



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

Environmental Laboratory

Expertise,
Capabilities,
and Employment
Opportunities



BUILDING STRONG®

providing solutions for tomorrow's environmental challenges

The background image shows a landscape with several trees, some of which are in bloom with pink flowers. A brick building is visible in the background, partially obscured by the trees. The sky is a clear, light blue. The overall scene is bright and natural.

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greetings from the director

Many thanks for your interest in the U.S. Army Engineer Research and Development Center's Environmental Laboratory. As you page through this booklet, you will see that the Environmental Laboratory is involved in many diverse areas of environmental research and development. Since 1974, we have been the problem solver in environmental science and engineering for the U.S. Army, the Department of Defense, and the Nation through research, development, special studies, and technology transfer.

Most importantly, I hope you will recognize that our people are as diverse and outstanding as our work. Whether it is validating a new technique at an ecosystem restoration field site or testing the effects of a chemical control agent on a nuisance aquatic plant, our people bring their expertise, experience, and enthusiasm to the mission of solving tomorrow's environmental challenges. They exhibit passion for their research because it benefits the nation — I'm very proud of them!

Again, thank you for your interest in the ERDC Environmental Laboratory,
Building Strong!



Beth C. Fleming
Beth C. Fleming, PhD
Director
Environmental Laboratory

providing solutions for tomorrow's environmental challenges

environmental laboratory

Problem Solvers:

We provide the U.S. Army, the Department of Defense, and the Nation with interdisciplinary technical expertise and institutional knowledge. As part of the Army, we have detailed understanding of Corps of Engineers district, division, and installation responsibilities and missions.

Technology Advisors:

We stay abreast of current scientific technology, which helps our customers make the right technology choices. Since the 1974 National Environmental Policy Act, our scientists and engineers have been leaders in wide-ranging research and development activities addressing a multitude of environmental issues – ecosystem restoration, ecological resources, and contaminant management.

We are the problem solver for the U.S. Army, the Department of Defense, and the Nation in environmental science and engineering. Our engineers and scientists support environmental missions through research, development, special studies, and technology transfer. Our research includes a network of expertise and facilities from other ERDC laboratories, academia, and the private sector. We know our customers and help them succeed.

Technology Developers:

We develop technology to meet our customers' needs. We are part of a unique government laboratory system that has been a technology developer and innovator for years, providing critical support to our soldiers, our Nation's infrastructure, environmental sustainability, water resource management, and disaster operations.

Business Development Partners:

We give our customers a competitive advantage via technology and access to ERDC laboratories and unique partnering authorities. This provides rapid access to critical science and technology expertise wherever it resides – other federal labs, nongovernmental organizations, academia, and the private sector.

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world leader in environmental science

ERDC's Environmental Laboratory is recognized worldwide as problem solvers in environmental science and engineering research.



Dr. Afrachanna Butler, Research Physical Scientist, recipient of the Research Leadership Award at the 13th Annual National Women of Color, Science, Technology Engineering, and Math Conference.

Dr. Steve Larson, Research Chemist, recipient of the Federal Laboratory Consortium's Award for Excellence in Technology Transfer for "Bullet Trapping Medium and System for Live-Fire Training Ranges."



Kyle McKay, Research Civil Engineer, recipient of the National Society of Professional Engineers "New Faces in Engineering" award.



Dr. Judy Shearer, Research Plant Pathologist, recipient of the Federal Laboratory Consortium's Award for Excellence in Technology Transfer for "Utilization of Plant Pathogens as Biocontrol Agents."

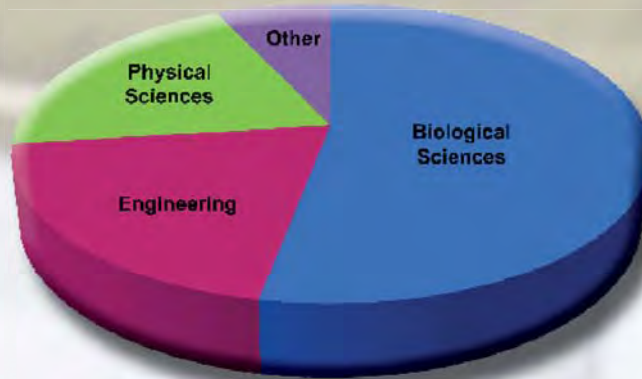


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our people...

