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USGS EROS – Who We Are

The more than 600 members of the workforce at the U.S. Geological Survey (USGS) Center for Earth Resources Observation and Science (EROS) are dedicated to improving our understanding of a changing world. The work performed by EROS staff is dynamic, multi-scale (global, national, regional, and local), and potentially affects millions of people each day. EROS activities and investigations are diverse, but their ultimate goal is the same: to acquire and disseminate objective, impartial, and authoritative scientific data and information about the Earth and its resources.

Geographers and other scientists at EROS investigate ways to use satellite images and other types of geographic information to study the Earth. For example, some scientists at EROS are exploring the effects of wildfires, monitoring the regeneration of vegetation after a fire, and finding ways to better predict fires and deal with their consequences. Other scientists participate in emergency response activities worldwide by rapidly making available satellite images of areas that have been hit by earthquakes, floods, and other natural or human-induced disasters. Still other EROS scientists are investigating ways to use radar to predict volcanic eruptions, modeling the carbon cycle, simulating the effects of climate change, monitoring drought, providing early warning of famines, and studying environmental impacts on wildlife, such as frogs and other amphibians. In addition to their research activities, many EROS scientists also conduct training classes all over the world on the use of satellite images and geographic information.

Teams of scientists and data management specialists at EROS use many types of geographic information to create detailed digital representations of elevation, land cover, and other aspects of the Earth's surface. Many of these digital data sets are available on the Internet. Some teams study ways to discern trends in the changing land cover of the United States or investigate new sources of data that can detect very small and subtle changes to the landscape. For example, scientists employ data collected using a special type of airborne laser technology called lidar to analyze both the terrain and the vegetation on the Earth's surface in great detail.

Satellite systems engineers at EROS operate the Landsat satellites and ensure that they continue their vital role as unique sources of terrestrial data. The USGS Landsat receiving station at EROS is staffed by satellite operation specialists who make sure that incoming data from Landsat and other satellites is processed and stored for further use. The broad task of satellite operations and data reception, whether from Landsat, other satellites, or aerial photography, supports the work of scientists at EROS and many others around the world.

Front entrance to USGS EROS

One of the greatest strengths of EROS is its archive of historic satellite imagery and aerial photography, the largest civilian archive of such data in the United States. EROS archivists not only work to ensure that this 35-year data record is perfectly preserved, but also explore innovative ways to make the archive's holdings more readily available. For instance, the archive's entire aerial photography collection—over 8.5 million frames—is being scanned so that each image can be accessed digitally via the Internet.

Software developers perform a vital function at EROS by creating special-purpose software that enables scientists and engineers to do their work efficiently. Computer system engineers keep EROS computer systems and networks running, a critical job given the fact that roughly a terabyte of data is received at the Center every day. All this information must be moved over internal networks that link processing, storage, and distribution systems. Computer engineers also evaluate new storage and network technology that can enhance EROS' already state-of-the-art computer systems.

Communications specialists creatively showcase the work going on at EROS via posters, news releases, exhibits, workshops, Web sites, videos, and articles, and by giving tours to visitors. Data and applications support staff help customers find data, manage data sales, and promote EROS capabilities at national and international conferences. Logistics staff keep the physical plant at EROS in working order.

EROS staff come from across the United States and from around the world. Most members of the EROS workforce operate out of the USGS facility located 16 miles northeast of Sioux Falls, South Dakota. Some staff, however, are based with partners at various other locations throughout the country and the world. EROS supports a strong visiting scientist program, hosting scientists and post-doctoral researchers from local, national, and international universities. In addition, the North American node of the United Nations Environment Programme's Global Resource Information Database is located at EROS, with international staff working on environmental and natural resource issues. Student interns at EROS also provide support for science projects while gaining firsthand research experience.

EROS is a government facility under the direction of the USGS, which is an agency of the U.S. Department of the Interior. However, it has a large contract labor force. About 80 government managers direct the work at EROS, while most of the staff are employed by support service contractors. This partnership combines government and industry strengths and ensures workforce flexibility—and has proven to be effective and successful for over 35 years. The largest support service contract at EROS is the Technical Support Services Contract, or TSSC. The first TSSC was awarded in 1972; various private companies compete for this contract every 5 years. Some of the other service contracts at EROS include those for satellite flight operations, facility maintenance, security, accounting, and custodial services. The table below shows the current service contractors at EROS.

Table 1. USGS EROS Service Contractors, 2007.

