



PROJECT OVERVIEW

The overarching goal of the RII Track-1: Harnessing the Data Revolution for Fire Science (HDRFS) project is to increase the capacity of Nevada for wildland fire research, education, and workforce development and to demonstrate this increased capacity through technology-enhanced fire science in the regionally important sagebrush ecosystem.

This project addresses Grand Challenges by the National Science and Technology Council for reducing and mitigating wildland fire-related disasters in the western U.S. due to changes in wildfire regimes and increased wildfire potential (WFP). Nevada and its neighboring states have the highest WFP in the nation. This project will fill knowledge gaps about fire processes and their effects on smoke emission, ecology, and hydrology in the sagebrush ecosystem of the intermountain west.

HDRFS MISSION STATEMENT: THE HDRFS PROJECT MISSION IS TO INCREASE THE CAPACITY AND EXCELLENCE IN NEVADA FOR WILDLAND FIRE RESEARCH, RESEARCH INFRASTRUCTURE PLANNING AND COORDINATION, EDUCATION, AND WORKFORCE DEVELOPMENT AND TO DEMONSTRATE THIS THROUGH TEAM SCIENCE IN THE REGIONALLY IMPORTANT SAGEBRUSH ECOSYSTEM.

These fire science areas will be supported by Education/Workforce Development, creating end-to-end pipelines for research and STEM advancements. HDRFS has an integrated approach through the common topics of scaling of wildland fire processes and effects, joint prescribed burn experiments, and common data-focused technology platforms.

This project will develop infrastructure and build capacity for the characterization of pre- and post-fire ecosystem carbon and water fluxes, fire processes and emissions, and for Computer Vision / Machine Learning (CV/ML) analysis including data fusion and products.

HDRFS deeply integrates with Nevada education and workforce development via educational activities, mentorship, and other efforts in the Nevada System of Higher Education (NSHE) to grow a nimble and diverse STEM workforce.

The project draws on strengths of data and wildland fire science through a series of focused activities to train teachers and students. The proposed research and educational activities will advance Nevada STEM capacity and all major components of this proposal are focus or priority areas of the [Nevada Science and Technology Plan](#).

BROADER IMPACTS

HDRFS will help Western U.S. communities to reduce wildland fires impacts related to human smoke exposure and safety, ecosystem services (e.g., water supplies and recreational opportunities), and wildland and fire management. Integrated educational activities will:

- ✓ Advance the abilities of pre-service and in-service NV educators to teach basic systems modeling through fire science to students with standards-based materials;
- ✓ Increase access to STEM research for NV PUI students through data analytics scholarships followed by three-month project internships;
- ✓ Broaden STEM research participation through proposal-writing workshops for applicants for Undergraduate Research Opportunity Program scholarships (UROPs).

Recruiting underrepresented students, postdocs, and faculty, and establishing new educational programs, will build a larger, more diverse NV STEM workforce.