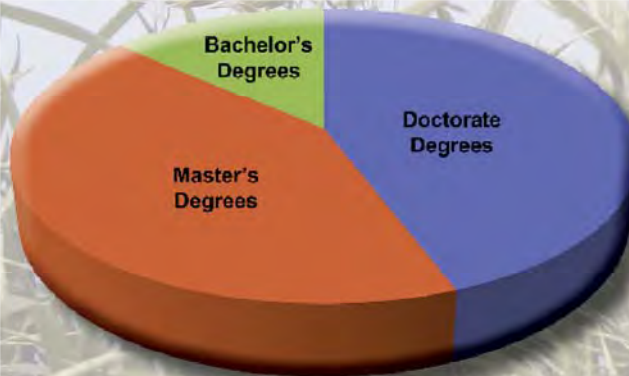
We comprise a diverse workforce:

- Over 200 biologists, ecologists, physical scientists and engineers with expertise and experience covering the full spectrum of environmental science and engineering.
- More than 125 contract professionals.
- Over 30 student contractors.
- More than 30 administrative staff.



We also team with six other laboratories within ERDC:

- Coastal and Hydraulics Laboratory
- Cold Regions Research and Engineering Laboratory
- Information Technology Laboratory
- Geotechnical and Structures Laboratory
- Construction Research Engineering Laboratory
- Topographic Engineering Center



85 percent of our staff hold graduate degrees from 88 universities around the world.

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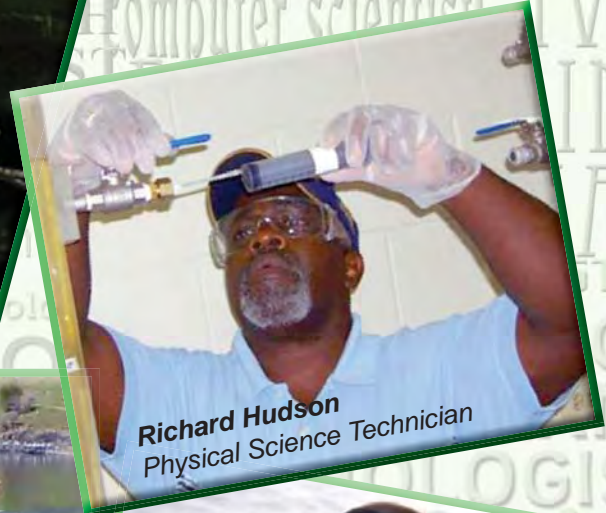
...OUR expertise



Karl Gustavson
Research Biologist



Elizabeth Summers
Research Ecologist



Richard Hudson
Physical Science Technician



Will Jones
Research Chemist



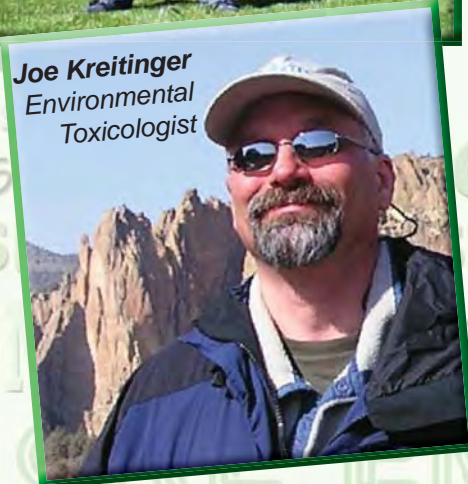
Tony Friona
Physical Scientist



Andy Casper
Aquatic Ecologist



Debra Robinson Goodman
Technical Information Specialist



Joe Kreitinger
Environmental Toxicologist



Christine Wibowo
Operations Research Analyst

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our facilities

Located throughout the United States, ERDC's Environmental Laboratory has many facilities and employees. A total of 32 remote site employees are located at 16 sites.