The U.S. Geological Survey Center for Earth Resources Observation and Science

The Center for Earth Resources Observation and Science (EROS) is owned and activities are managed by the Department of the Interior, U.S. Geological Survey (USGS). Several private companies, under contract to the USGS, or under contract to partnering Federal agencies, support the mission of USGS EROS.

Science Applications International Corporation (SAIC)
Primary Technical Support Services Contractor

SAIC Subcontractors
SGT, Inc.
Tri - Star

Raytheon Intelligence and Information Systems
ECS Operations and Maintenance

Honeywell
Mission Operations Center Landsat - 5 and Landsat - 7

Aerospace Corporation
Technical and Administrative Support

DCT, Inc.
Facility Maintenance and Operations

ATA, Administrative and Technical Services, Inc.
Security and Financial Services

Pleasant Valley
Custodial Service

EROS Cafeteria
(via the Business Enterprise Program Division of the Service to the Blind and Visually Impaired)
Food Service

University of California Center for Water Resources
Climate Research and Field Studies for the Famine Early Warning System Network (FEWS NET)

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USGS EROS – What We Do

The mission of the U.S. Geological Survey (USGS) Center for Earth Resources Observation and Science (EROS) is to collect data and conduct scientific research that improves our understanding of a changing world. Much of the work we do is based on remote sensing.

Remote sensing is the science of acquiring information about the Earth's surface without actually being in contact with it. This information can be collected by satellites, cameras, or a variety of other sensors. Remotely sensed earth science data form the heart of the EROS mission. EROS is perhaps best known as the USGS receiving station for Landsat satellite images. However, data from many other satellites and other remote sensing platforms—including radar, lidar (an airborne laser instrument), and aerial photography—as well as information about elevation, land cover, and other aspects of the Earth's land surfaces are also stored at and distributed by EROS.

Receiving, processing, archiving, and distributing satellite images and other remotely sensed data are primary tasks carried out at EROS. Furthermore, EROS scientists use these different forms of remotely sensed data in a wide variety of research projects that range from drought monitoring and climate change to international emergency response. Other EROS specialists support the promotion and distribution of these data. Specifically, the key elements of the work done at EROS include:

- **Data Reception and Processing:** EROS operates the USGS Landsat receiving station, and also receives data from other satellites and sensors. EROS is responsible for Landsat operations and for running the ground station that processes and distributes new remotely sensed data. EROS will host the ground receiving station for the successor to Landsats 5 and 7, the current satellites in the series that began in 1972.

- **Data Archive and Distribution:** EROS houses the world's largest civilian archive of remotely sensed imagery. Stewardship of this collection involves preserving the data and making it available at the lowest possible cost. In addition to millions of satellite images, the archive also contains more than eight million aerial photographs that date back to the 1930s. Archival experts at EROS are in the process of scanning all these photographs and making the entire collection available on the Internet.

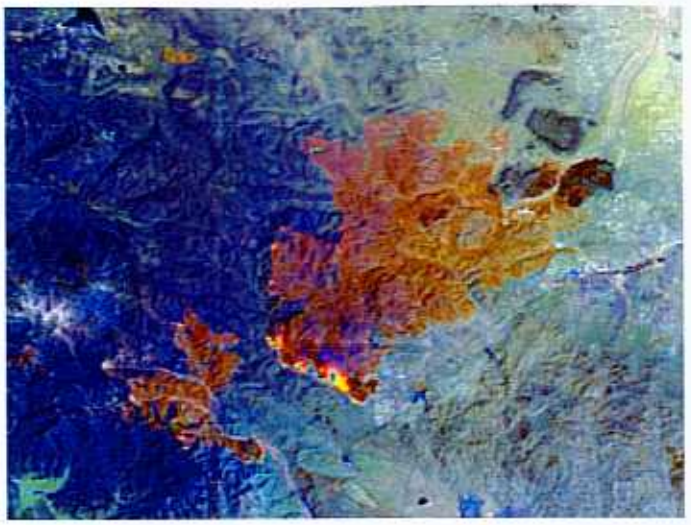
- **Data Set Development:** EROS scientists develop data sets for use in research and monitoring of the Earth and the changes that are occurring to it. Land cover and elevation are two fundamental data sets developed at EROS that are used by scientists worldwide. EROS also plays a key role in the investigation of new sources of geographic information, such as lidar and radar technologies. Many of these data sets, and products derived from them, are available on the Internet.

Grand Canyon, Arizona
Landsat 7 image.

- **Climate Change:** Using satellite images to monitor the growth of vegetation worldwide and employing sophisticated software to model the carbon cycle are two ways that EROS scientists contribute to the study of climate change.

