

## Environmental Programs & Projects in the Mid-Atlantic Region

### Army Center for Environmental Health Research Ft Detrick

<http://usacehr.detrick.army.mil/>

The U.S. Army Center for Environmental Health Research is a completely renovated building includes state-of-the-art aquaculture facilities and laboratories specifically designed for aquatic toxicology and molecular biology. Our staff is an interdisciplinary team of scientists and technicians who are dedicated to improving risk assessment methods and to developing biomonitoring technologies for military environmental health hazards.

.....Science and Technology Director, USACEHR

The mission of the USACEHR is to plan, direct, and conduct research, development, testing and validation for occupational and environmental health surveillance (OEHS) and environmental health technology in support of Force Health Protection. Currently, the USACEHR is under the United States Army Medical Research Institute of Chemical Defense (USAMRICD). This organizational relationship is beneficial to both organizations, because the missions are closely related.

#### Focus Area: Environmental Sentinel Biomonitor

To provide rapid toxicity identification for a broad spectrum of industrial and agricultural chemicals in water, USACEHR is developing an ESB system to provide rapid identification of toxic conditions in water. An Integrated Product Team (IPT) of Army users has identified several possible Army applications for the ESB system.

#### Focus Area: Biomarker Discovery and Toxicogenomics

Gene and protein biomarkers reflect the basic biological status of each individual tested. Genetic information is transformed into a living organism, and proteomics, a complementary field approach dealing with the large scale investigation of protein expression have produced technologies that permit high sensitivity and high throughput surveys of thousands of genes and proteins as potential biomarkers. Miniaturizing tests in the above areas on "lab-on-a-chip" would allow the health monitoring of our soldiers.



## National Energy Technology Laboratory (Morgantown, WV and Pittsburg, PA)

[www.netl.doe.gov](http://www.netl.doe.gov)

“In my view, securing our energy future is one of the most pressing challenges of our time. In order for our economies to grow, for our people to prosper, for the health of our environment to improve and for the countries of the world to be safe, we must have access to a secure, clean, affordable energy supply.”

..... Samuel W. Bodman  
Secretary Of Energy



The National Energy Technology Laboratory (NETL), which is part of DOE's national laboratory system, is owned and operated by the U.S. Department of Energy (DOE). The NETL is the only U.S. national laboratory devoted to fossil energy research and implements a broad spectrum of energy and environmental research and developmental R&D programs.

### Key Issues & Mandates

One of DOE's primary strategic goals is “to protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy.” NETL contributes to this strategic goal through cutting-edge research and development, focused on the clean production and use of our Nation's domestic fossil energy resources. Advanced technologies provide policy makers with expanded options for meeting vital national energy, environmental, and security needs.

#### Secure and Reliable Energy Supplies

How will our Nation secure tomorrow's energy supplies? Domestic coal, oil, and natural gas resources are a fundamental part of the equation. NETL is advancing cost-effective technologies for finding and producing domestic fossil resources while meeting environmental requirements.

#### Clean Power Generation

Technology advances will equip power generators to use fossil resources with ever-greater efficiency and reliability, in ways that protect our natural environment. NETL is leading Research, Development and Demonstration (RD&D) efforts to make today's coal power plants cleaner and to enable tomorrow's systems to perform with near-zero emissions.

#### Toward a Hydrogen Economy

Hydrogen fuel cells produce power through an electrochemical (battery-like) process that differs radically from traditional combustion-based approaches. NETL is working on cost-effective ways to derive hydrogen from domestic coal and natural gas, and to utilize fuel

cells for power generation. Each step takes our Nation closer to an energy future where hydrogen systems deliver virtually pollution-free energy and reduce our dependence on imported oil. In addition to clean power generation and hydrogen advances, the Laboratory pursues novel approaches to monitoring, capturing, and sequestering greenhouse gases.

#### Climate Change

NETL provides a portfolio of technology options that further the President's Global Climate Change Initiative. In addition to clean power generation and hydrogen advances, the Laboratory pursues novel approaches to monitoring, capturing, and sequestering greenhouse gases.

