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INFORMATION BULLETIN

SERDP Releases FY 2010 Solicitation Providing New Research Funding Opportunities

Workshops Identify High-Priority Science and Technology Needs

SERDP recently released its FY 2010 solicitation. The Core Solicitation included 14 Statements of Need (SON). In addition, three SONs were released under the SERDP Exploratory Development (SEED) Solicitation. A full list of SONs in each focus area is highlighted below. Pre-proposals responding to the FY 2010 Broad Agency Announcement (BAA) for the Core Solicitation are due January 8, 2009. Full proposals responding to the Federal Call for Proposals and requested full proposals responding to the BAA are due March 12, 2009. Proposals responding to the FY 2010 SEED Solicitation also are due on March 12. Visit www.serdp.org under the *Funding Opportunities* link for details.

One of several tools SERDP and ESTCP use to develop SONs are workshops that convene subject matter experts to identify research, development, test, and evaluation (RDT&E) needs. In 2008, SERDP and ESTCP sponsored workshops to address air quality management, particularly non-point emissions, and the bioavailability of contaminants in soils and sediments. With participation by renowned experts providing diverse viewpoints from the military Services, academia, and industry, these workshops examined the current state of the science and engineering, identified gaps in knowledge and technology, and prioritized those gaps against DoD needs to determine where investments in RDT&E could have the greatest impact on DoD's ability to address its environmental requirements. As illustrated by the FY 2010 SERDP solicitations, results of these and other recent workshops are guiding current and future investment decisions.

See WORKSHOPS, page 6

FY 2010 SERDP Statements of Need

Environmental Restoration
- Predictive Techniques for Assessment of the Environmental Impact of New Munition Compounds
- The Impact of Contaminant Storage in Low-Permeability Zones on Chlorinated Solvent Groundwater Plumes
- Mechanisms of Contaminant Interaction with Soil Components and Its Impact on the Bioavailability of Contaminants
- Improved Fundamental Understanding of Contaminant Bioavailability in Aquatic Sediments

Munitions Management
- Advanced Technologies for Detection, Discrimination, and Remediation of Military Munitions
- Improvements in the Detection and Remediation of Underwater Military Munitions
- (SEED) Advanced Technologies for Detection, Discrimination, and Remediation of Military Munitions on Land and Underwater

Sustainable Infrastructure
- Southwest Ecological Systems on Department of Defense Lands: Altered Fire Regimes and Non-Native Invasive Plants
- Managing and Restoring Southwest Intermittent and Ephemeral Stream Systems on Department of Defense Lands
- Fugitive Dust Emissions Due to Department of Defense Activities
- (SEED) Innovative Control/Eradication Approaches for the Brown Tree Snake (*Boiga irregularis*)

Weapons Systems and Platforms
- Scientific Understanding of the Impact of Lead-Free Electronics
- Environmentally Benign Alternatives to Sulfur Hexafluoride in Department of Defense Applications
- Sustainable Materials and Processes for Resins and Fibers Used in Military Composites
- Environmentally Friendly, Non-Aqueous Cleaners for Use on Weapons Systems and Platforms
- Environmentally Benign, High-Performance Non-Media Paint Strippers
- (SEED) Replacement of Ammonium Perchlorate in Tactical Missile Rocket Motors

S•U•C•C•E•S•S STORIES

SERDP research and development and ESTCP demonstration and validation activities provide a rapidly increasing number of outstanding technical and environmental advances. These developments are important and relevant to the Department of Defense (DoD), Department of Energy (DOE), Environmental Protection Agency (EPA), and many other user communities.

SUCCESS STORY

SERDP, ESTCP, and NAOC Promote Munitions Response Technology Transfer

SERDP, ESTCP, and the National Association of Ordnance Contractors (NAOC) hosted a workshop in Denver, Colorado, July 16-17, 2008, to promote transfer of emerging munitions response technologies to the user community. Nearly 140 technology developers, contractors, regulators, and government project managers attended this event, which showcased rapidly maturing munitions detection, classification, and characterization technologies.

The workshop, which was a sequel to the original munitions technology transfer workshop held in Aberdeen, Maryland, in 2005, featured a series of platform presentations on next generation sensors, the future of munitions response technologies, and successful applications of maturing munitions detection and classification technologies. Ground-based, underwater, and airborne technologies as well as various classification tools demonstrated through ESTCP's Pilot Study at the former Camp Sibert, Alabama, were highlighted.

During an outdoor session at the Denver Federal Center, participants had the opportunity to tour 10 stations at which technology developers demonstrated their systems. A variety of cart-based and handheld platforms using electromagnetic induction (EMI) and magnetic sensors were featured along with a filler identification system based on acoustic technology. Classroom tutorials were offered on four software products developed to facilitate munitions response projects, including QA/QC and advanced analysis modules for Oasis montaj, the UXO module for Visual Sample Plan, and a discussion of the application of GIS tools for the management of wide area assessment data.

The SERDP/ESTCP/NAOC Technology Transfer Workshop provided attendees unique opportunities to learn more about rapidly maturing munitions detection, classification, and characterization technologies. Improved knowledge and awareness of these technologies will assist DoD in effectively addressing munitions response sites across the country.

The workshop closed with a panel discussion that included representatives from the Navy, Army, U.S. EPA, California Department of Toxic Substances Control, State of Alaska Department of Environmental Conservation, and NAOC. Discussion topics included barriers to transitioning emerging technologies to the field, mature technologies ready for operational applications, potential cost savings of advanced munitions detection and classification technologies, and gaps in technology that still need to be addressed.

The maturing technologies presented at the workshop have the potential to both improve the quality of munitions response efforts and reduce their costs. Realizing this potential will require transition of the technologies to industry and their acceptance by contractors, regulators, and government managers. This series of workshops represents a unique opportunity to gather these stakeholders and facilitate technology transfer.

For additional information about the workshop, please contact Dr. Herb Nelson, the SERDP and ESTCP Munitions Management Program Manager, at (703) 696-8726 or herbert.nelson@osd.mil. ◆

Teaching Search Dogs a New Trick: Detection Dogs Focus on Desert Tortoises to Help the Military Maintain Mission Readiness

DoD installations in the Mojave Desert face potential conflicts between their training and testing missions and environmental compliance requirements for the federal- and state-listed desert tortoise, *Gopherus agassizii*. The ability to train or test effectively on these installations depends on current knowledge of where, in what densities, and with what population structure desert tortoises are present. With ESTCP support, researchers have demonstrated that trained search dog teams can safely and efficiently detect and find desert tortoises including those approximately as small as a silver dollar. The development of certification standards via this effort supports full implementation of this novel survey tool in which dogs play a vital role in the military's effort to coexist with the desert tortoise.

An icon of the Mojave Desert, the desert tortoise occurs within California and Nevada on Edwards Air Force Base, Marine Corps Air Ground Combat Center at Twentynine Palms, National Training Center (NTC) Fort Irwin, Naval Air Warfare Center Weapons Division at China Lake, and Nellis Air Force Base. When desert tortoises are encountered, training or testing is halted, delaying operational activities until a permitted biologist moves the desert tortoise out of the way. The ability to accurately survey an area to determine population status or in some instances clear areas prior to conducting military activities is, therefore, a critical element in maintaining continuity of training or testing, while complying with the Endangered Species Act and other desert tortoise protection regulations.

Desert tortoise habitat is currently surveyed using various visual detection methods that require humans to determine if tortoises are present. These methods encounter difficulties detecting small size classes, which are so infrequently detected in human surveys that they are omitted from analysis under current range-wide monitoring efforts. As a result, the data generated do not provide population structure information necessary for detecting population trends.

A current lack of knowledge of desert tortoise occurrence and population structure impacts the military's ability to test and train effectively. With ESTCP support, researchers have demonstrated that trained search dog teams can safely and efficiently find tortoises of all size classes.