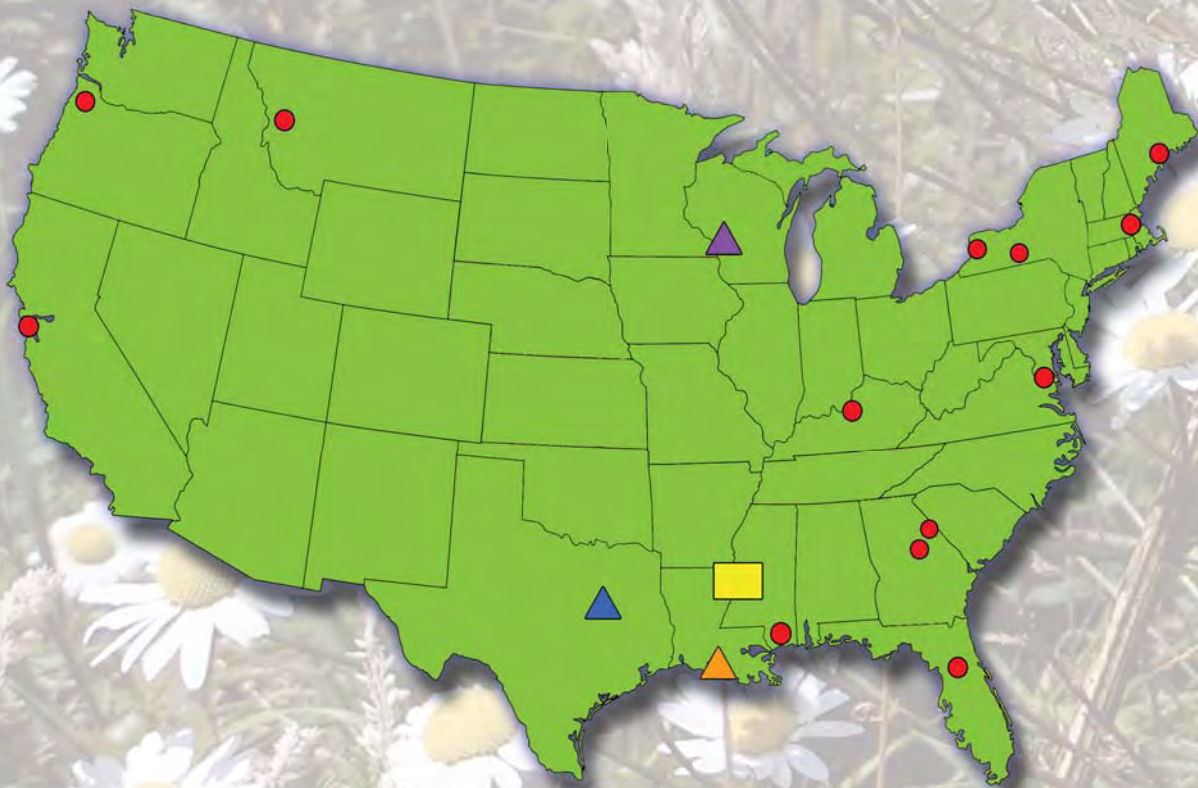
ERDC Environmental Laboratory, Vicksburg, MS
 Aquatic and Wetland Ecosystems Research and Development Center
 Contaminated Sediments Laboratory
 Environmental Chemistry Laboratory
 Fish Flumes/Cognitive Research Facility
 Geospatial Data Analysis Facility
 Hazardous Waste Research Center

Eau Galle, WI
 Eau Galle Aquatic Ecology Laboratory

Lewisville, TX
 Lewisville Aquatic Ecosystem Research Facility

Baton Rouge, LA
 Wetlands Environmental Technology Research Facility

Remote employee(s) at other Corps sites



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The Lewisville Aquatic Ecosystem Research Facility in Lewisville, Texas, is an experimental pond facility that supports studies on biology, ecology, and management of aquatic plants. LAERF provides an intermediate-scale research environment to bridge the gap between small-scale laboratory studies and large-scale field tests.



Eau Galle Aquatic Ecology Laboratory, located near Spring Valley, Wisconsin, offers extensive experience in field and experimental analysis of ecological and water quality processes essential for evaluating and implementing rehabilitation and management techniques for a variety of aquatic systems.



