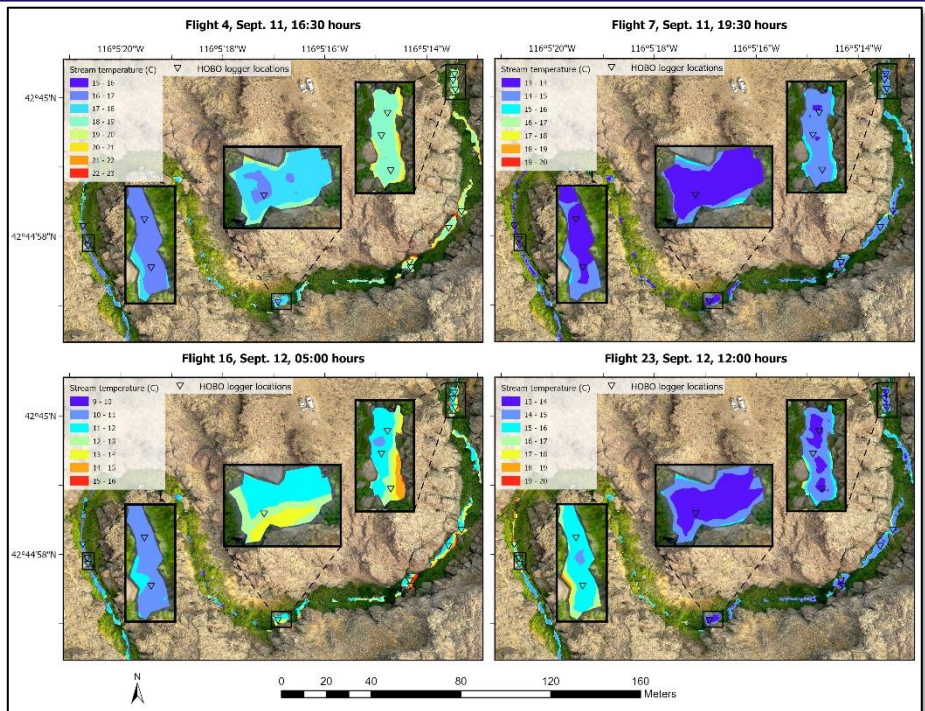


Figure 1. Diel stream temperatures along Little Jacks Creek, Idaho



Figure 2. Little Jacks Canyon, Idaho.

In 2023, we conducted remote sensing analysis and prepared a journal manuscript on the findings from our data to highlight the diel variation in both stream temperature and TIR sensor accuracy in this desert stream environment (Figure 2). This study revealed specific patterns in TIR sensor accuracy that were dependent on the time of the flight. These findings will enhance future efforts in conserving cold water organisms that rely on cold water refuges. In addition to supporting student research in remote sensing, this project is in alignment with NLRSEORA Objective 4 (Advance Education and Training, Technology Transfer, and Outreach) goals. This applied research project included both underrepresented graduate and undergraduate students in data collection, analysis of UAS data, and advanced modeling.



## BENEFITS TO IDAHO

### Engaging Students in STEM Activities for Workforce Development

It is vital to Idaho's economy to educate a qualified workforce in Science, Technology, Engineering, and Mathematics (STEM) professions. Industries that require STEM are expected to increase in Idaho and across the nation. IdahoView actively engages graduate and undergraduate students in field data collection and the hands-on use of advanced sensors to address issues that impact Idaho's natural resources to aid decision making. Both undergraduate and graduate students are encouraged to participate in the research and communication of results to stakeholders through one-on-one interactions, posters, and oral presentations.



*Agriculture is an important contributor to Idaho's economy. We work to help growers with remote sensing to detect crop threats.*

IdahoView actively works with local growers to assist in using remotely sensed data to identify crop threats and monitor crop health through the growing season. Several student-led projects using Landsat and Sentinel satellite imagery are helping to monitor crop vigor by providing information to growers to improve variable rate fertilization practices. Preliminary trials are underway to link vegetation indices with yield data shared by local farmers in southeast Idaho.



*Undergraduate research for Landslide Hazard Mapping. GPS Data collection along Idaho Transportation Corridors.*

## IDAHOVIEW CONSORTIUM MEMBERSHIP



**Idaho State  
University**



**BOISE STATE  
UNIVERSITY**



**University of Idaho**

IdahoView works with public and private sector partners to:

- Promote the development of novel tools and techniques to translate remotely sensed data into information that is meaningful to decision-makers
- Use remote sensing to promote STEM interest and learning
- Expand work force development opportunities in remote sensing across all higher education institutions in Idaho
- Advance remote sensing literacy through workshops and extension
- Encourage the use and scientific application of remotely sensed data from advanced sensors
- Provide opportunities for graduate and undergraduate research experiences in remote sensing

*Federal consortium members do not receive funding from AmericaView.*

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