In April 2008, the final field trials of the Desert Tortoise K9 (DT-K9) Program were completed under ESTCP project *Validation and Development of a Certification Program for Using K9s to Survey Desert Tortoises* (SI-0609). Led by Dr. Mary Cablk of the Desert Research Institute with colleagues Dr. Russell Harmon of the U.S. Army Research Office and Dr. Ken Nussear and Dr. Todd Esque of the U.S. Geological Survey (USGS), this effort has demonstrated that trained search dog teams can safely and efficiently find tortoises of all size classes, from under 100 mm midline carapace length (MCL) to adults over 280 mm in size. This effort represents the culmination of six years of training, testing, and refining the capabilities of dog teams, with the specific purpose of creating an additional survey tool for desert tortoises. The smallest tortoises that dogs found under field deployment conditions were 55 mm MCL.

It's one thing to train a dog to find a particular animal and another to bring that technology forward as a viable and accepted tool. In 2002 Dr. Cablk and Dr. Jill Heaton of the University of Redlands conducted the first experiments asking the simple questions: Can dogs detect desert tortoises? If so, how well can they do it and can they do it safely? Their results demonstrated detection rates of more than 90% for adult tortoises. The research team was surprised to observe and record that the dogs found five small tortoises in the 50 mm MCL size range despite never having trained on such small tortoises. Initial attempts, however, to replicate this latter finding were not successful.

As part of this ESTCP project, Dr. Cablk and her USGS colleagues decided to refocus efforts specifically on the small size class of tortoises. They concentrated on training the dogs to small tortoise odors, hypothesizing that differences in odor signature or in concentration might be involved. They re-evaluated the search strategy, which included working with the dogs on a leash to allow finer direction and control of the dog, and they refined the physical search pattern to ensure that the dog's nose was optimized to sniff in every shrub and burrow. They also examined what is referred to as the "handler mindset," the relationship between the handler and the dog. This was found to be extremely important for maintaining calibration of the dog and the efficacy of a DT-K9 team during

See DT-K9 PROGRAM, page 4

field deployments when searches conducted over hours or days yielded few or no verifiable tortoises.

With this extensive preparation completed, the final demonstration took place earlier this year. Along with demonstrating the ability of DT-K9 teams to detect all size classes of desert tortoises, the emphasis was the development and testing of certification standards that would demonstrate a DT-K9 team's minimum level of proficiency and quantify the degree to which performance on certification tests yielded similar performance in field deployment. For a survey tool to be useful, it must actually find its target to a known level of accuracy with consistency over time. Because tight restrictions exist on harassing and harming tortoises, a top priority also is safety to the tortoise. Certified DT-K9 teams thus must meet minimum performance thresholds to show that they are not only safe but do in fact find tortoises.

The research team's results showed that DT-K9 teams that passed the certification requirements far exceeded minimum detection criteria while those teams that did not pass performed similarly during survey deployments. For all size classes of tortoises, from less than 110 mm MCL to greater than 180 mm MCL, the certified DT-K9 teams averaged a 90% detection rate for tortoises with 90% reliability, indicating that detections were accompanied by trained alerts by the dogs that are the means by which they communicate a detection to the handler. The teams that did not pass the certification tests performed at only a 44% detection rate with 55% reliability in alerts.

Multiple benefits accrue to DoD from using DT-K9 teams to survey desert tortoises. Developing an additional tool that is effective and safe for finding a full complement of tortoises could save DoD hundreds of thousands to millions of dollars over the long term in maintaining compliance with environmental regulations. For management applications that require surveys either for tracking population status or for clearance, no alternative technology is proven to be effective for finding tortoises less than 180 mm MCL.

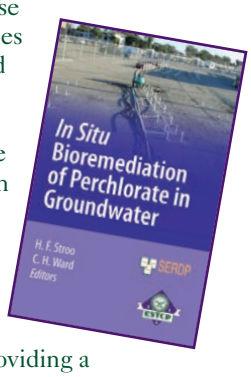
The various facets of the DT-K9 program also provide DoD with a blueprint for developing detection dogs for additional species that might benefit other installations facing similar compliance challenges. Although this initial work focused on a single animal species in a specific ecosystem, the testing and validation of carefully designed experimental methodologies over multiple field seasons resulted in a process for identifying how and under what circumstances trained search dogs can fill a survey need and be optimized to do so. With the knowledge gained from the DT-K9 project, the potential for using trained search dogs to assist the military with environmental compliance is significant and could include not only surveys for other listed species but also invasive plant and animal species, chemical spills, and other applications.

For more information about the DT-K9 Program, contact Dr. Mary Cablk, Desert Research Institute, Reno, Nevada, at (775) 673-7371 or mary.cablk@dri.edu. ◆

For DT-K9 teams to be accepted as a viable tool for surveying desert tortoises, they must find their target to a known level of accuracy consistently over time. As part of the ESTCP-funded project, certification standards were developed to demonstrate a team's minimum level of proficiency and quantify the degree to which performance on certification tests yielded similar performance under field conditions. DT-K9 teams passing certification averaged a 90% detection rate.

New Monograph on In Situ Bioremediation of Perchlorate in Groundwater Now Available

SERDP and ESTCP are pleased to announce the release of a book entitled *In Situ Bioremediation of Perchlorate in Groundwater*, the first volume in an Environmental Restoration Monograph Series. The treatise was written by several leading experts from academia and industry and edited by Dr. Hans F. Stroo of HydroGeoLogic, Inc., and Dr. C. Herb Ward of Rice University. While significant progress has been made in the development of innovative and more cost-effective environmental remediation technologies, efforts are needed to facilitate broader use of these technologies by government and industry. This monograph will serve as a reference tool for remediation professionals to effectively apply in situ bioremediation of perchlorate in groundwater by providing a critical review of the past decade of intensive research, development, and technology demonstrations.



The initial chapters of the monograph provide a general overview of the perchlorate problem and the development of in situ bioremediation of perchlorate. The current state of the science is described, including the principles of the technology. Subsequent chapters discuss important characterization issues relevant to perchlorate contamination, describe the different options available for applying in situ bioremediation, offer various options for implementing the technology, and provide cost data based on an analysis of several template sites. Costs also are compared to other technologies to illustrate the potential cost savings associated with the use of bioremediation. The final chapter on emerging technologies depicts potential applications for three innovative bioremediation technologies that are still under development.

This first volume will be followed by a series of books on topics including the remediation of chlorinated solvent source zones and dissolved-phase plumes, bioaugmentation for groundwater remediation, delivery and mixing strategies to enhance subsurface remediation, and the remediation of contaminated sediments. Additional volumes will be written as new environmental technologies are developed and validated.

To obtain a copy of the In Situ Bioremediation of Perchlorate in Groundwater monograph, visit http://www.springer.com/environment/environmental+management/book/978-0-387-84920-1.

ESTCP Answers the Most Frequently Asked Questions Regarding Chlorinated Solvent Sites

Chlorinated solvents are the most prevalent groundwater contaminants, with an estimated 15,000 to 25,000 contaminated sites in the United States. They are also particularly difficult and costly to remediate, so the selection of appropriate management strategies for chlorinated solvents and other dense nonqueous phase liquids (DNAPL) can be controversial. To help state regulators, federal regulators, consultants, DoD staff, and community members make site management decisions based on the best available science, an ESTCP team including Dr. Tom Sale (Colorado State University), Dr. Chuck Newell (GSI Environmental), Dr. Rob Hinchee (IST), Dr. Paul Johnson (Arizona State University), and Dr. Hans Stroo (HydroGeoLogic, Inc.) has compiled a Frequently Asked Questions (FAQ) document on chlorinated solvent site management.