The Wetlands and Environmental Technologies Research Facility, located on the campus of Louisiana State University, conducts research and provides assistance regarding the application of geospatial technologies to support restoration ecology, coastal management, landscape fragmentation and ecosystem modeling, and wetland restoration planning and monitoring.



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our research capabilities

ERDC's Environmental Laboratory's research capabilities are as diverse as our staff; while our primary focus areas are listed in the pages that follow, EL's capabilities extend far beyond the items we are able to list on these pages. EL's work falls under the following categories:



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environmental sensing

Mission: Provide state-of-the-art technologies to use passive and active optical, geophysical, and chemical sensing approaches to characterize the environment.

Niches:

- **Physics-Based Modeling of Smart Munitions.** Develop specialized models for environmental impacts, flight/scanning dynamics, and first-order physical effects on smart munitions.
- **Field Data Instrumentation, Data Collection, and Analysis.** Collect specialized and geo-located field data, including soil profiles, vegetation, meteorological, and micro-topography data.
- **Geospatial Databases, Spatial Analysis, and Development of Custom Applications.** Develop spatial databases compliant with all federal and DoD spatial data standards; custom spatial model development for GIS software platforms; web-based dissemination of geographic data and models.
- **Image Processing and Analysis.** Acquire and analyze active and passive multispectral and hyperspectral remote sensing imagery from ground-based, airborne, and space platforms. Analyze fused data from multiple sources, such as LIDAR and hyperspectral imagery.
- **Development and Testing of Electromagnetic and Chemical Sensors.** Develop innovative sensors for chemical detection to support wide array of civil and military applications.
- **Unexploded Ordnance and Improvised Explosive Device Detection Research.** Test and develop sensors for unexploded ordnance detection on closed installations and techniques for management of active ranges.



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contaminant management and munitions response



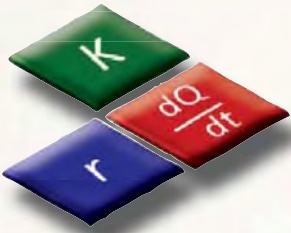
Mission: Be a national and international leader in remediation and munitions response, develop practical solutions to civil and military remediation and contaminants response issues, support the U.S. Army Corps of Engineers on civil works projects and emergency management needs, and support the soldier by developing sustainable range technologies and remediation approaches.

Niches:

- **Sediments Management.** Continue to be the leader in developing solutions in support of the sediment management work effort.
- **Munitions Response.** Fulfill DoD requirements regarding restoration of UXO-contaminated properties, and rapid access and maintenance of operational ranges.
- **Sustainable Range Technologies.** Provide an avenue for the military to train with the necessary weaponry to maintain the advantage on the battlefield while taking the environmental impact of the weapons into consideration.
- **Emerging Contaminants.** Investigate the emergence and importance of new materials, such as nanotechnologies, and their effects on the environment.
- **Sustainable Use Strategies.** Adapt, develop, and design appropriate techniques and procedures to meet remedial goals at reduced cost for the U.S. Army and its customers.



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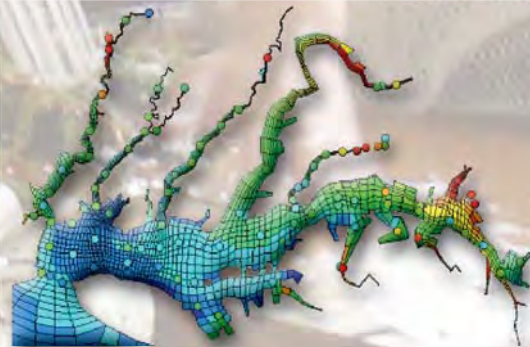
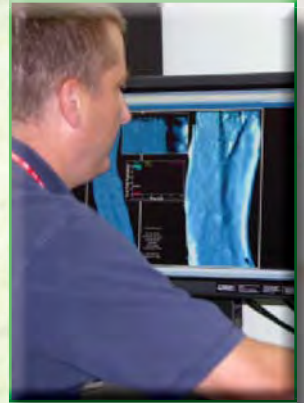


ecological modeling and forecasting

Mission: Develop the knowledge bases, skill sets, and tools to establish the Environmental Laboratory as a national and international leader in environmental problem solving.

