



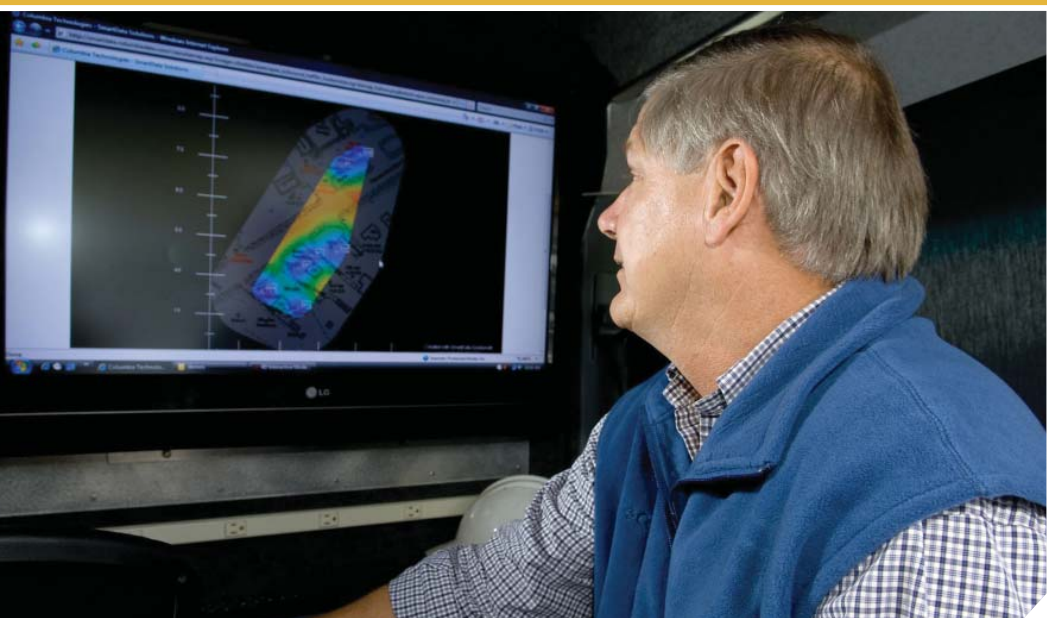
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Science Solutions to Restore and Protect Our NATION'S LAND




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EPA scientists provide the tools and expertise to solve complex waste cleanup problems.

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The Land Research Program in EPA's Office of Research and Development (ORD) provides innovative science solutions with more efficient and cost effective approaches to preserve the nation's land, restore contaminated properties, and protect public health from exposure to environmental contaminants.

Preserving the Earth

EPA's Land Research Program is dedicated to preserving and restoring land that has been degraded by pollution. Hazardous waste contamination, polluted sediments in rivers, and contaminated groundwater all require the best available science to remediate and restore the environment and protect public health.

Research is providing the technology and information that contributes to more cost-effective and efficient ways to remove or contain pollutants from leaking underground storage tanks, oil spills, mining operations, and industrial operations. Despite the progress that has been made to remediate sites, many of the more complex cleanup problems remain, such as mining sites, treatment methods for contaminated ground water, and remediation of persistent chemicals in sediments. Scientists at EPA tackle the most difficult environmental challenges associated with these contaminated sites.

Science for Environmental Decisions

Cleaning up polluted land and water requires difficult environmental decisions and complex risk assessments. EPA researchers are partnering with other federal agencies, states, and communities to provide the science for environmental decision making. They are developing new technologies and processes for monitoring cleanup progress, improving techniques to identify the types of contaminants at a site, and developing sophisticated models to predict and evaluate what will happen under different waste-management scenarios.

EPA's Land Research Program is solving today's contamination problems using the latest science and technology. The Science Advisory Board, in an independent review, found the Land Research Program responsive to EPA's regulatory needs and noted its judicious use of leveraging opportunities. Another outside peer review by the Board of Scientific Counselors applauded the Land Research Program's plan for addressing the research needs of EPA's land protection and restoration programs, including Superfund.

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Success Stories

Tools to Estimate Sediment Contamination:

Risk managers frequently choose to dredge or remove sediments in rivers that have been contaminated by pollutants. Understanding the impact of post-dredging residuals is important to clean-up efforts. Developing a method for estimating the volume and contaminant concentration of post-dredging residuals is a high research priority for EPA's Superfund Program. A study on the Ashtabula River in Ohio is providing critical information about post-dredging residuals and advancing the development of an assessment tool.

Database to Assess PCB Risk:

The Land Research Program completed an important database that provides new tools for assessing the risks of persistent organic pollutants known as PCBs in soil or water. The PCB Residue Effects (PCBRes) Database assists scientists and risk assessors in connecting PCB and dioxin-like residues with toxic effects. The purpose is to identify levels of PCB residues that may harm fish, mammals, and birds.

Cleanup Technology to Protect Groundwater:

Over the past decade, permeable reactive barrier (PRB) technology has expanded rapidly as a cost effective approach for remediating contaminated property and groundwater. EPA scientists contributed significantly to its widespread use and acceptance by providing key technical support and research on PRBs at Superfund sites and other contaminated properties. The use of this new technology has resulted in cleanup cost savings in the millions.

Research to Clean Up Leaking Tanks:

Underground storage tanks that leak can contaminate groundwater and endanger the health of those who live or work near them. The innovative methods, models, and tools developed by EPA scientists have resulted in cost-effective and efficient cleanup solutions to this environmental problem.

Tools to Assess Vapor Intrusion:

Volatile chemicals in buried wastes and contaminated groundwater can emit vapors that may migrate through solid



subsurfaces and into buildings. This vapor intrusion can result in health risks to building occupants. EPA science is providing solutions to address vapor intrusion problems, and this research has been incorporated into state guidance for handling vapor intrusion.

Multimedia Models to Assess Risk:

The development of a multimedia modeling system (3MRA) by EPA directly addresses the complexities of today's environmental risk assessments. Using the model, researchers conducted a comparative risk reduction assessment of select chemicals identified for priority remediation, known as Waste Minimization Priority Chemicals (WMPCs). Decision makers can use this comparative risk reduction analysis to select a waste management plan that leads to the least risk to humans and the environment.

Landfill Technology to Reduce Costs:

EPA scientists have advanced the development of covers for landfills that are cheaper to install and have more environmental benefits than traditional covers. These "evapotranspiration covers" are expected to save millions of dollars in waste-management costs. EPA research and technology transfer on evapotranspiration covers has resulted in construction of covers at more than 35 landfills. As a result, cost savings ranged from \$20,000-100,000 per acre for 13 sites that reported figures in fiscal year 2006, with a combined cost savings of \$20-30 million per year, compared to a conventional, multi-layer cover. EPA also supported training on the use of the new covers.

LEARN MORE AT:

www.epa.gov/landscience

The Land Research Program collaborates with federal, regional, state, and tribal partners to develop methods and models to effectively remediate and restore contaminated sediments and groundwater at Superfund sites and other properties.

Technical Support Centers

EPA's Land Research Program provides scientific and technical support to regional project managers for remediating contaminated sites.

Research Areas:

- Contaminated Sediments
- Groundwater
- Site Characterization (mining, oil spills, and arsenic contamination)
- Leaking Underground Storage Tanks
- Nanotechnology Fate & Transport
- Brownfields and Land Revitalization
- Landfills
- Leach Testing for Material Reuse
- Asbestos