The document entitled *Frequently Asked Questions Regarding Management of Chlorinated Solvents in Soils and Groundwater* addresses 25 key questions, providing a concise overview of current knowledge regarding the management of subsurface chlorinated solvent releases. It begins with an overview of the technical challenges posed by chlorinated solvent sites, including the properties of chlorinated solvents and their behavior and fate after being released to the subsurface. Source zone areas are defined and discussed, with summaries of the benefits and limitations of various source characterization and remediation technologies. The document presents a "new" way of thinking about chlorinated solvent sites that recognizes current technical and practical limitations, as well as the changes that have occurred over time at most chlorinated solvent sites. Key findings that have affected the approach to managing these sites include the significant mass of persistent contamination that can be present in lower permeability zones and the experiences from recent attempts to remediate chlorinated solvent source zones. These findings can help site managers set realistic goals for subsurface chlorinated solvent remediation.

Although the document is not meant to foster or discourage source zone treatment, it takes a hard look at the costs and performance of the most commonly used source zone treatment technologies and compares source treatment to alternative containment approaches. Results of real-world remediation projects are summarized to evaluate the impacts of treatment, including both the remaining mass and groundwater concentrations within treated source zones and the risks and longevity of the associated plumes. Most importantly, the document examines how decisions are made at sites impacted by chlorinated solvents and suggests an approach to develop cleanup objectives that are attainable, cost effective, and protective of human health and the environment. The final questions address the conditions and reasoning that can lead to improved success in solvent remediation efforts.

Developed under ESTCP project *Protocol for Selecting Remedies for Chlorinated Solvent Releases (ER-0530)*, the FAQ document is intended to be a concise overview, while the more extensive companion document, *Guide for Selecting Remedies for Subsurface Releases of Chlorinated Solvents*, is planned for release in 2009. Both documents are expected to contribute to better use of resources, more effective remediation and risk management, and more productive cooperation between the parties involved in site cleanups.

The FAQ Document is available in the SERDP and ESTCP Online Library at http://docs.serdp-estcp.org. Technical questions may be directed to Dr. Tom Sale, Colorado State University, Fort Collins, Colorado, at (970) 491-8413 or TSale@engr.ColoState.Edu. ◆

SERDP and ESTCP Sponsor Workshops to Identify High-Priority Science and Technology Needs

Workshop on Research Needs for Assessment and Management of Non-Point Air Emissions from DoD Activities

February 19-20, 2008 ◆ Research Triangle Park, North Carolina

Participants

More than 60 representatives from the Office of the Secretary of Defense, EPA, military Services, U.S. Army Corps of Engineers, U.S. Forest Service, National Oceanic and Atmospheric Administration, DOE, and numerous state organizations, private industry firms, and academic institutions (see workshop report for complete list).

DoD Need

Through the conduct of its mission activities, DoD is a source of non-point air emissions, many of which are under regulatory control. Given the closure of military installations as a result of the 2005 Base Realignment and Closure (BRAC) initiative and other force redeployments, more military personnel will be testing and training on a smaller inventory of land. In addition, development pressure continues adjacent to many installations and places more and more people in proximity to the impacts of DoD activities. These two factors place tremendous pressure on DoD's continued ability to test and train without interruption because of potential air quality-related compliance issues or community complaints.

Objectives

The workshop objectives were to (1) assess DoD air quality management needs, with a focus on non-point air emissions; (2) assess the current state of the practice relative to those needs; (3) assess the current state of the science and technology related to these needs and practices; (4) identify the gaps in knowledge, technology, and management that, if addressed, could improve DoD and EPA's ability to address air quality issues; and (5) set priorities for future SERDP and ESTCP investments to address these gaps.

Format

The workshop opened with presentations summarizing background papers on regional haze and visibility, technologies for emission characterization and monitoring, remote sensing for assessment of non-point source emissions, fugitive air emissions modeling, and mitigation techniques for fugitive dust emissions. Participants were then divided into smaller working groups to identify specific data gaps and research priorities. In the first two sessions, groups were divided to concentrate discussions on the characterization, monitoring and modeling, and mitigation of both particulate and gaseous emissions. A third session focused on military-specific emission sources and activities, namely fire emissions; training range emissions; and fuels, lubricants, and solvents.

See AIR QUALITY WORKSHOP, page 7

Workshop on Research and Development Needs for Understanding and Assessing the Bioavailability of Contaminants in Soils and Sediments

August 20-21, 2008 ◆ Annapolis, Maryland

Participants

More than 90 representatives from the Office of the Secretary of Defense, U.S. Army, U.S. Navy, U.S. Air Force, U.S. Army Corps of Engineers, EPA, DOE, Department of Agriculture, Department of Health and Human Services, and numerous state organizations, private industry firms, and academic institutions (see workshop report for complete list).

DoD Need

DoD is responsible for managing thousands of sites with contamination in soils and sediments. A growing body of evidence suggests that some of these contaminants are less available to cause harm to human health than is suggested by total soil or sediment contaminant concentrations. As a result, cleanup levels based on bulk concentrations may not correlate with actual risks. Physical and chemical sequestration processes can reduce exposure, but changes in bioaccessibility and bioavailability are generally not addressed when setting risk-based cleanup criteria. Explicitly assessing contaminant bioavailability can result in setting more technically defensible cleanup goals and establishing more realistic cleanup priorities, while still ensuring protection of human health and the environment.

Objectives

The workshop objectives were to (1) examine current understanding of bioavailability processes that may impact risk-based remedial action decisions, (2) evaluate current and potential future applications of bioavailability concepts and assess barriers to their implementation, and (3) identify and prioritize research and demonstration opportunities that, if addressed, can facilitate regulatory acceptance and field implementation of bioavailability concepts to support risk assessments at DoD sites.

Format

The workshop opened with presentations summarizing DoD risk pathways and regulatory drivers for soils and sediments, the state of the science for bioavailability in soils and sediments, and bioavailability use in the regulatory decision-making process. Smaller working groups then focused on fate, transport, and risk assessment issues; current and potential future applications of bioavailability concepts; and RDT&E opportunities to facilitate regulatory acceptance and field implementation of bioavailability concepts to support risk assessments.

See BIOAVAILABILITY WORKSHOP, page 14

AIR QUALITY WORKSHOP, from page 6

Results

In addition to specific RDT&E needs, which are identified in the Workshop Proceedings (see Products section, this page), the following overarching priorities emerged:

Improve characterization, monitoring, modeling, and mapping of fuels to support enhanced smoke management and fire planning. Such improvements would provide an enhanced source characterization for determining emissions generated from prescribed fires, improve fire and smoke management planning, and improve ecological assessments.

Enhance smoke management using advanced monitoring and modeling approaches. Research is needed to accurately quantify smoke emissions; monitor pollutant concentrations; and model smoke plume rise, dispersion, and transformation to better assess the impacts of fires on air quality and help DoD installations obtain prescribed burning permits.

Quantify, model, and monitor post-fire effects to improve fire management. A better understanding of post-fire effects would enhance DoD fire management programs, facilitate communications with regulators and the concerned public, and prepare DoD to better manage its ecosystems under changing, large-scale environmental conditions.

Develop surface characterization procedures for determining dust emission potential. A better understanding of fugitive dust emission potentials will improve management practices and ultimately translate into better operational range sustainability and cost savings by efficiently predicting and controlling the most significant sources of fugitive dust.

Improve understanding of the generation and transport of fugitive dust as a function of the interaction between soils, terrain, and mission activity. The lack of specific equipment activity, soil, and vegetation information prevents military installations from accurately estimating fugitive dust emissions and near-field deposition reductions.

Develop an emissions model broadly applicable to wheeled and tracked vehicle fugitive dust emissions. Better theoretical and empirical approaches to relating emissions to surface properties and to the models that estimate their impacts are needed to improve estimates of off-site contributions of suspended dust to $PM_{2.5}$ and PM_{10} concentrations.