#### Energy Efficiency and Renewable Energy

DOE invests in R&D to make more efficient use of energy in buildings, transportation, and industry, and to accelerate development of renewable energy options. NETL supports DOE's Office of Energy Efficiency and Renewable Energy in managing research partnerships.

#### Areas of Focus:

Energy System Dynamics conceives, analyzes, and develops pre-commercial energy technology that minimizes the environmental impact of fossil fuel use, and maximizes reliable use of domestic energy sources and infrastructure.

Geological and environmental systems conducts research into minimization and abatement of environmental problems associated with the development and use of fossil fuels. Research concentrates on geological sequestration of carbon dioxide, oil and gas exploration and production, air pollution/particulate matter issues, and removal of toxins from emissions from coal utilization systems.

Material Science specializes in formulating, characterizing, and/or melting of most metals, alloys, and ceramics; casting and fabrication, prototype development; and the recycle and remediation of waste streams associated with these processes. NETL is one of the few places in the world where alloy development, melting, casting, fabrication, physical and chemical analyses and performance testing (wear, erosion, and various forms of corrosion) can be performed in one place.

#### Institute of Water Resources, (Alexandria, Virgin

<http://www.iwr.usace.army.mil/waterresources>

ENVIRONMENT



Rivers



Lakes



Wetlands



Coasts



Watersheds

#### Coastal Storm Damage Reduction

The Army Corps of Engineer's works to reduce damages to shorefront development caused by shore erosion, hurricanes, and abnormal tidal/lake flooding by undertaking a variety of shore protection projects. Working in cooperation with a number of other federal

and state agencies the Corps has helped restore 3,800 miles of riparian forest buffers, preserved over 6 million acres of land and re-opened 1,500 miles of river to migratory fish in the Chesapeake Bay area.

## Environment

The U.S. Army Corps of Engineers Civil Works environmental program has three major focus areas: ecosystem restoration, stewardship, and the Formerly Used Sites Remedial Action Program, or FUSRAP. Efforts in both areas are guided by the Corps Environmental Operating Principles, which help us balance economic and environmental concerns through sound management of existing Corps lands and waters and restoration/repair of degraded ecosystems and contaminated sites.

## Flood Damage Reduction to Human and Natural Environment By

- Providing flood risk and water management information
- Coordinating with federal and state agency efforts to assist local communities with flood hazard mitigation measures
- Performing Levee inspections and certification and repairs to damaged structures
- Implementation of structural and nonstructural flood damage reduction projects.

## Clean Non-Polluting Hydropower

The U.S. Army Corps of Engineers is the largest operator of hydroelectric power plants in the United States and one of the largest in the world. Corps hydropower plants provide 100 billion kilowatt-hours annually, enough power to serve more than 10 million households.

## Regulatory

The mission of the U.S. Army Corps of Engineers regulatory program is to protect the nation's waters for current and future generations. The Corps permit process is designed to minimize the environmental impact of construction and dredging activities in U.S. waters and to ensure that all such efforts are well thought-out and carefully coordinated to minimal impact on the environment.

## Environmental Protection Agency, Mid Atlantic Region

[www.epa.gov/region03/index.htm](http://www.epa.gov/region03/index.htm)



The Mid-Atlantic regional office of the U.S. Environmental Protection Agency is responsible for programs in Delaware, Maryland, Pennsylvania, Virginia, West Virginia and the District of Columbia. Headquartered in Philadelphia, the region has field operations and laboratories in Wheeling, W.Va., Annapolis and Ft. George G. Meade, Md., and Pittsburgh, Pa.

Federal environmental programs include air and water pollution control; toxic substances, pesticides and drinking water regulation; wetlands protection; hazardous waste management; hazardous waste site cleanup; and some regulation of radioactive materials. Activities include compliance and enforcement, inspection, engineering reviews, ambient monitoring, analysis of environmental trends, environmental planning, pollution prevention, risk assessment, and education and outreach.

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*Environmental Science Center, 8 Fort Meade (Laurel, MD)*

[www.epa.gov/region3/esc/index.htm](http://www.epa.gov/region3/esc/index.htm)

At the Environmental Science Center, EPA scientists conduct tests on soil, air and water samples to determine the presence of pollutants and other contaminants. EPA microbiologists test drinking water to ensure its safety. Hospital disinfectants are tested to ensure the validity of their claims and chemists develop the analytical methods necessary to monitor pesticide residues in food. Science center staff also inspects and investigate manufacturing facilities, hazardous waste sites, and public and private labs.

