

# Columbia Environmental Research Center



The U.S. Geological Survey, Columbia Environmental Research Center, is located in Columbia, Missouri, with aquatic and terrestrial environmental research programs extending across our nation and other countries.

## Introduction

<http://www.cerc.usgs.gov/>

The Columbia Environmental Research Center (CERC) provides scientific information and data for the U.S. Geological Survey (USGS) needed to address national and international environmental contaminant issues and assesses effects of habitat alterations on aquatic and terrestrial ecosystems.

The Center has a unique capability for conducting both focused and large-scale multidisciplinary research that includes, but is not limited to, large river floodplains, coastal habitats, wetlands, and lakes. Emphasis is on projects that integrate scientific disciplines to address complex environmental issues on large geographical scales.

Scientists at CERC form partnerships with national, state and local agencies, non-government organizations and universities to enhance scientific information needed for management of the Nation's resources.

In addition to the main facility in

Columbia, MO, CERC administers field research stations located across the Nation.

Historically, the Center was established in 1959 at the Denver Wildlife Research Center of the Fish and Wildlife Service, and was called the Fish Pesticide Research Laboratory (FPRL). In 1966, the University of Missouri deeded 33 acres to the Fish and Wildlife Service and the FPRL moved to its present location. The Center was incorporated into the USGS in 1996.

## Center Organization

<http://www.cerc.usgs.gov/about/about/>

Staff at CERC have an extensive range of scientific and technical expertise. Research areas and services cover broad aspects of environmental toxicology and chemistry, biochemistry, ecology, large river ecology, and information and technology transfer. The Center's science program is organized into seven branches:

- Toxicology**
- Environmental Chemistry**
- Biochemistry and Physiology**
- Ecology**
- River Studies**
- Field Station Research**
- Information Technology**



Sediment toxicity test development requires establishing standard procedures such as seen above, placing test organisms into test beakers.

## Toxicology Branch

[www.cerc.usgs.gov/about/tox\\_brnch.htm](http://www.cerc.usgs.gov/about/tox_brnch.htm)

Environmental toxicology scientists develop, apply, and validate methods for assessing the effects of contaminants and other environmental stressors on aquatic organisms. Research focuses on bioaccumulation and toxicity of contaminants from water, sediment, and food; the physical, chemical, and biological factors affecting these processes; and relationships between lab responses and characteristics of contaminated aquatic ecosystems.

## Environmental Chemistry Branch

[www.cerc.usgs.gov/brnch\\_webs/echem/](http://www.cerc.usgs.gov/brnch_webs/echem/)

Environmental chemistry research encompasses all areas relating to environmental pollution, including analytical methods development, fate of environmental contaminants, development of techniques for defining bioavailability, bioconcentration potential, and determination of the toxicological significance of exposure to contaminant residues in aquatic, terrestrial, and atmospheric ecosystems.

## Biochemistry and Physiology Branch

[www.cerc.usgs.gov/about/bchem\\_brnch.htm](http://www.cerc.usgs.gov/about/bchem_brnch.htm)

The Biochemistry/Physiology Branch conducts basic and applied research at the cellular, organ, and organismal levels in fish and wildlife. Emphasis is on the sublethal effects of chemicals that lead to behavioral, developmental, and population changes that may ultimately influence ecosystem health.

Research focus includes reproductive, developmental, and neurotoxic effects of stressors. The Branch develops and uses analytical techniques such as microscale assay, cell bioassay, and immunoassay, to quantitate exposure and estimate toxicity in both lab and field studies.



*Fisheries biologists conduct in situ toxicity tests to assess the biological significance of degraded water quality.*

### Field Station Research Branch

[www.cerc.usgs.gov/about/frs\\_brnch.htm](http://www.cerc.usgs.gov/about/frs_brnch.htm)

The Field Station Research Branch specializes in ecological and toxicological research that is relevant to natural resource issues in the DOI from the Texas/Gulf Coast, Intermountain West, and Great Lakes/Great Plains regions. Research Stations are located in Corpus Christi, TX; College Station, TX; Padre Island, TX; Jackson, WY; Yankton, SD; and International Falls, MN.

Scientific expertise includes marine ecotoxicology; sediment toxicology; waterfowl and grassland bird ecology, wildlife ecology; ecotoxicology of mammals, reptiles, and amphibians; sea turtle ecology and population recovery; assessment of metals effects in native western fishes; Natural Resource Damage Assessments; agricultural irrigation drainwater assessment; and aquatic community evaluations of endangered, native, and invasive fish species.

### Ecology Branch

[www.cerc.usgs.gov/brnch\\_webs/ecology/](http://www.cerc.usgs.gov/brnch_webs/ecology/)

Ecological research focuses on understanding the effects of habitat alteration on aquatic systems caused by contamination, physical destruction, eutrophication, exotic species, and climate change. The ecological investigations are integrated with other biological, chemical, and physical science programs at CERC to provide a comprehensive understanding of habitat alteration on aquatic populations and communities.

### River Studies Branch

[www.cerc.usgs.gov/About/river\\_studies\\_brnch.htm](http://www.cerc.usgs.gov/About/river_studies_brnch.htm)

The primary mission of the River Studies Branch is to increase the understanding of how management and restoration activities function on large river systems using integrated

science approaches. River studies emphasizes how changes in the physical and chemical condition of rivers affect habitat and ecological conditions.

CERC developed the River Studies Branch to improve scientific understanding of the ecological consequences of management actions on large-river ecosystems, achieved by evaluating habitat changes over temporal scales ranging from centuries to individual floods, and over spatial scales ranging from river segments to macrohabitats.

Staff provide information and technical support for the development and use of digital databases for natural resource planning and management, and for conducting research at an ecosystem scale, which includes the Missouri River.

Current efforts are underway to move CERC to a new level of recognition in providing information to aid in floodplain management for the lower Missouri River. These new activities provide scientific information to decision makers and are the basis for the Missouri River InfoLINK. The InfoLINK is an Internet-based Missouri River information clearinghouse, created for stakeholders who want to understand how the river functions and make informed decisions about the river's future use and management. The InfoLINK web page includes maps that provide a visual perspective of Missouri River basin information.



*The pre-development Missouri River represented one of North America's most diverse ecosystems with abundant braided channels, riparian lands, chutes, sloughs, islands, sandbars, and backwater areas.*

### Information Technology Branch

[www.cerc.usgs.gov/about/it\\_brnch.htm](http://www.cerc.usgs.gov/about/it_brnch.htm)

The Information Technology (IT) Branch performs information analysis and management and provides the technology infrastructure allowing Center staff to manage, utilize, and deliver scientific information. Functional areas within the IT Branch include computer services, data management, information management, telecommunications, and database development.

Obtain more information on CERC research and science capabilities by contacting CERC staff:

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