INTRODUCTION
ADDRESSING NATIONAL CONCERNS WITH NOVEL TECHNOLOGIES.

- 200 million acres of land face the risk of catastrophic wildfire.
- Climate change threatens forested and agricultural ecosystems.
- Increasing water stress and increasingly acidic soils limit plant growth.
- Few strategies efficiently use low-value timber from wildfire risk reduction.
- Biochar has the potential to improve agricultural soils. Currently, a limited supply of biochar restricts the ability of growers to apply biochar to agricultural lands just as the limited demand for forest harvest residues restricts the ability of foresters to fund restoration projects. Does a forest-origin biochar strategy pair these reciprocal needs?
- This study jointly optimizes wildfire hazard reduction treatments, biochar facility locations, and agricultural field applications to promote forest restoration, forest-related employment, increased agricultural competitiveness, and carbon sequestration.

QUESTION AND APPROACH
QUESTION: DOES THE PRODUCTION OF BIOCHAR EFFICIENTLY OFFSET THE COST OF REDUCING WILDFIRE HAZARD, SEQUESTER FOREST-ORIGIN CARBON, AND INCREASE AGRICULTURAL PRODUCTIVITY?
OVERALL APPROACH: ENLIST AN INTERDISCIPLINARY TEAM OF FOREST AND AGRICULTURAL SCIENTISTS, FORM PARTNERSHIPS WITH INDUSTRY, AND DEVELOP USEFUL MODELS.

- A2. Evaluate the physical properties of forest-origin biochar and its function as a soil amendment.
- A3. Optimize fire hazard reduction in the context of biochar production.
- A4. Identify long-term carbon consequences of an optimized forest-to-field biochar production chain.

FOREST AND BIOMASS RESEARCH
METHODS AND CONTRIBUTIONS
A1, A3, and A4

- Conduct a shift level productivity study using emerging steep slope harvesting technology to develop a harvest cost model.
- Refine previous models that identify optimal wildfire risk reduction treatments.
- Develop and modify silvicultural prescriptions across landscapes.
- Use previously developed decision support models to optimize transport from forest to plant, and plant to field.
- Establish costs for building and operating the biochar production facility.

AGRICULTURAL / CARBON RESEARCH
A2 and A4

- Provide in-depth description forest-origin biochar.
- Pair biochar properties with agricultural soils to optimize the effect of biochar application.
- Greenhouse and laboratory analysis to determine if biochar amendments mitigate the effects of drought.
- Determine ability of biochar to sequester carbon.

OUTREACH

- A biochar supply chain decision support model that determines if production of forest-origin biochar provides a win-win-win scenario for wildfire risk reduction, biomass utilization, agricultural productivity, and carbon sequestration.
- A description of biochar properties.
- A collection and transportation model for treating stands on steep slopes using state-of-the-art harvest and transport technologies.
- A landscape-level hazard reduction assignment model, including a carbon accounting framework.