Develop and validate near-field models for fugitive dust emissions. Successful development of these models would help alleviate the discrepancies between near-source measurements of fluxes of fugitive dust and other flux measurements made further downwind, thus improving environmental compliance planning.

Evaluate dispersion models for assessing off-site impact, including evaluation with receptor-oriented source apportionment models. Research is needed to develop the science and technology necessary to compare and enhance dispersion models for assessing off-site impact due to non-point source emissions from DoD installations and improve general tools for assessing and determining acceptance criteria for models.

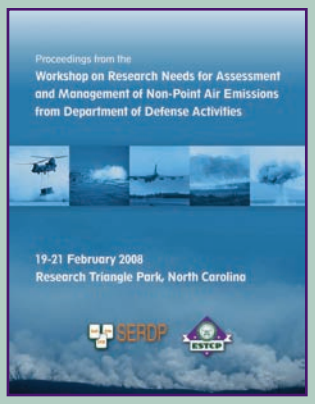
Develop monitoring methods to determine source and fenceline amounts of fugitive dust emissions for source and ambient compliance monitoring. Methodologies need to be developed that take into consideration meteorological and field conditions, rapid in-situ particulate matter sampling strategies, and new detection strategies that can be integrated with facility activity records to relate source activities with the resulting dust emissions.

Evaluate fugitive emissions from storage, handling, and transfer of fuels and the effects of these emissions on air quality. Understanding the quantity and chemical constituents of fugitive emissions from storage, handling, and transfer of JP-8 and alternative fuels at DoD installations is essential for providing the environmental risk analyses necessary to make management decisions and prevent the imposition of unnecessary penalties and controls for fuel-related activities at DoD installations.

Develop optical remote sensing methodologies to quantify volatile organic compound (VOC) emissions. To address data gaps in quantifying airborne emissions of VOCs, sufficient operational data, process information, sample, and related parameters should be collected concurrently with field studies to independently correlate measured VOC emissions with those normally estimated and calculated using standard emission inventory procedures.

Products

The Workshop Proceedings are available at http://www.serdp.org/Research/upload/Air%20Quality%20Workshop%20Report.pdf. SERDP has released one FY 2010 Statement of Need (*Fugitive Dust Emissions Due to Department of Defense Activities*) as a result of this workshop.



Spotlight on SERDP and ESTCP FY 2008

Throughout 2008, new initiatives in all SERDP and ESTCP focus areas

SERDP and ESTCP initiatives in **Environmental Restoration** (ER) focus on the technologies and strategies required to clean and restore contaminated sites, both to ensure that the lands can continue to be used for military training and to protect the health of the people who live and work on and near these sites. In 2008, SERDP initiated research and development efforts to improve understanding and prediction of plume response to dense nonaqueous phase liquid (DNAPL) source zone architecture and depletion, understanding of the biological degradation of nitroamines, and methods and practices for long-term monitoring of contaminated groundwater. ESTCP investigators began demonstrating state-of-the-art technologies and approaches for characterizing, remediating, and monitoring contaminants of concern in groundwater, soil, and sediments, as well as developing guidance and decision support tools for remedial project managers to select, implement, and optimize technologies in the field. Results from these initiatives will help DoD implement efficient and cost-effective approaches to remedy the effects of past practices.

SERDP Research

Additional information on these efforts can be found at www.serdp.org under the Research Projects *link.*

Chlorinated Solvents: DNAPL Source Zone Remediation

Computational and Experimental Investigation of Contaminant Plume Response to DNAPL Source Zone Architecture and Depletion in Porous and Fractured Media (ER-1610)
Principal Investigator: Edward Sudicky/University of Waterloo

While progress has been made with respect to process understanding in the context of DNAPL fate and migration in heterogeneous unconsolidated deposits, there remains a paucity of knowledge on the behavior of DNAPL in fractured geologic media. This project will develop computational tools for predicting aqueous-phase plume response to DNAPL source zone architecture and depletion for both porous and fractured geologic media.

Practical Cost Optimization of Characterization and Remediation Decisions at DNAPL Sites with Consideration of Prediction Uncertainty (ER-1611)
Principal Investigator: Jack Parker/The University of Tennessee

The objective of this project is to develop and test methodologies to guide cost-optimized and risk-based decisions regarding management and cleanup of DNAPL-contaminated sites. Methods will be developed to determine source functions and other parameters needed to predict dissolved plume response to remedial actions at DNAPL sites, quantify prediction uncertainty based on model and data limitations, and determine the level and type of characterization needed to minimize total cost, including characterization and remediation.

Metric Identification and Protocol Development for Characterizing DNAPL Source Zone Architecture and Associated Plume Response (ER-1612)
Principal Investigator: Linda Abriola/Tufts University

Most chlorinated solvent plumes emanate from aquifer regions containing DNAPL. Recent research has revealed that there is a strong link between DNAPL source zone architecture (local-scale distribution) and down-gradient plume response to partial mass removal. This project will develop and demonstrate a comprehensive approach for field characterization of DNAPL source zones that quantifies the key features controlling plume response. The suite of protocols and models developed can be employed for source zone characterization and remedy screening.

Predicting DNAPL Source Zone and Plume Response Using Site-Measured Characteristics (ER-1613)
Principal Investigator: Michael Annable/University of Florida

Predicting the relationship between DNAPL source zone changes and down-gradient plume response is critical to making informed site management decisions, especially those related to remedial actions. Thus, it is vital that source zone and plume characterization be conducted within a framework that is consistent with appropriate predictive models. This project will demonstrate effective field-scale approaches that provide vital links among characterization, prediction, and decision making at DNAPL sites.

Impact of DNAPL Source-Zone Architecture on Contaminant Mass Flux and Plume Evolution in Heterogeneous Porous Media (ER-1614)
Principal Investigator: Mark Brusseau/The University of Arizona

Chlorinated solvents in the form of NAPLs represent a long-term source of vadose zone and groundwater contamination. The objective of this project is to enhance understanding of the relationships between source zone architecture, mass-transfer dynamics, and contaminant mass flux for heterogeneous DNAPL source zones. The results will enable the prediction of the impact of DNAPL source zone depletion on changes in source strength, ultimately improving the effectiveness of remediation and site management strategies.

Energetics Remediation and Monitoring

Development of Biomarkers for Assessing In Situ RDX Biodegradation Potential (ER-1606)
Principal Investigator: Alison Cupples/Michigan State University

The explosive RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) is a particularly problematic groundwater contaminant because of its relatively high solubility, recalcitrance, toxicity, and frequency of use. This project will identify the microorganisms able to degrade RDX in situ and develop molecular tools so that the presence and abundance of these organisms can be investigated at contaminated sites. Such information will facilitate the establishment of more cost-effective and efficient RDX remedial plans, expediting the cleanup of RDX-contaminated DoD sites.

Initiatives for Environmental Restoration

have been highlighted. Featured here are Environmental Restoration efforts.

New Approaches to Evaluate the Biological Degradation of RDX in Groundwater (ER-1607)

Principal Investigator: Paul Hatzinger/Shaw Environmental, Inc.

The objective of this project is to combine state-of-the-art analytical techniques, molecular approaches, and biogeochemical studies to improve understanding of the biodegradation of the nitramine explosive RDX in subsurface environments. A new understanding of such biodegradation processes will provide DoD with an enhanced ability to predict the fate of nitramines in contaminated groundwater environments and to more consistently enhance the rate and extent of their biodegradation through active remedial approaches.