- **Earth Monitoring:** By comparing satellite images of the United States from over a decade ago to current images, scientists at EROS detect how land cover has changed over time and discern some of the effects of those changes. Drought monitoring and famine early warning projects in the United States and many foreign countries rely on satellite images and data sets derived from those images to analyze vegetation conditions—and identify potential drought conditions—throughout the growing season. Information on the extent of wildfires, the consequences fires have on vegetation, and the likelihood of fire occurrence is developed at EROS and provided to forest managers around the country.

Topography of Puget Sound, Washington
Merged topography and bathymetry data with SHOALS (computer application) of Puget Sound, Wash.

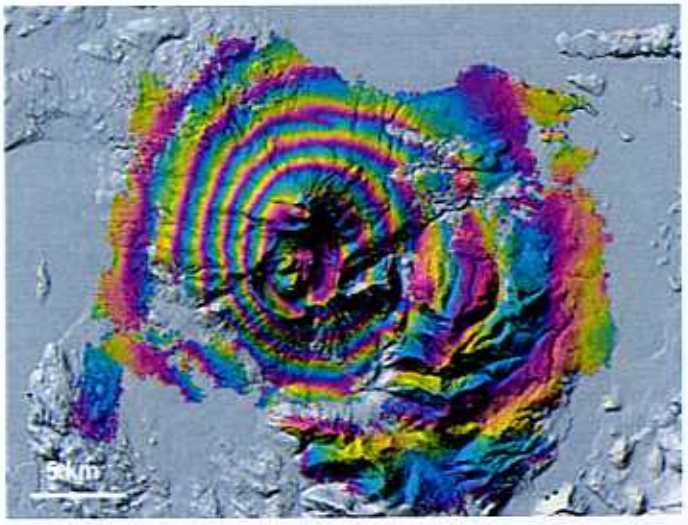


Sawtooth and Millard Fires
Landsat 7 image of two lightning-ignited wildfires in the San Bernardino Mountains. The fires burned 58 homes near the town of Yucca Valley, California. July, 2006.

Additionally, EROS scientists have been among the world's leaders in using radar to detect pre-eruptive expansion of the Earth's crust near volcanoes, a sign that a volcanic eruption could be imminent.

- **Emergency Response:** EROS scientists respond to natural and human-induced disasters around the world with data, maps, and information. Flood monitoring projects at EROS attempt to predict the extent of potential inundation in places such as Afghanistan and Africa.
- **Outreach and Customer Support:** EROS seeks to inform and educate the public about the Earth's resources and its terrestrial environment with publications, videos, Web sites, workshops, presentations at conferences, and tours. EROS staff help customers find and acquire satellite images and other data, and coordinate requirements with other government agencies.

In summary, scientists and engineers at EROS provide the definitive data and information required to understand and monitor landscape characteristics, natural processes, and land management practices that affect society and the environment. EROS provides informed and unbiased assessments of emerging science and engineering requirements to the land remote sensing and earth science communities. Its staff work to ensure the long-term viability of remotely sensed data as a scientific resource through the renewal and enrichment of the contents and capabilities of the EROS archive. The work performed at EROS to preserve and distribute remotely sensed data and to conduct scientific research ensures that these data sets will contribute to a greater understanding of our changing world.



Peulik Volcano, Alaska Aleutian Islands
In the above image, each interferometric fringe (cycle of colors from red to green to cyan to yellow and back to red) represents about 2.83 cm of vertical uplift. The 1996-1998 inflation episode at Peulik Volcano confirms that InSAR detects magma accumulation beneath volcanoes believed to be dormant several months before other signs of unrest are apparent.

