Title: Linking Pre-fire Fuel Characteristics with Observed Fire Intensity and Severity During the 2023 Practice Burns in an Arid Shrub Ecosystem

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A major objective of the "Harnessing the Data Revolution for Fire Science" (HDRFS) project is determining how variability in pre-fire fuels influences wildfire severity and post-fire processes in the Great Basin sagebrush ecosystem, which will be determined experimentally by burning plots that span a fuels gradient (from mostly herbaceous to mostly shrub fuels) at the Red Rock Road study site. In spring 2023, we conducted practice burns at the University of Nevada Reno farm to determine 1) potential differences in flammability between shrub and herbaceous fuels, and 2) whether pre-fire shrub fuel characteristics (volume, percent live/dead biomass, or fuel moisture content) are associated with observed fire intensity and severity. We burned two plots within burn barrels (12 m^2) that differed in pre-fire fuel composition. At one plot, shrubs comprised most of the pre-fire fuels, which had larger volumes and a greater proportion of standing dead biomass, ignited readily, burned at high intensity, and were almost entirely consumed by fire. At the other plot, pre-fire fuels were comprised of a mix of shrubs, herbs, and grasses. There, shrubs had smaller volumes and a greater proportion of live biomass, but still ignited readily and were almost entirely burned. Herbaceous fuels burned but minimally. Our results provide an early proof of concept for the HDRFS experimental design. Shrub fuels were more flammable than herbaceous fuels, at least in late spring, and burned at high intensity and severity, likely related to shrub volume and proportion of standing dead biomass. This suggests that future experimental burns may be particularly intense and severe in plots dominated by shrubs, with implications for fire-induced soil hydrophobicity and plant community recovery. However, differences in the timing of practice and experimental burns (the latter are planned for late summer 2024), as well as herbaceous fuel curing, may complicate these expectations.