Molecular Microbiology of Nitroamine Degradation in Soils (ER-1608)

Principal Investigator: Stuart Strand/University of Washington

RDX is a significant issue at a number of DoD sites because of its high mobility in soils and subsequent contamination of groundwater. Currently, it is not clear which pathways and enzymes are responsible for RDX degradation in situ. Using molecular techniques, this project will characterize the microbial communities of soils contaminated to varying degrees with RDX. Specific objectives include investigating new RDX-degrading bacteria, determining RDX metabolites, and elucidating the metabolic pathways mediating the degradation of RDX. A greater understanding of nitroamine biodegradation in the environment would enable more cost-effective and efficient RDX remedial plans, expediting the cleanup of RDX-contaminated DoD sites.

Identification of Microbial Gene Biomarkers for In Situ RDX Biodegradation (ER-1609)

Principal Investigator: Fiona Crocker/U.S. Army Corps of Engineers, Engineer Research and Development Center-Environmental Laboratory

The sustainability of DoD training ranges is threatened by mobile explosive contaminants such as RDX, which have migrated from the source areas and now contaminate surface and subsurface soils with relatively low but potentially toxic levels. This project will focus on understanding the genetics, physiology, and biochemistry of RDX biodegradation in order to develop probes that can predict the potential for RDX biodegradation or monitor the progress of RDX bioremediation in the field. The information gained from this research will fill knowledge gaps in the understanding of RDX catabolism as well as the proteomics and genetics of RDX-degrading bacteria.

Process Monitoring and Optimization

New Cost-Effective Method for Long-Term Groundwater Monitoring Programs (ER-1601)

Principal Investigator: Charles Newell/GSI Environmental, Inc.

New approaches for groundwater monitoring are needed to alleviate the long-term cost burdens of the existing programs at DoD facilities. This project will evaluate the accuracy and cost of vapor-phase groundwater monitoring technologies; compare three different configurations of field-based, vapor-phase groundwater monitoring technologies to existing groundwater monitoring technologies; using statistical methods, assess the sampling variability contributed by a variety of aquifer and well construction characteristics to determine their impact on attainment of equilibrium partitioning between the water and vapor phases; and develop practical guidelines for the use of vapor-phase groundwater monitoring for various applications.

A Portable Fiberoptic Surface Enhanced Raman Sensor for Real-Time Detection and Monitoring of Perchlorate and Energetics (ER-1602)

Principal Investigator: Baohua Gu/Oak Ridge National Laboratory

The objective of this project is to develop a new tool for in-situ detection and monitoring of perchlorate and other energetics such as RDX in groundwater via fiberoptic surface enhanced Raman scattering (SERS). The performance, reliability, and cost effectiveness of the SERS technique will be evaluated in the laboratory and at selected DoD field sites. Both labor and analytical costs associated with laboratory analysis may be eliminated and costs for long-term monitoring and analysis of multiple contaminants at DoD sites reduced significantly.

Micro Ion Mobility Sensor for In Situ Monitoring of Contaminated Groundwater (ER-1603)

Principal Investigator: Jun Xu/Oak Ridge National Laboratory

This project will develop a novel real-time sensor for providing cost-effective and reliable in-situ monitoring of contaminated groundwater. The core technology combines linear and nonlinear ion mobility spectrometers in a miniature configuration and incorporates the vapor analyzer with an advanced membrane inlet. Monitoring of chlorinated hydrocarbons in groundwater will be the initial focus, but the instrument also may be modified to detect explosives and perchlorate.

Periodic Mesoporous Organosilicas as Pre-Concentration Elements for Improved Long-Term Monitoring of Key Contaminants in Groundwater (ER-1604)

Principal Investigator: Paul Charles/Naval Research Laboratory

This project will investigate the feasibility of using periodic mesoporous organosilica (PMO) materials to pre-concentrate trace levels of key contaminants, which will improve in-line sensor performance for long-term monitoring of contaminants of concern in groundwater plumes. Studies will evaluate the adsorption of targets by PMO materials, the selectivity of the binding interaction, elution of targets from the materials, and the regeneration of the materials following binding of target molecules.

Novel Sensor for Real-Time Characterization and Monitoring of Chlorinated Hydrocarbons in Groundwater (ER-1605)

Principal Investigator: Bill Major/Naval Facilities Engineering Command Engineering Service Center

A significant portion of the cost of remediating groundwater contaminated with chlorinated solvents is associated with the sampling and laboratory analyses that are required for site characterization and long-term monitoring (LTM). The objective of this project is to develop and optimize a novel real-time sensor to discriminate and quantify chlorinated solvents in groundwater resulting in real-time measurement capabilities that would significantly reduce characterization time, increase confidence that a site is fully characterized, provide more complete data sets for modeling and monitoring, and reduce LTM costs.

See FY 2008 ER DEMONSTRATIONS, page 10

ESTCP Demonstrations

Additional information on these efforts can be found at www.estcp.org under the Technologies *link.*

Chlorinated Solvents: DNAPL Source Zone Remediation

Improved Field Evaluation of NAPL Dissolution and Source Longevity (ER-0833)
Principal Investigator: Michael Kavanaugh/Malcolm Pirnie, Inc.

The lack of accurate and technically defensible estimates of source mass and persistence is a major obstacle in determining the optimal path to cleanup at DoD facilities impacted by nonaqueous phase liquids (NAPL). In this project, NAPL mass flux in the source zone will be measured with novel tools, including integral pumping tests combined with the deployment of passive flux meters and multi-component modeling using the source zone depletion function of Sequential Electron Acceptor Model 3D. Results will lead to improved characterization of NAPL mass, distribution, and the projected longevity of NAPL source areas, as well as the potential costs and benefits of partial source reduction.

Chlorinated Solvents: Dissolved Phase Remediation

Verification of Methods for Assessing the Sustainability of Monitored Natural Attenuation (ER-0824)
Principal Investigator: Carmen Lebrón/Naval Facilities Engineering Command Engineering Service Center

The objective of this project is to demonstrate/validate an integrated methodology for assessing the long-term sustainability of monitored natural attenuation (MNA). Developed as an enhancement to Sequential Electron Acceptor Model 3D, the method captures the full range of natural attenuation processes—diminishing source mass flux, dilution and dispersion, biological and abiotic transformations, volatilization, and evapotranspiration. Reliable, defensible estimates of MNA sustainability will lead to improved use of MNA and savings in capital and in operations and maintenance costs.

Contaminated Sediments

In Situ Wetland Restoration Demonstration (ER-0825)
Principal Investigator: Amy Hawkins/Naval Facilities Engineering Command Engineering Service Center

This project will demonstrate and validate in-situ wetland remediation technologies designed to sequester contaminants in wetlands without disrupting the ecology of these systems. Several sequestration agents and delivery systems will be evaluated to determine the combinations that provide the most cost-effective and environmentally protective solutions.

Integrated Forensics Approach to Fingerprint PCB Sources Using Rapid Screening Characterization and Advanced Chemical Fingerprinting (ER-0826)
Principal Investigator: James Leather/SPAWAR Systems Center San Diego

Determining the original source of contamination for a heterogeneous matrix such as sediments is a requirement for both cleanup and compliance programs. The objective of this project is to provide guidance on integrating chemical techniques into a cost-effective forensics program to apportion regulatory costs among principal responsible parties. The technology to be demonstrated includes two primary components: (1) screening technologies that provide for wide spatial and temporal coverage to delineate sediment contaminant heterogeneity in a cost-effective manner and (2) advanced chemical fingerprinting on a selected subset of samples to delineate sources.

Demonstration and Validation of Enhanced Monitored Natural Recovery at DoD Sites (ER-0827)
Principal Investigator: Bart Chadwick/SPAWAR Systems Center San Diego

The objective of this project is to foster broader understanding and acceptance of the enhanced monitored natural recovery (EMNR) remedy for contaminated sediment sites. EMNR technology relies on a combination of enhanced natural recovery via placing a thin layer of clean sediment over contaminated sediment and an effective characterization and monitoring program to project and verify recovery. The effort will focus on two key technical performance issues, specifically (1) How effective is the EMNR remedy? and (2) How well do available monitoring tools gauge the effectiveness of the EMNR remedy?

