



**US Army Corps
of Engineers®**
Engineer Research and
Development Center

Environmental Remediation Processes

Problem Procedures and protocols are needed to remediate environmental contamination and to sustain use of military and public lands subject to changing weather conditions. Training impacts that include invasive weeds, aerosols, endangered species, and distributed contaminants limit current and future use of live-fire and maneuver ranges. To better remediate contaminated ranges and public lands, ERDC researchers are developing fundamental understanding of soil microbial interactions and processes. To establish and maintain protective vegetative cover on these lands, ERDC researchers are answering questions outside the scope of conventional agricultural processes, especially where sustainable, low-cost, low-maintenance land use is important.

Description To address the remediation of cold or surface soils, ERDC researchers are coupling soil microbial processes to remotely sensed or predicted soil conditions, and coupling soil conditions and biochemistry to emerging biomimetic sensor response. To address vegetation problems on military lands, ERDC researchers are improving methods for plant selection and use, for establishing native plants with fewer chemicals, and for restoring environments to support a sustainable Army with a reduced environmental footprint.



ERDC researchers are improving methods for plant selection and use to address vegetation problems on military lands.

Expected Products Soil biochemical products include guidance for science-based, low-cost rhizosphere remediation implementation and monitoring, and understanding of humification of explosives residues using natural soil–plant–microbe–soil carbon cycles. Additional advances include new understanding of biofilm dynamics based on biopolymer production and extracellular enzyme synthesis under dynamic soil conditions and of biomimetic sensors in non-ideal surface soil conditions, such as low water potential.

Products promoting sustainability of ranges include several new native and introduced plant germplasms, the ecological-bridge seeding method for establishment of natives, and a Planting Guide for seeding and restoring military lands in the intermountain west. Also in the works are protocols for understanding humic acids for improved native plant establishment, and plant selection criteria for reduced metal uptake.

Potential Users

Primary users are military land managers and other federal land managers who want low-cost methods to remediate ranges and establish native plants.

Projected Benefits

This research will bring low-cost “green” remediation and accepted monitoring methods, along with new plant germplasms and improved seeding methods, to widespread use on Department of Defense and other federal lands. Transfer of results to installations already has demonstrated 25% cost savings for revegetation at Fort Drum, New York, and expected savings of 20% on reseeded costs for western United States.

Program Managers

Dr. C. Michael Reynolds
603-646-4394
E-mail: Charles.M.Reynolds@usace.army.mil

Antonio J. Palazzo
603-646-4374
E-mail: Antonio.J.Palazzo@usace.army.mil

**Participating ERDC
Laboratories**

U.S. Army Cold Regions Research and Engineering Laboratory
72 Lyme Road
Hanover, New Hampshire 03755-1290
603-646-4100
<http://www.crrel.usace.army.mil/>

U.S. Army Construction Engineering Research Laboratory
2902 Newmark Drive
Champaign, Illinois 61826-9005
217-373-6714
<http://www.cecer.army.mil/>

U.S. Army Environmental Laboratory
3909 Halls Ferry Road
Vicksburg, Mississippi 39180-6199
601-634-2505
<http://el.ercd.usace.army.mil/>

U.S. Army Topographic Engineering Center
7701 Telegraph Road
Alexandria, Virginia 22315-3864
703-428-6655
<http://www.tec.army.mil>