Niches:

- **Ecological Dynamics.** Depict important ecological processes and how they are shaped by changes in physical and environmental setting.
- **Cognitive Ecology.** Use knowledge of stimuli/response relationships to improve our understanding of and ability to predict the outcomes of interactions among organisms, and between organisms and their physical environment.
- **Large-Domain Ecosystems.** Develop the knowledge and expertise to forecast ecological outcomes at landscape, basin or regional scales, and across multiple time scales.
- **Complex Human-Natural Systems.** Improve our understanding of complex relationships between man's activities and nature, and forecasting how such relationships influence ecosystems.
- **Knowledge Systems.** Develop a virtual environment that fosters knowledge gain, facilitates collaborative problem solving, and effectively delivers management-relevant information.



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risk and decision science



Mission: Improve the quality of decision making by researching and developing risk and decision science methods and applying them to real-world problems in the fields of public safety, security, and the environment.

Niches:

- **Risk Analysis.** Assess and manage risks using quantitative and qualitative approaches.
- **Uncertainty Analysis in Complex Systems.** Apply holistic methods for uncertainty analysis of complex models, including Monte-Carlo, Bayesian Networks, and System Analysis.
- **Decision Analysis.** Use structured methods of analysis that bridge science and decision making while incorporating information about uncertainty and conflicting objectives.
- **Cognitive Science.** Apply new methods and algorithms for mapping perceptions of risk for comprehensive risk management.
- **Decision Fusion.** Integrate technical information and expert judgment in emerging areas.
- **Adaptive Management.** Provide a quantitative framework to integrate new information, monitoring plans, and evolving social/political values to advance current practice.
- **Life Cycle Analysis.** Develop methodologies to assess environmental impact of emerging materials and technologies at different life cycles.
- **Value of Information Analysis and Prioritization.** Focus investment in new research and information acquisition based on evaluation of its impact on ultimate management decisions.



climate change

Mission: Incorporate consideration for climate change in research projects involving contaminant transport and remediation, ecosystem restoration, invasive species, threatened and endangered species, wetlands evaluation, carbon sequestration as well as hydropower, water supply, and flood risk management.

Niches:

- **Forecast Responses.** Proactively forecast environmental responses to climate change.
- **Climate Change Risk.** Propose adaptive engineering and management strategies to incorporate climate change risk into planning, management, and operational processes.
- **Uncertainty.** Develop quantitative tools for considering uncertainty.



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environmental security



Mission: Conduct research on environmental issues associated with national security and force protection. Reduce environmental risks to deployed soldiers as well as to Corps of Engineers personnel and contractors conducting disaster response.

Niches:

- **Terrorism and Ecoterrorism.** Monitoring, remediation, risk assessment, modeling and decision-making tools, response and cleanup in support of remedial and restoration activities and prevention of chemical, biological, and radiological (CBR) threats.
- **Natural and Anthropogenic Disasters/Releases.** Risk assessment, modeling and decision-making tools, response and cleanup focused on natural or manmade short-term events with potentially long-term environmental and human health consequences.
- **Deployed Military Force Support.** Assessment, monitoring, and mitigation of environmental threats related to field activities, base camp support, and assistance to native populations.



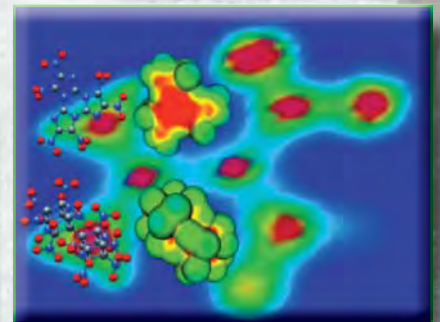
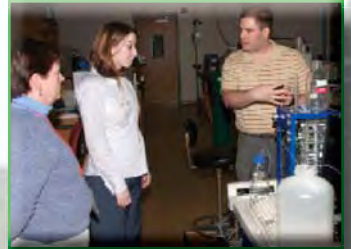
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environmentally sustainable material

Mission: Integrate experimental approaches, research tools, and models for comprehensive life cycle evaluation and impact of new materials in development, acquisition, use, and disposal.

