

# Protect and Enhance the Nation's Natural Resource Base and Environment

## Provide science-based knowledge and education to improve the management of forest and rangeland

*KA 121/122, Response of a Missouri River breaks riparian ecosystem to prescribed fire, CRIS #[0192395](#)*

### **PROGRESS:** 2005/01 TO 2005/12

2005: Continued monitoring at the Armells Creek Prescribed Fire Demonstration site indicated the following. a) Shallow groundwater levels in 50% of the burned drainages continued to exceed those in the unburned drainages. b) There did not appear to be a related response in total vegetative cover; changes from pre-burn (2001) to 2005 were not different ( $P > 0.05$ ). c) However, there were significant differences ( $P < 0.05$ ) in relative abundance of wetland indicator species (*Juncus balticus* and *Carex praegracilis*) following the prescribed fire. d) Wetland indicator species made up a higher proportion of the total riparian vegetative community in the drainages with elevated groundwater levels. Similar changes were not measured in the unburned or heavily grazed drainages.

### **IMPACT:** 2005/01 TO 2005/12

Information from 2002 through 2005 has been incorporated into Central Montana Fire Zone fire prescription guidelines. Results have also been used to acquire additional funding support for a second project near Whitehall, Montana. The new project addresses supplementation of stream flows for trout habitat and irrigation flow with prescribed fire in the watershed.

## Provide science-based knowledge and education to improve the management of soil, air, and water resources to support production and enhance the environment

*KA 133/723, Hazardous substances, safeguard human and environmental health (security of people's safety and health and rapid responses to terrorist threats), CRIS #[0194236](#)*

### **PROGRESS:** 2004/10 TO 2005/09

Analytical procedures and mitigation technologies are important tools for emergency responses to intentional threatening, risk evaluation, and hazard mitigation and remediation. We have developed new extraction and analysis procedures of explosives, pesticides and persistent organic pollutants. We have also employed those procedures for various environmental monitoring applications. We have studied various remediation technologies, which include microbial degradation, zero-valent iron reduction and photolysis. The mechanisms by which oxidative enzymes may degrade chemicals have been extensively investigated. We continue to collaborate with HEER (Office of Hazard Evaluation and Emergency Response) personnel on emergency responses to cases that have occurred during the report period, including cases where possible weapons of mass destruction were suspected. A total of 157 samples were analyzed within the reporting period. We have improved the training course titled "All Hazards Field Sampling and Categorization". A workshop (January 25-26, 2005) was conducted to train 30 personnel from Fire Department Hazardous Material Units in Maui on responses to a situation where chemical and biological weapons of mass destruction are suspected. The production of the training video is in progress with incorporation of hands-on exercises filmed in Hilo. We participated in the removal of the Hilo Burrito chemical contaminated site in Hilo, Hawaii.

### **IMPACT:** 2004/10 TO 2005/09

New methods have been developed for rapid extraction and measurement of toxic chemicals in various matrices, and are useful for emergency responses, risk assessment and responses to threats. In addition to further understanding of bioremediation mechanisms, new abiotic and biotic mitigation technologies were developed for cleanup of contaminated sites. A workshop was conducted to train 30 personnel from Fire Department Hazardous Material Units in Maui on responses to a situation where chemical and biological weapons of mass destruction are suspected.