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The objective of this proposal is to determine whether water quality and soil chemistry are impacted by prescribed burning in a shortleaf pine restoration area. The Upper West Gulf Coastal Plain was historically maintained with wildfire but now requires human intervention. Prescribed burning is an important management practice for fire-adapted species like shortleaf pine (Pinus echinata) in areas that are unnaturally dominated by loblolly pine (Pinus taeda). Prescribed burns promote growth of understory vegetation that support important forest insects like pollinators and decomposers. Decomposition is essential for providing nutrients to support plant growth, but the effects of burning on decomposition is lacking. Thus, prescribed burning in shortleaf pine forest ecosystems can support increased biodiversity. However, burning can also increase erosion rates that can increase sediments, nutrients, and other types of pollutants leaching into streams. These depositions have the potential to either reduce water quality or provide beneficial nutrient subsidies for aquatic ecosystems. We will test the hypothesis that prescribed burning impacts stream quality, soil chemistry and leaf litter decomposition rates on Wafer Creek Ranch, Louisiana. We predict increased carbon and other nutrients in streams following fires that may impact streams both on the short- and long-term. We also predict leaf litter decomposition rates immediately after this prescribed burn will be lower in burned than unburned areas, but will be greater on burned areas in the long-term as burning typically increases soil nutrients. To determine how burning in a short leaf pine restoration forest impacts belowground processes and stream quality, we measured decomposition, soil and stream nutrients, stream flow, and stream conductivity in Wafer Creek Ranch on areas of 1) Shortleaf Pine Restoration + Burn and 2) No restoration (e.g., Loblolly Pine) without Burn by measuring these processes pre-burn and immediately after. From preliminary samples of decomposition rates in filter paper, we saw an average mass loss of 23.21% in no restoration areas and 12.80% in restored areas. For the future of this research, stream invertebrates and terrestrial invertebrates will be sorted and identified to further understand the ecological implications of a prescribed burn. This research will help inform management strategies of shortleaf pine restoration projects in the ecoregion that are transforming agriculturally damaged and fire suppressed lands to their native vegetative species composition.