Evaluating the Efficacy of a Low-Impact Delivery System for In-Situ Treatment of Sediments Contaminated with Methylmercury and Other Hydrophobic Chemicals (ER-0835)
Principal Investigator: Charles Menzie/Exponent, Inc.

Conventional approaches to in-situ treatment of contaminated sediments involve mechanical mixing of the material into the sediment. SediMite™ is a granular material developed to deliver treatment materials without disturbing habitats or resuspending contaminants. Applied at the water surface, SediMite™ sinks to the bottom where it slowly releases the treatment material for mixing into the biologically active zone by native benthic organisms. This project will conduct a field demonstration at two DoD sites to provide performance information sufficient to design SediMite™ applications at other sites.

Initiatives for Environmental Restoration

have been highlighted. Featured here are Environmental Restoration efforts.

Emerging Contaminants

Field Demonstration of Propane Biosparging for In Situ Remediation of N-Nitrosodimethylamine in Groundwater (ER-0828)

Principal Investigator: Paul Hatzinger/Shaw Environmental, Inc.

N-Nitrosodimethylamine (NDMA) is an emerging groundwater contaminant at a number of DoD installations. The objective of this project is to demonstrate and validate an in situ bioremediation approach for treating groundwater contaminated with low concentrations of NDMA. This technology entails distributing propane gas and oxygen in the subsurface to stimulate propanotrophs, a class of indigenous microorganisms that have been shown to rapidly degrade NDMA to innocuous products.

Treatment of N-Nitrosodimethylamine in Groundwater Using a Fluidized Bed Bioreactor (ER-0829)

Principal Investigator: Todd Webster/Shaw Environmental, Inc.

The objective of this project is to demonstrate and validate an ex-situ approach for remediating NDMA in groundwater. The fluidized bed reactor (FBR) is an efficient fixed-film bioreactor in which a high concentration of biomass is attached onto fluidized medium. Within the fluidized medium, biological treatment of the contaminated water occurs. In laboratory studies, the particular NDMA-degrading microorganism, *R. rubber ENV425*, has developed extensive biofilm that may be highly suitable for optimal performance in an FBR.

Site Characterization, Monitoring, and Process Optimization

Development of More Cost-Effective Methods for Long-Term Monitoring of Soil Vapor Intrusion to Indoor Air Using Quantitative Passive Diffusive-Adsorptive Sampling Techniques (ER-0830)

Principal Investigator: Todd McAlary/Geosyntec Consultants, Inc.

Passive sampling techniques for vapor intrusion assessment have the potential to greatly reduce costs as compared to EPA Method TO-15. This project will demonstrate the applicability of passive-diffusive samplers for sampling and analysis of volatile organic compounds in indoor air and soil gas, during investigation of subsurface vapor intrusion to indoor air. The results of this work will provide a comparative study of diffusive gas sampling techniques to identify under which conditions the passive samplers provide good quality data that will be accepted by regulatory agencies.

Demonstration and Validation of a Fractured Rock Passive Flux Meter (ER-0831)

Principal Investigator: Kirk Hatfield/University of Florida

Complex hydrogeologic conditions such as fractured and karst bedrock settings pose substantial economic and technical challenges for the characterization and remediation of dense nonaqueous phase liquid (DNAPL) source zones. The objectives of this project are to demonstrate and validate the fractured rock passive flux meter (FRPFM) for measuring the magnitudes and directions of cumulative water and contaminant fluxes in fractured rock aquifers and to enable the technology to receive regulatory and end-user acceptance.

Assessing Alternative Endpoints for Groundwater Remediation at Contaminated Sites (ER-0832)

Principal Investigator: Rula Deeb/Malcolm Pirnie, Inc.

The objective of this project is to provide environmental managers and regulators at DoD sites with tools, metrics, and information needed to evaluate alternative endpoints for groundwater remediation at complex sites. By analyzing case studies that have incorporated alternative endpoints into the final remedy along with sponsoring workshops, this project will improve understanding and promote dialogue about the underlying limitations to complete groundwater restoration and lines of evidence used to predict restoration potential.

Geophysical Imaging for Investigating the Delivery and Distribution of Amendments in the Heterogeneous Subsurface of F. E. Warren AFB (ER-0834)

Principal Investigator: Robert Kelley/Regenesis

This project will demonstrate how geophysical imaging can be used to verify the placement and subsurface distribution of amendments to treat contaminants in the subsurface. Through coupled laboratory and field experimentation followed by a cost/benefit analysis, the project will assess the utility of time-lapse geophysical methods for monitoring and detecting fracture and amendment distribution, the utility of geophysical methods for monitoring amendment diffusion rates, and the utility and cost effectiveness of geophysical methods for developing and validating an amendment delivery strategy.

SERDP's SAB Members Focus on Program's Technical Quality

SERDP's Scientific Advisory Board (SAB) helps to ensure that the Program maintains a clear focus on technical quality. The SAB reviews proposed research projects and makes recommendations to the SERDP Council regarding technologies, research, projects, programs, activities, and if appropriate, funding within the scope of SERDP. The SAB consists of no more than 14 and no fewer than six members, who are jointly appointed by the Secretary of Defense and the Secretary of Energy in consultation with the Administrator of the EPA. SERDP is fortunate to have a group of prominent experts in their fields serving on the SAB. Following is an introduction to those members not previously highlighted in the *Information Bulletin*.

Sandy J. Andelman

Dr. Andelman is Vice President and Director of the Tropical Ecology, Assessment, and Monitoring (TEAM) Network of Conservation International. Previously, she held the position of deputy director for the National Center for Ecological Analysis and Synthesis and director of Conservation Science at The Nature Conservancy. Dr. Andelman has served as editor of *Biological Conservation*, as a member of the editorial board for *Conservation Biology*, and on the Board of Governors for the Society for Conservation Biology. She has authored numerous articles in publications such as *PLoS Biology*, *Science*, *Nature*, and *Ecology Letters*. Dr. Andelman holds a Ph.D. in Behavioral Ecology from the University of Washington.

Joseph P. Francis

Mr. Francis has been with the Nebraska Department of Environmental Quality (NDEQ) for more than 30 years and since 1998 has held the position of Associate Director of the Division of Environmental Assistance. Previously, he worked in various capacities within the Nebraska Department of Environmental Quality and the Department of Environmental Control, including Assistant Director of the Air and Waste Management Division; Section Supervisor for the Integrated Waste Management Section; and Section Supervisor for the Air Quality Inspection and Compliance Section. He has served as co-chair for the Interstate Technology and Regulatory Council and on numerous other committees and groups, including the EPA Compliance Assistance Advisory Committee and the NDEQ/Nebraska Public Power District Environmental Partnership. Mr. Francis holds a Master of Public Administration (Environmental) from the University of Nebraska at Omaha.

James W. Mercer

Dr. Mercer has been with GeoTrans, Inc. for nearly 30 years and serves as Executive Vice President and Principal Hydrogeologist. He has provided expert witness testimony, litigation support, and regulatory compliance services for various cases regarding groundwater remediation since 1983. Among his numerous professional accomplishments, he served on an expert panel advising the Air Force on nonaqueous phase liquid issues and, in June 1999, served as co-chair at the AGU Committee on Public Affairs session, Contaminated Groundwater and Litigation: Lessons from the Woburn Case in Boston. For the Department of Energy, he served on the Hanford Peer Review Panel for the site wide groundwater model. He is the author of more than 90 publications on groundwater, vadose zone evaluation, wetland hydrology, computer modeling, geochemistry, and groundwater contamination and hazardous waste disposal. He holds a Ph.D. in Geology from the University of Illinois.