*National Center for Environmental Assessment*

<http://cfpub.epa.gov/ncea/index.cfm>

EPA's National Center for Environmental Assessment, NCEA, provides guidance and risk assessments aimed at protecting human health and the environment. This guidance presents critical analyses and summaries of scientific consensus, vetted through a rigorous peer review process, on the risks of pollutants to human health and the natural environment.

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*EPA Office of Science Policy*

[www.epa.gov/osp](http://www.epa.gov/osp)

EPA functions as both a scientific and regulatory agency in the United States. Research conducted under ORD provides the basis for the formulation of environmental policies and programs. OSP plays a vital role by providing expert advice and evaluation on the use of scientific knowledge and science policy to support sound science in the Agency.

## US Geological Survey, (Reston, VA.)

<http://www.usgs.gov>

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

Every day the 10,000 scientists, technicians, and support staff of the USGS are working in more than 400 locations throughout the United States.

### *Discipline Components of the Integrated Science Centers:*

#### Biology

The Biological Research Division is to work with others to provide the scientific understanding and technologies needed to support the sound management and conservation of our Nation's biological resources. A fundamental part of our mission is embodied in our deep commitment to make data and information on the Nation's biological resources more accessible to more people.

..... Susan D. Haseltine

Associate Director for Biology, US Geological Survey

#### Biology Programs

- Biological Informatics Program
- Contaminant Biology Program
- Cooperative Research Units Program
- Fisheries: Aquatic & Endangered Resources Program
- Invasive Species Program
- Status and Trends of Biological Resources Program
- Terrestrial, Freshwater and Marine Ecosystems Program
- Wildlife: Terrestrial and Endangered Resources Program



#### Geography

USGS Geography confronts some of the most pressing natural resource and environmental issues of our Nation. Observing the Earth with remote sensing satellites, USGS geographers monitor and analyze changes on the land, study connections between people and the land, and provide society with relevant science information to inform public decisions.

#### Geography Areas of Concentration

LRS Research and Applications

GAM Research and Applications



## Geology

### •Water

The Water Resource information that is needed promotes the use of this

- Minimize loss of life and as floods, droughts, and movement.
- Effectively manage agricultural, commercial, industrial, recreational, and ecological uses.
- Protect and enhance water resources for human health, aquatic health, and environmental quality.
- Contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

..... Robert M. Hirsch, Ph.D.

USGS Associate Director for Water,



Discipline mission is to provide reliable, impartial, timely to understand the Nation's water resources. WRD actively information by decision makers to:

property as a result of water- related natural hazards, such land

ground-water and surface-water resources for domestic,



The USGS investigates the occurrence, quantity, quality, distribution, and movement of surface and underground waters and disseminates the data to the public, State and local governments, public and private utilities, and other Federal agencies involved with managing our water resources.

The USGA has much environmental information in the following areas:

- Atmosphere and Climate
- Earth Characteristics
- Ecology and Environment
- Environmental Issues
- Geographic Analysis and Mapping
- Geologic Processes
- Hydrologic Processes
- Natural Hazards

- Natural Resources
- Oceans and Coastlines
- Planets
- Plants and Animals
- Techniques and Methods

Water Resources

## National Institute Of Standards And Technology, (Gaithersburg, Md.)

<http://www.nist.gov/>

“We pride ourselves on being able to see far into the future. Our mission is to ensure that the U.S. industrial and scientific communities have all the right tools to spur innovation and competitiveness at a world-leading pace. To do this we must identify key measurement science, standards, and technology needs as much as 15 years before products using them will be available in the marketplace”.

..... Dr. James M. Turner  
Acting Director, NIST



NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. Its mission is carried out primarily through the operation of facilities in two locations: Gaithersburg, Maryland (234-hectare/578-acre site) and Boulder, Colorado, (84-hectare/208-acre site) and we have a history of implementing safe and effective environmental practices and innovative environmental technologies. The organization is committed to protecting human health and our natural resources.