Niches:

- **New Materials.** Determine potential environmental hazards associated with the life cycle of new materials.
- **Life Cycle Assessment.** Research and apply capabilities, tools, and models to life cycle assessment of new materials.
- **Innovative Tools.** Integrate innovative tools in the areas of life cycle evaluation, systems biology, prospective risk analysis, computational chemistry, and biogeophysical relationships.



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ecological resources

Mission: Monitor and manage natural resources by studying population and community dynamics, habitat assessment, molecular ecology, and ecological land management of USACE and Army lands.

Niches:

- **Invasive Species.** Monitor distribution, abundance, and spread of invasive species populations as well as their impacts on ecosystems and industrial infrastructure.
- **Endangered Species.** Monitor and assess project impacts on the distribution and abundance of endangered species. Partner with civil works and military sponsors to develop conservation management plans and bioassessment protocols for endangered species.
- **Ecological Genetics.** Genetic applications across the fields of wildlife ecology, conservation biology, population genetics, and molecular ecology.
- **Community Ecology and Bioassessment.** Long-term monitoring and assessment of community dynamics and habitat assessment.
- **Wetlands.** Provide fundamental understanding of ecological processes and dynamics in wetland ecosystems. Conduct extensive environmental research in wetland systems.
- **Fish Mitigation.** Promote ecosystem-based research to solve complex fishery issues relating to water resource development. Conduct research on mitigation and restoration techniques to support stewardship and conservation of aquatic ecosystems.
 - **Stewardship.** Conduct research, development, and technical assistance in support of environmental stewardship activities.
 - **Recreation.** Provide research, development, and technical support associated with recreation resources planning and management. Create tools to improve the efficiency and effectiveness of the Corps of Engineers recreation program.



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ecosystem restoration

Mission: Serve the U.S. Army, the Department of Defense, and the Nation by advancing leadership in ecosystem restoration and management, enhancing the quality and success of restoration nationally, and being a nationally recognized leader in restoration science and engineering.

Niches:

- **Environmental Benefits Analysis.** Develop scientifically based benefit evaluation techniques, models, tools, and metrics to analyze ecosystem restoration projects.
- **Modeling and Forecasting.** Provide restoration practitioners with a dynamic modeling tool kit to restore ecosystem functions and processes.
- **Ecological Engineering and Design.** Create innovative, cost-effective design, engineering, and construction guidance that promotes fundamentally sound restoration of ecosystem structure, function, and dynamic process.
- **Monitoring and Assessment.** Establish baselines, ranges of system variability, and the roles of external influences to assess project and program performance.
- **Technology Transfer.** Foster information exchange and communication by developing an Ecosystem Restoration Gateway to serve as an online resource of people, policies, programs, practices, and partnerships as well as the Ecosystem Restoration Webinar series.



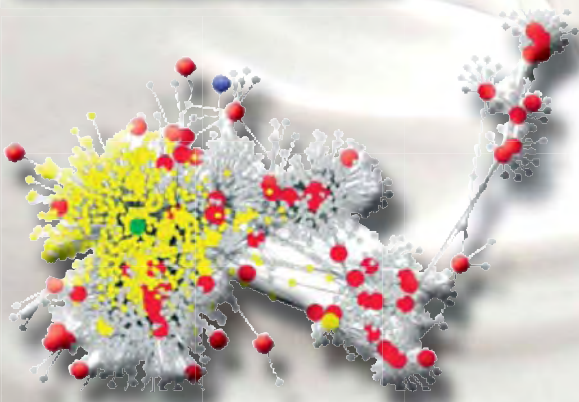
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systems biology

Mission: Model, predict, and exploit the dynamic properties of complex biological systems. Develop biotechnologies for novel materials, processes, and ecosystem sustainability. Design computational biology solutions for safety, risk assessment, sensing. Develop predictive biology tools to provide faster, cheaper screening and assessment models for estimating stressor impacts on animals and populations. Apply systems biology to provide solutions for development of novel green products such as lubricants, surfactants, and other biotechnology-based solutions that are sustainable, environmentally friendly materials.

