Thresholds of Disturbance: Land Management Effects on Vegetation and Nitrogen Dynamics

SERDP Strategic Environmental Research and Development Program
Improving Mission Readiness Through Environmental Research

ERDP's SEMP Ecosystem Management Project

Background:

Current land use for military training at Ft. Benning ranges from light disturbance by foot and occasional light vehicle traffic to heavy disturbance by repeated armored vehicle traffic. Upland mixed pine/hardwood forests are thinned and periodically burned to promote longleaf pine (*Pinus palustris*) savanna for the endangered red-cockaded woodpecker (*Picoides borealis*). At some combination of intensity and frequency, disturbances due to these land uses may no longer be sustainable. The ecosystem may lose nutrients or fail to regenerate desirable species. Identification of the thresholds beyond which ecosystems cannot sustain a disturbance can guide land management practices.

Objective:

The broad objective of our research is to evaluate the combined ecological effects of military training and forestry practices at Fort Benning, to determine if there are thresholds beyond which upland ecosystems cannot sustain the combined effects of forest management and military traffic disturbances.

Approach:

We are using a comparative, experimental approach in which sites in military training compartments open to tracked vehicles and those not open to tracked vehicles, and on clayey and sandy soils, are subjected to different forest management scenarios (burned on 2 yr cycle, burned on 4 yr cycle, thinned, unthinned).

Results to Date:

Greater soil A horizon depth in sandy and clayey sites in compartments open to dismounted infantry training suggests these sites have had lighter land use than sites in compartments open to tracked vehicles. We are monitoring forest floor carbon and nitrogen to estimate nutrient flux from recently burned (2002) and unburned sites. Loss of forest floor organic layer biomass in burned sites was comparable to that for southeastern pine/mixed-pine stands with light-moderate intensity burns.

Benefit:

Our comparative, experimental approach will reveal ecological effects of military and forest management disturbances, and identify thresholds beyond which these disturbances are not sustainable. This information can guide management decisions to promote site-appropriate vegetation species diversity, composition, and dynamics. Our research will facilitate adaptive management to improve sustainability of upland ecosystems while supporting military and forest management goals.

For more information, visit the SEMP website
http://www.denix.osd.mil/SEMP

Contact information:

Dr. Beverly S. Collins, Project Manager
Savannah River Ecology Laboratory
Phone: (803) 725-8158
Fax: (803) 725-3309
E-mail: collins@srel.edu

The University of Georgia
Savannah River Ecology Laboratory

Dr. Harold Balbach, SEMP Program Manager
U.S. Army Engineer Research and Development Center
Phone: (217) 373-6785
Fax: (217) 373-7266
E-mail: h-balbach@cecer.army.mil

US Army Corps of Engineers

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CS-1114E-00
REV 08/01/02