Accomplishments and projects:

### Sulfur

NIST measurement standards for sulfur in fossil fuels have produced a net value to society of more than \$409 million since 1984, according to a new economic impact study by the Center for Economic Research of the Research Triangle Institute, a non-profit science and technology organization. In addition, NIST sulfur measurement standards have produced more than \$78 million in environmental benefits. The bulk of the economic benefits, \$401 million, come from improved efficiency in fuel blending, desulfurization and equipment operations in the petroleum and coal industries. The savings come from fuel producers being able to assess more accurately the exact level of sulfur in their products. The value of the reduction in sulfur dioxide emissions is based on an Environmental Protection Agency estimate of \$4,400 in environmental damage per ton of sulfur dioxide.

### Nanomaterial

While nanomaterials promise many useful applications, very little is known about the environmental, health, and safety (EHS) risks associated with them. The safety or toxicity of nanomaterials can be determined only with well-understood materials and well-defined testing methods. NIST is the Federal agency of choice because it has the interdisciplinary physical-science expertise and the facilities needed to develop accurate, validated methods for understanding the EHS properties of nanoscale materials.

#### Standard Methodology Development for Detection and Measurement

NIST Scientists provide the analytical community with methodology for the detection and quantification of perceived chemicals that may have environmental or human and non-human health issues. For example,

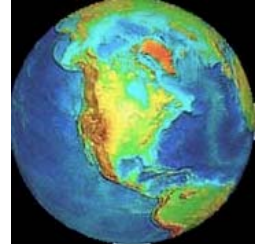
- Standards Development and Measurements to Support Global Climate Change Studies
- Method Development and Measurements of Polybrominated Diphenyl Ethers (PBDEs) in Tissue, Serum, and Sediment SRMs

#### **National Oceanic and Atmospheric Administration, (Silver Springs, MD)**

<http://www.noaa.gov/about-noaa.html>

“NOAA is an agency that enriches life through science. Our reach goes from the surface of the sun to the depths of the ocean floor as we work to keep citizens informed of the changing environment around them.”

..... Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.)  
Undersecretary of Commerce for Oceans and Atmosphere



NOAA is a federal agency focused on the condition of the oceans and the atmosphere. It plays several distinct roles within the Department of Commerce:

- A Supplier of Environmental Information Products. One of the most important resources in our society is information. NOAA supplies information to its customers that pertains to the state of the oceans and the atmosphere. This is clearly manifest in the production of weather warnings and forecasts through the National Weather Service, but NOAA's information products extend to climate, ecosystems and commerce as well.
- A Provider of Environmental Stewardship Services. NOAA also is the steward of national coastal and marine environments. In coordination with federal, state, local, tribal and international authorities, NOAA manages the use of these environments, regulating fisheries and marine sanctuaries as well as protecting threatened and endangered marine species.
- A Leader in Applied Scientific Research. NOAA is a trusted source of accurate and objective scientific information in four particular areas of national and global importance:

Office of Response and Restoration: To fulfill its mission of protecting and restoring, NOAA Trust Resources, and the Office of Response and Restoration:

- provides scientific and technical support to prepare for and respond to oil, chemical & nuclear (air and water) releases;
- determines damage to natural resources from these releases;
- protects and restores marine and coastal ecosystems, including coral reefs; and
- works with communities to address critical local and regional coastal challenges

Ecosystems: Ensure the sustainable use of resources and balance competing uses of coastal and marine ecosystems, recognizing both their human and natural components.

Climate: Understand changes in climate, including the El Niño phenomenon, to ensure that we can plan and respond properly.

Weather & Water: Provide data and forecasts for weather and water cycle events, including storms, droughts and floods.

Commerce & Transportation: Provide weather, climate, and ecosystem information to make sure individual and commercial transportation is safe, efficient and environmentally sound.