Niches:

- **Theory, Technology, and Computational Approach.** Develop and advance theory, technology, and computational approaches for understanding, predicting, and exploiting the function and behavior of complex biological systems in areas relevant to the U.S. Army, the Department of Defense, and the Nation.
- **Knowledge Base.** A systems biology knowledge base will be prerequisite for exploiting emergent properties in complex systems, providing novel bioinspired processes and materials critical for ecosystem sustainability.



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Water-Jacketed Incubator

technology transfer

Over the last five years, ERDC's Environmental Laboratory has won the Federal Laboratory Consortium Technology Transfer award four times. Using a variety of applications, the EL researchers are masters at a variety of technology transfer applications.



Environmental Workshops

Technical Responses

Numerical Models

Conference Papers

Fact Sheets

Websites

Webinars

One-on-One Interactions

Training

Technical Reports

Technical Notes

Customer Responsive Technology

Information Exchange Bulletins

Peer-Reviewed Journals

-250
Technical Products

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research and technical assistance programs

The Environmental Laboratory has numerous research and technical assistance programs available through Operations Branches in Corps of Engineers Districts. Assistance is available at no charge for a period of two weeks.



The **Aquatic Nuisance Species Research Program (ANSRP)** provides information on aquatic nuisance species including basic life history and ecological information, risk assessment tools, preventative strategies, and cost-effective and environmentally sound management options. ANSRP conducts interdisciplinary research on the prevention, control, and management of aquatic nuisance species that impact Corps of Engineers projects and public facilities.



The **Aquatic Plant Control Research Program (APCRP)** is the Nation's only Federally authorized research program directed to develop technology for the management of non-indigenous aquatic plant species. The program provides effective, economical, and environmentally compatible methods for assessing and managing problem aquatic plants.



The **Dredging Operations and Environmental Research (DOER) Program** balances operational and environmental initiatives to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission. Research results provide technology for cost-effective operation, evaluation of risks associated with management alternatives, and environmental compliance.



The **Dredging Operations Technical Support Program (DOTS)** provides direct environmental and engineering technical support to the U.S. Army Corps of Engineers Operations and Maintenance (O&M) dredging mission. Technology transfer activities have supported diverse field needs for years and have directly benefited O&M dredging operations throughout the United States.



The **Ecosystem Management and Restoration Research Program (EMRRP)** is the Corps' responsive, tactical research and development response to the demand for new and expanding technologies to address the need for ecosystem assessment, restoration, and management activities at the project level. Technologies developed under the EMRRP build upon a sound understanding of ecosystem functions, which lead to sustainable stewardship of Corps resources.

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The **Army Environmental Quality Technology (EQT) Program** uses technology development, exploitation, and transfer to achieve environmentally sustainable installations and systems that support transformation, modernization, readiness, and quality of life.



The **Environmental Security Technology Certification Program (ESTCP)** is DoD's environmental technology demonstration and validation program. The Program was established in 1995 to promote the transfer of innovative technologies that have successfully established proof of concept to field or production use. ESTCP demonstrations collect cost and performance data to overcome the barriers to employ an innovative technology because of concerns regarding technical or programmatic risk, the so-called "Valley of Death."



The **Recreation Management Support Program (RMSP)** provides funding to develop and maintain tools to address problems, issues and initiatives associated with the Corps of Engineers Recreation Program that have broad applicability to Corps Civil Works projects nationwide. This is accomplished through management studies, management assistance, and information exchange.



The **Strategic Environmental Research and Development Program (SERDP)** is DoD's environmental science and technology program, planned and executed in partnership with DOE and EPA, with participation by numerous other federal and non-federal organizations. SERDP invests across a broad spectrum of basic and applied research, as well as advanced development.



The **System-Wide Water Resources Program (SWWRP)** is a U.S. Army Corps of Engineers research and development initiative designed to assemble and integrate the diverse components of water resources management. Products from this program are designed to help users surpass individual project-level analysis, and apply current and improved technologies for multidisciplinary system-wide assessments.