Michael L. Rosenzweig

Dr. Rosenzweig is a Professor of Ecology and Evolutionary Biology at the University of Arizona in Tucson and has been the Publisher and Editor-in-Chief of the scientific journal *Evolutionary Ecology Research* since 1998, when he founded the publication. Dr. Rosenzweig has served as a visiting professor and scholar to several U.S. and international universities, including Ben-Gurion University in Beersheva, Israel; the University of Wisconsin, Madison; the University of Miami; the University of Umeå, Sweden; and James Cook University, Australia. He is the founding head of the Department of Ecology and Evolutionary Biology at the University of Arizona. At the Ninth Lukacs Symposium in 1999, he was awarded the Twentieth Century Distinguished Service Award, and in 2001, he was awarded the College of Science Career Teaching Award by the University of Arizona. Dr. Rosenzweig is the author and co-author of more than 200 chapters, articles, and editorials. He holds a Ph.D. in Zoology from the University of Pennsylvania.

Joseph M. Suflita

Dr. Suflita is currently the George Lynn Cross Research Professor for the Department of Botany and Microbiology and Sarkeys Energy Center at the University of Oklahoma, as well as the Mapco Professor of Environmental Quality and Director of the Institute for Energy and the Environment. Since 1997, Dr. Suflita has served as the Associate Director of the Executive Committee of the Integrated Petroleum Environmental

See SERDP SAB, page 13

Program Update

SERDP

Proposals selected in response to the FY 2009 SERDP solicitations were presented to the SERDP Scientific Advisory Board (SAB) for review at its September and October 2008 meetings. The SAB review will continue at the upcoming March 2009 meeting. Forty-eight projects were recommended for funding from the Core Solicitation and two projects from the SEED solicitation. On September 29, the SERDP Council met and approved the FY 2009 Program Plan. As noted in this issue's cover story, SERDP released the FY 2010 Core and SEED solicitations on November 6. Pre-proposals responding to the FY 2010 Broad Agency Announcement (BAA) for the Core Solicitation are due January 8, 2009. Full proposals responding to the Federal Call for Proposals and requested full proposals responding to the BAA are due March 12, 2009. Full proposals responding to the FY 2010 SEED Solicitation also are due on March 12. Visit www.serdp.org under the *Funding Opportunities* link for details regarding the FY 2010 Solicitations and schedule for proposal submission.

ESTCP

In September, as part of the FY 2009 Solicitation, full proposal submitters presented their proposed work to the ESTCP Technical Committees (ETC). The ETCs made recommendations to the ESTCP Director, who selected projects to be funded in FY 2009. Proposal acceptance letters have been disseminated, and Principal Investigators are requested to enter their initial project plan information in the online reporting system. These plans must be submitted before the release of FY 2009 funding. Project initiation kickoff conference calls then will be scheduled with the ESTCP Program Managers.

A solicitation for the FY 2010 Program is planned for release on or about January 8, 2009. Watch www.estcp.org under the *Opportunities* link for details. ◆

SERDP SAB, from page 12

Consortium and has been a member of the Scientific Advisory Committee for the International Symposium on Subsurface Microbiology since 1998. He has been an active member of a number of associations and societies, including the American Association for the Advancement of Science and the American Society for Microbiology. Dr. Suflita is the author and co-author of more than 115 refereed publications. He holds a Ph.D. from The Pennsylvania State University.

John C. Warner

Dr. Warner is President, Chief Technology Officer, and Chairman of the Board for the Warner-Babcock Institute for Green Chemistry, as well as President of the Beyond Benign Foundation. Previously, at the University of Massachusetts, Dr. Warner served as a professor, chair, and director in the fields of Plastics Engineering, Chemistry, Biochemistry, and Community Health and Sustainability. He is the Editor of the peer-reviewed journal *Green Chemistry Letters and Reviews* and has served on several advisory boards, including California's Green Chemistry Initiative Science Advisory Board, the Massachusetts Governor's Science Advisory Board, and the Green Chemistry Institute Board of Directors. Dr. Warner is a founding stakeholder of the Presidential Green Chemistry Challenge. This year Dr. Warner received the Council of Scientific Society Presidents Leadership Award and was recognized in 2004 with the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. Dr. Warner has authored more than 90 scientific publications and patents on topics such as green chemistry, organic chemistry, and pollution prevention. He holds a Ph.D. in Organic Chemistry from Princeton University.

Other current SERDP SAB members include Dr. Jeffrey Daniels, The Ohio State University; Dr. Perry McCarty, Stanford University; Dr. Ellen Mihaich, Environmental and Regulatory Resources, LLC; Dr. William Neff, National Oceanic and Atmospheric Administration; and Dr. Jeffrey Siirola, Eastman Chemical Company. Dr. Mihaich is the current chair of the SAB. ◆

SERDP and ESTCP Sponsor Student Participation at ESA and SCB Annual Meetings

To increase awareness of research opportunities involving DoD by up and coming scientists, SERDP and ESTCP provided travel awards to 17 promising students to attend either the Ecological Society of America (ESA) Annual Meeting or the Society of Conservation Biology (SCB) Annual Meeting. The award-winning students and their paper topics follow. Congratulations to each of them!

93rd ESA Annual Meeting August 3-8, 2008 Milwaukee, Wisconsin

◆ ◆ ◆

- **Ms. Christina Alba-Lynn**
  Colorado State University
  Effects of Natural Disturbance on Exotic Plant Invasion in Urban and Rural Plant Communities
- **Mr. Brian Allan**
  Washington University
  Invasive Honeysuckle (Lonicera maackii) Increases Tick-Borne Disease Risk
- **Ms. Karen Alofs**
  University of Texas at Austin
  Does Habitat Fragmentation Inhibit the Spread of Invasives? An Observational Study of an Invasive Grass in Central Texas Landscapes
- **Mr. Michael Carey**
  Illinois Natural History Survey
  Native Fish Diversity Alters the Effect of an Invasive Species on Ecosystem Properties
- **Ms. Sarah Haller**
  Texas A&M University
  Shrub Removal Effects on an Endangered Texas Orchid, Spiranthes parksii
- **Ms. Johanna Hamburger**
  Colorado State University
  Thresholds of Zinc Toxicity: Selecting Shrubs for the Reclamation of Mining Lands Contaminated with High Levels of Zinc
- **Ms. Meghann Jarchow**
  Iowa State University
  Allelopathy as a Mechanism for the Invasion of Typha angustifolia
- **Mr. Peter Levi**
  University of Notre Dame
  Coupled Forest Management and Salmon Disturbances May Alter Nutrient Dynamics in Southeast Alaskan Streams
- **Ms. Sharmila Pathikonda**
  University of Louisiana at LaFayette
  Invasion, Disturbance, and Competition: Modeling the Fate of Coastal Plant Populations
- **Ms. Lindsay Reynolds**
  Colorado State University
  Causes and Timing of Tamarisk and Russian Olive Invasion into a Southwestern Floodplain

Society for Conservation Biology 2008 Annual Meeting July 13-17, 2008 Chattanooga, Tennessee

◆ ◆ ◆

- **Mr. Justin Bohling**
  University of Idaho
  Assessing the Extent of Hybridization Between Sympatric Red Wolves (Canis rufus) and Coyotes (Canis latrans) in Coastal North Carolina
- **Ms. Jennifer Costanza**
  University of North Carolina at Chapel Hill
  Examining Stakeholder Priorities for Restoration of Longleaf Pine on the North Carolina Coastal Plain
- **Ms. Melanie Coulter**
  Bowling Green State University
  Implications of Lark Sparrow Breeding Habitat Requirements for Midwest Sand Barren Conservation
- **Mr. David DesRochers**
  Tufts University
  Revised Population Estimates of Hawaiian Moorhen on Oahu Using Call-Broadcast, with Comparison of Survey Methods
- **Ms. Lindsey Fenderson**
  University of New Hampshire
  The Effects of Habitat Fragmentation and Landscape Features on New England Cottontail (Sylvilagus transitionalis) Population Genetic Structure
- **Mr. Richard Seidel**
  Miami University
  Phylogeographic Analysis Reveals Multiple Undescribed Species of Amphipods in Chihuahuan Desert Springs
- **Mr. Jared Underwood**
  Arizona State University
  The Influence of Data Source in Identifying Areas of Conservation Priority

BIOAVAILABILITY WORKSHOP, from page 6

Results

In addition to specific RDT&E needs, which are identified and prioritized in the Workshop Report (see Products section, this page), the following overarching recommendations emerged:

Improve the technology transfer process. An outreach program is needed to inform remedial project managers (RPM), federal and state regulators, and the general public on what tools and models are available to assess bioavailability, along with case studies demonstrating applications of such tools.