### **Naval Research Laboratory, (DC)**

<http://www.nrl.navy.mil/>

NRL operates as the Navy's full-spectrum corporate laboratory, conducting a broadly based multidisciplinary program of research and advanced technological development directed toward maritime applications of new and improved materials, equipment, systems and ocean, atmospheric, and space sciences and related technologies. Environmental research within the Mid-Atlantic region is concentrated in the following areas:



Meteorology- Although the only wholly dedicated scientific center in the Navy where atmospheric research is conducted is at the Monterey site, the main NRL is located within the Mid-Atlantic region and undoubtedly has some influence on the type of research that goes on at the Monterey Site. The North Pacific Experiment (NORPEX) has extended the forecasts range for severe storms in the central and eastern U.S. to 4 days in advance.

### El Nino Modeling

Polar Ozone and Aerosol Measure - Polar Ozone and Aerosol Measurement (POAM) is a satellite-borne instrument that monitors ozone in the Arctic and Antarctic stratosphere year-round. POAM was developed by NRL to measure the vertical distribution of ozone with a vertical resolution of one kilometer. The NRL is involved in measuring the size and extent of both polar ozone holes and understanding how they are formed.

Seafloor Mapping and Interpretation - The sidescan sonar imagery and sub-bottom profiler data, plus other ancillary data such as sediment samples and bottom camera photographs, are used to produce a geological map of the seafloor.

**Bureau of Reclamation (Washington, DC)**

<http://www.usbr.gov/main/about/>



The mission of the Bureau is to assist in meeting the increasing water demands of the West while protecting the environment and the public's investment in these structures. The Bureau places great emphasis on fulfilling our water delivery obligations, water conservation, water recycling and reuse, and developing partnerships with our customers, states, and Native American Tribes.

The bureau manages, develops, and protects water and related resources in an environmentally and economically sound manner in the interest of the American public by:

- Honoring State water rights, interstate compacts, contracts with Reclamation users, further the Secretary of the Interior's Indian Trust responsibilities, and comply with all environmental statutes.
- Ensuring the continued delivery of water and power benefits in conformity with contracts, statutes, and agreements.
- Developing strategies to manage and deliver water more efficiently and effectively to our customers in order to help satisfy the many needs of irrigation, municipalities, power and the environment and serving as a technical resource for water users and planners.

**National Institute For Occupational Safety And Health (W. DC & WV)**

<http://www.cdc.gov/niosh/about.html>

The National Institute for Occupational Safety and Health (NIOSH) is the federal agency responsible for conducting research and making recommendations for the safe environment as related the human work place. NIOSH is part of the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services.

The Institute is authorized to:

- Develop recommendations for occupational safety and health standards;
- Perform all functions of the Secretary of Health and Human Services under Sections 20 and 21 of the act;

- Conduct Research on Worker Safety and Health (Section 20);
- Conduct Training and Employee Education (Section 21);
- Develop information on safe levels of exposure to toxic materials and harmful physical agents and substances;
- Conduct research on new safety and health problems;
- Conduct on-site investigations (Health Hazard Evaluations) to determine the toxicity of materials used in workplaces;
- Fund research by other agencies or private organizations through grants, contracts, and other arrangements.

The Federal Mine Safety and Health Amendments Act of 1977 delegated additional authority to NIOSH for coal mine health research. The mine health and safety law authorized NIOSH to:

- Develop recommendations for mine health standards for the Mine Safety and Health Administration;
- Administer a medical surveillance program for coal miners, including chest X-rays to detect pneumoconiosis (black lung disease) in coal miners;
- Conduct on-site investigations in mines similar to those authorized for general industry under the OSH Act;
- Test and certify personal protective equipment and hazard-measurement instruments.

Environmental issues that are of routine concern are:

Aerosols | Infectious Aerosols

Antineoplastic Agents

Asbestos

Asphalt Fumes

Asthma and Allergies

Carbon Monoxide

Carpal Tunnel Syndrome

Coal Mine Rescue

Confined Spaces

Drug Exposures in Health Care

Electrical and Magnetic Fields (EMF)

Hazards to Outdoor Workers

Hearing Loss

Hazardous Drug Exposures in Healthcare Worker

Heat Stress

Hexavalent Chromium

Latex Allergies

Lead

Lyme Disease

Metalworking Fluids

Mining

Musculoskeletal Disorders

Nanotechnology

Osmium Tetroxide

Pesticides

SARS

Silica

Take Home Toxins

West Nile Vi