The **Water Operations Technical Support (WOTS) Program** was initiated in 1985 to support technology transfer efforts for environmental and water quality operational studies. The WOTS Program provides effective environmental and water management engineering technology to address a wide range of water resource management problems at Corps of Engineers reservoir and waterway projects, and in the river systems affected by project operations nationwide.



The **Wetlands Regulatory Assistance Program (WRAP)** provides direct scientific and engineering technical support to the Corps' Operations and Maintenance (O&M) Regulatory business practice. WRAP is a technology transfer activity that has supported diverse field needs for years and directly benefited O&M projects.



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exceptional career opportunities

ERDC's Environmental Laboratory offers a variety of opportunities and incentives to both new and long-term employees in furthering their careers.

- Advanced Educational Opportunities
- Developmental Assignments
- Outstanding Programs
- Distinguished Scholar (DSA) employment opportunities
- Direct Hire (DHA) employment opportunities
- Pay for Performance
- Technical and supervisory career tracks



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earn and learn

ERDC's Environmental Laboratory provides avenues for students to further their education while gaining work experience.

STEP: The Student Temporary Employment Program (STEP) provides a great opportunity to get real-life work experience and earn money during semester and summer breaks.

SCEP: The Student Career Experience Program (SCEP) alternates semesters or quarters of full-time work with full time study. Work assignments are made individually, depending on your interests and abilities.

GEMS (Gains in the Education of Mathematics and Science): The GEMS Program gives students in grades 8-12 an opportunity to intern at Army laboratories and be exposed to career opportunities in the areas of math, science, and engineering.

SMART (Science, Mathematics and Research for Transformation): The SMART Scholarship for Service Program has been established by the Department of Defense (DoD) to support undergraduate and graduate students pursuing degrees in Science, Technology, Engineering, and Mathematics (STEM) disciplines.

DA Intern Program: The Department of Defense CP-18 DA and Local Intern Rotational Assignment Program is designed to provide CP-18 DA and Local Interns an opportunity to learn the various Research and Development (R&D) missions in DA and the U.S. Army Corps of Engineers.

Contract Students: ERDC's Environmental Laboratory has a continuing need for technical support services that can be performed by college and university students. Opportunities are available for undergraduate or graduate university students in the fields of computer science, geographic information system technology/remote sensing, information technology, drafting, pre-engineering, all engineering fields, mathematics, chemistry, geophysics, physics, geology, geo-science, biology, all pure-science related fields, and all physical-science related fields.

join our team... come work with us



Benefits for New / Prospective Employees

The Federal government offers a comprehensive compensation package to meet your work-life needs.

- Health Insurance
- Dental & Vision Insurance
- Life Insurance
- Flexible Spending Accounts
- Long Term Care Insurance
- Sick, Vacation, & Holiday Leave
- Retirement Program
- Work-Life Enrichments



Insurance Programs: As a Federal employee, you may be able to enroll in health, dental, vision and life insurance, flexible spending accounts, and apply for long term care insurance. You can find information about each program by visiting http://www.opm.gov/insure/new_employ/.

Leave: Most Federal employees earn both annual and sick leave. You can find information about the leave program by visiting <http://www.opm.gov/oqa/leave/index.asp>.



Retirement Program: Most Federal employees will be in one of two retirement systems. The Civil Service Retirement System (CSRS) originally covered employees first employed prior to 1983. The Federal Employees Retirement System (FERS) is the newest retirement system generally covering employees employed after 1987 and those who voluntarily switched from CSRS. You can find information about Federal retirement benefits by visiting <http://www.opm.gov/retire/pre/>.

Work-Life Enrichments: Work/Life programs and policies are designed to create more flexible, responsive work environments supportive of commitments to community, home, and loved ones. As the nation's largest employer, with a workforce committed to safeguarding the health, security, and well being of all Americans, the Federal Government recognizes that great work/life policies, programs, and practices make good business sense. We strive to create a diverse, effective, engaged workforce, ready to meet the needs of the American public, by enabling Federal employees to be committed to their own healthy careers, families, and communities. For additional information visit the Work/Life website at http://www.opm.gov/Employment_and_Benefits/worklife/.



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how to apply

Contact us at
EL-Inquiry@usace.army.mil
<http://www.el.erdc.usace.army.mil>

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