



United States Department of Agriculture  
**Forest Service**  
Research & Development  
Southern Research Station  
Science Update SRS-69

# Forest Operations Research

The mission of our unit is to provide the science and technology necessary for economically and ecologically viable forest operations for sustainable forest management.



**RESEARCH WORK UNIT 4763**

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# FOREST OPERATIONS RESEARCH



Forest management and forest operations are vital components in managing our changing forest landscape. Both require systems that operate effectively and facilitate progress toward the desired future condition of forested land. Our unit takes an integrated multidisciplinary approach to provide land managers with the science-based tools that consider the wide array of values that today's forests are expected to supply.

Forest operations are the physical actions that change the forest by altering its structure, composition, or condition to meet society's needs for clean air and water, forest products, wildlife, recreation, and other values. The unit's research addresses the following critical needs in three problem areas:

## Forest Operations Technology



**As the critical connection between forest management plans and desired future condition, forest operations consider the multiple array of demands placed on today's forests.** Research in this area addresses improvement of forest operations technology through productivity studies on machine and system performance; examination of physical workload, safety issues, design of work tasks, training, and decision-making; and development of new technology in biomass recovery, treating invasive species, enhancing carbon sequestration, addressing wildland-urban interface needs, and assessing net energy consumption.

## Ecological Effects of Forest Operations



**One of the primary goals in forest management on all forest land holdings is sustainably meeting demands placed on the forest resource.** Research in this area focuses on long-term implications of forest operations on soil compaction, hydraulic properties, nutrient cycling and depletion, microbial communities, and carbon flow; seeks understanding and predicting implications of forest operations on hydrologic processes and water resources; and examines the effectiveness of best management practices, innovative road- and stream-crossing designs, and soil-erosion mitigation measures.

## Forest Operations Management Systems



**The organization and management of forest operations can have an effect on system performance, productivity, and costs.** Research in this area focuses on developing models and tools to improve forest decision-making and estimate operational outcomes in the planning stages; and on improving business management by evaluating project and bid estimates, forest contractor business structures, workforce development, tax effects, and financial assessments.

PHOTOGRAPHS TOP TO BOTTOM: Residue pile from clean chipping—J.W. Sprinkle • Harvesting poplar in Oregon—J.W. Sprinkle  
Evaluating machine-soil interactions—J.W. Sprinkle • Road stormwater sampling station—U.S. Forest Service photo  
PHOTOGRAPH, FRONT: Investigating pinyon pine and juniper harvesting technologies for potential biomass use—J.W. Sprinkle