Build scientific consensus. Bioavailability is now recognized as an inherent part of the risk assessment process; however, to gain stakeholder and regulatory acceptance, it will be necessary to develop scientific consensus in areas of technical uncertainty. This can only be done through additional research and communication.

Bridge communications between scientists and managers. The language and measures used by chemists and other scientists are different from those commonly used by RPMs and engineers. While a common language may be desirable, all parties can better reach common ground by talking in terms of risk and risk reduction.

Utilize Weight-of-evidence assessments. Incorporating bioavailability measurements into site decision making will most likely involve a weight-of-evidence approach. The specific metrics to assess the role of bioavailability should be determined with all involved stakeholders.

Improve understanding of biological assessments and predictive modeling. There is growing recognition that total contaminant concentrations may not reflect actual risk nor correlate with risk reduction measures. Therefore, new indicators of contaminant risk and reduced contaminant availability are of interest, along with the means to reduce predictive risk uncertainty.

Products

A final report documenting the workshop's results is available at http://www.serdp.org/Research/upload/Bioavailability_Wkshp_Nov_2008.pdf. SERDP has released two FY 2010 Statements of Need as a result of this workshop—*Mechanisms of Contaminant Interaction with Soil Components and Its Impact on the Bioavailability of Contaminants* and *Improved Fundamental Understanding of Contaminant Bioavailability in Aquatic Sediments.*

Recent Additions to the Online Library

The following are new publications now available in the SERDP and ESTCP Online Library (http://docs.serdp-estcp.org). Access them by entering the project number noted after the report title (e.g., 0125) under Search Phrase. Other documents may be accessed by entering an appropriate keyword or selecting relevant search filters.

Environmental Restoration

- Cost & Performance Report: Grenade Range Management Using Lime for Dual Role of Metals Immobilization and Explosives Transformation (ESTCP ER-0216)
- Cost & Performance Report: Prediction of Groundwater Quality Improvement Down-Gradient of In Situ Permeable Treatment Barriers and Fully Remediated Source Zones (ESTCP ER-0320)
- Cost & Performance Report: Detailed Hydraulic Assessment Using a High-Resolution Piezocone Coupled to the GeoVIS (ESTCP ER-0421)
- Cost & Performance Report: Monitoring of Water and Contaminant Migration at the Groundwater-Surface Water Interface (ESTCP ER-0422)
- Final Report: Control of Manganese Dioxide Particles Resulting from In Situ Chemical Oxidation Using Permanganate (SERDP ER-1484)
- Final Report: Detailed Field Investigation of Vapor Intrusion Processes (ESTCP ER-0423)
- User's Guide: Estimating Cleanup Times Associated with Combining Source-Area Remediation with Monitored Natural Attenuation (ESTCP ER-0436)

Munitions Management

- Final Report: Optimal Sensor Management for Next-Generation EMI Systems (SERDP MM-1591)
- Technical Report: Geo-Location Requirements for UXO Discrimination (ESTCP MM-0413)

Sustainable Infrastructure

- Cost & Performance Report: BNOISE2™ Noise Impact Software (ESTCP SI-0006)
- Cost & Performance Report: SARNAM™ Noise Impact Software (ESTCP SI-0006)
- Cost & Performance Report: Total Copper Analyzer for Rapid In Situ Characterization of Effluent Discharges (ESTCP SI-0311)
- Final Report: Riparian Ecosystem Management at Military Installations: Determination of Impacts and Restoration and Enhancement Strategies (SERDP SI-1186)
- Final Report: Characterization of $PM_{2.5}$ Dust Emissions from Training/Testing Range Operations (SERDP SI-1190)
- Final Report: The Evolving Urban Community and Military Installations: A Dynamic Spatial Decision Support System for Sustainable Military Communities (SERDP SI-1257)
- Final Report: RSim—A Regional Simulation to Explore Impacts of Resource Use and Constraints (SERDP SI-1259)
- Final Report: Detection and Identification of Archaeological Sites and Features Using Radar Data (SERDP SI-1260)
- Final Report: Development of an Adaptive Framework for Management of Military Operations in Arid/Semi-Arid Regions to Minimize Watershed and In-Stream Impacts from Non-Point Pollution (SERDP SI-1340)

Weapons Systems and Platforms

- Cost & Performance Report: Electrospark Deposition for Depot- and Field-Level Component Repair and Replacement of Hard Chromium Plating (ESTCP WP-0202)
- Cost & Performance Report: Scale-Up, Environmentally Friendly Non-Destructive Inspection for Corrosion Inspection Through Coatings (IR2NDI) (ESTCP WP-0407)
- Final Report: Elimination of Redwater from TNT Manufacture (SERDP WP-1408)

PARTNERS IN ENVIRONMENTAL TECHNOLOGY

STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (SERDP)
&
ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM (ESTCP)

INFORMATION BULLETIN

LATE FALL 2008 NUMBER 36

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FOR SERDP AND ESTCP

JANUARY 2009

January 8
Pre-proposals due in response to the SERDP FY 2010 Core Solicitation Broad Agency Announcement

January 8
A Federal Call for Proposals and a Broad Agency Announcement for ESTCP FY 2010 project funding to be released on or about this date

January 15
SERDP and ESTCP quarterly progress reports due for the first quarter of government FY 2009

FEBRUARY 2009

February 3-5
Munitions Management (MM) In-Progress Review (IPR) meeting

February 5
Full proposal requests sent to qualified proposers responding to the SERDP FY 2010 Core Solicitation Broad Agency Announcement

February 9-13
Environmental Restoration (ER) In-Progress Review (IPR) meeting

February 18-20
Weapons Systems and Platforms (WP) In-Progress Review (IPR) meeting

February 23-27
Sustainable Infrastructure (SI) In-Progress Review (IPR) meeting

MARCH 2009

March 5
Pre-proposals due in response to the ESTCP FY 2010 Solicitation Federal Call for Proposals and Broad Agency Announcement

March 10-12
SERDP Scientific Advisory Board (SAB) meeting
Arlington, Virginia

March 12
Full proposals due in response to the SERDP FY 2010 Core Solicitation Federal Call for Proposals and Broad Agency Announcement

Full proposals due in response to the SERDP FY 2010 **S**ERDP **E**xploratory **D**evelopment (SEED) Solicitation

RELATED CONFERENCES & EVENTS

December 15-19, 2008
2008 AGU Fall Meeting
San Francisco, California
For more information, visit www.agu.org/meetings/fm08.

February 2-5, 2009
Fifth International Conference on Remediation of Contaminated Sediments
Jacksonville, Florida
For more information, visit www.battelle.org/conferences/sediments.

March 17-21, 2009
National Military Fish & Wildlife Association 2009 Meeting
Washington, DC
For more information, visit www.nmfwa.org/2009_Meeting.

March 29-April 2, 2009
22nd SAGEEP (Symposium on the Application of Geophysics to Engineering and Environmental Problems): Expanding Horizons for Near-Surface Geophysics
Fort Worth, Texas
For more information, visit www.eegs.org/sageep.

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