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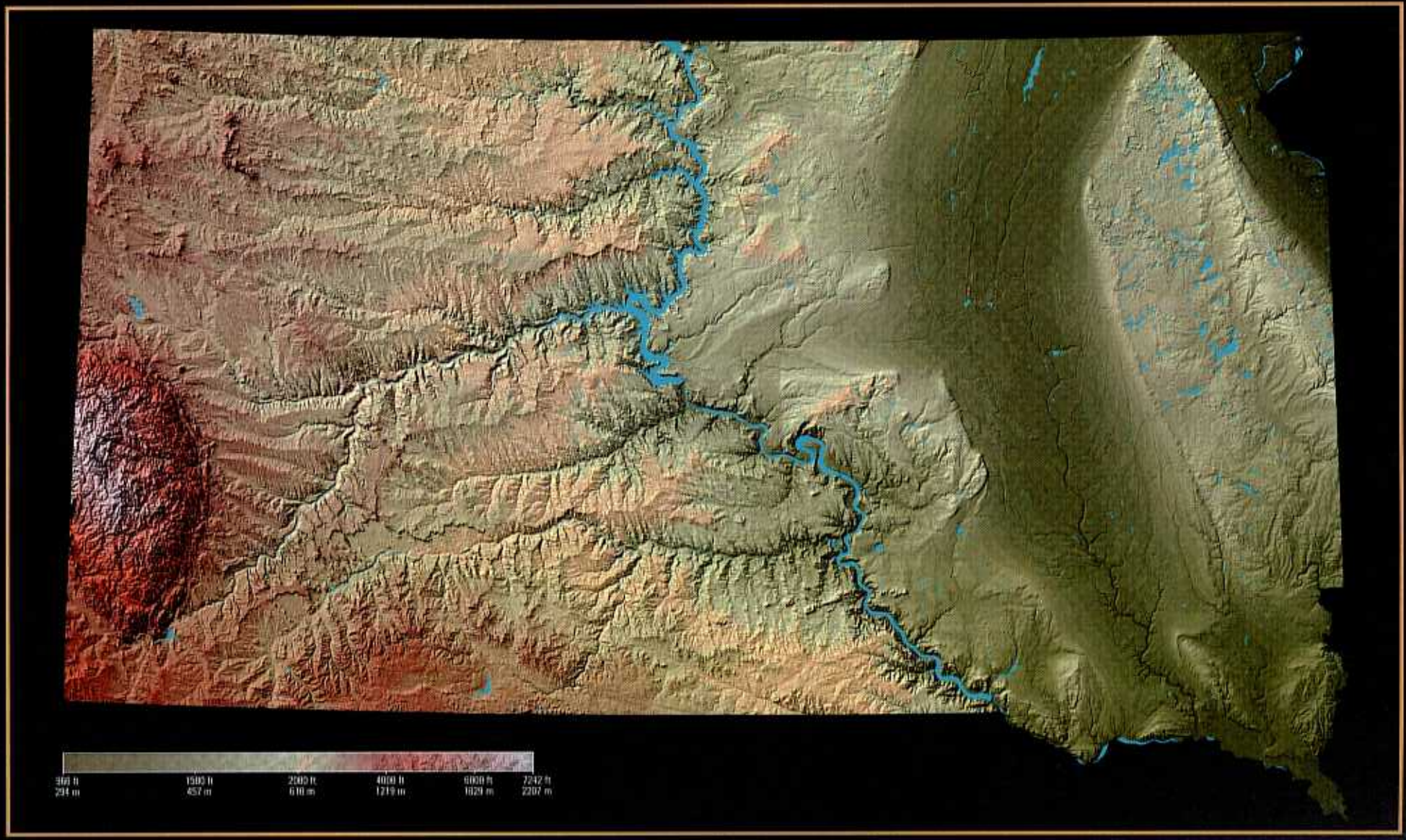
South Dakota Shaded Relief



http://eros.usgs.gov

U.S. Department of the Interior
U.S. Geological Survey

South Dakota's Physical Landscape

South Dakota's physical landscape has been shaped by wind, water, ice, and subsurface geological forces. Ice sheets have covered the eastern half of South Dakota many times during the past 2 million years, carving landforms as they advanced over the landscape and, during warmer intervals, depositing sediments as they retreated. The Coteau des Prairies is capped by an accumulation of sediments deposited during ancient ice ages. During the most recent ice age (that began about 60,000 years ago and ended about 10,000 years ago), two tongue-like lobes of ice diverged from the main ice sheet at the Coteau's northern end and sculpted the sides of the knife-shaped highland we see today.

Because it has experienced the advance and retreat of ice sheets, eastern South Dakota is generally flat and has few major rivers. In contrast, the highly developed drainage network of western South Dakota is a sign that this region has not been subjected to the leveling action of glaciation. The east-flowing rivers in the western half of the State – the Grand, Moreau, Cheyenne, Bad, and White – all end at the Missouri because it marks the furthest advance of the last ice sheet and their flows were diverted to the south along the ice margin. When the ice retreated, the drainage channel that had formed along its western edge remained as the Missouri River.

The Badlands along the White River resulted from the rapid erosion of layers of soft rock and volcanic ash to form steep-sided gullies and pinnacles. The combination of a dry climate, sparse vegetation, and infrequent, but occasionally torrential, rainfall accelerates the erosive action of streams in this type of terrain. Far to the north, the Castle Rocks and Slim Buttes areas were similarly created by this type of erosion.

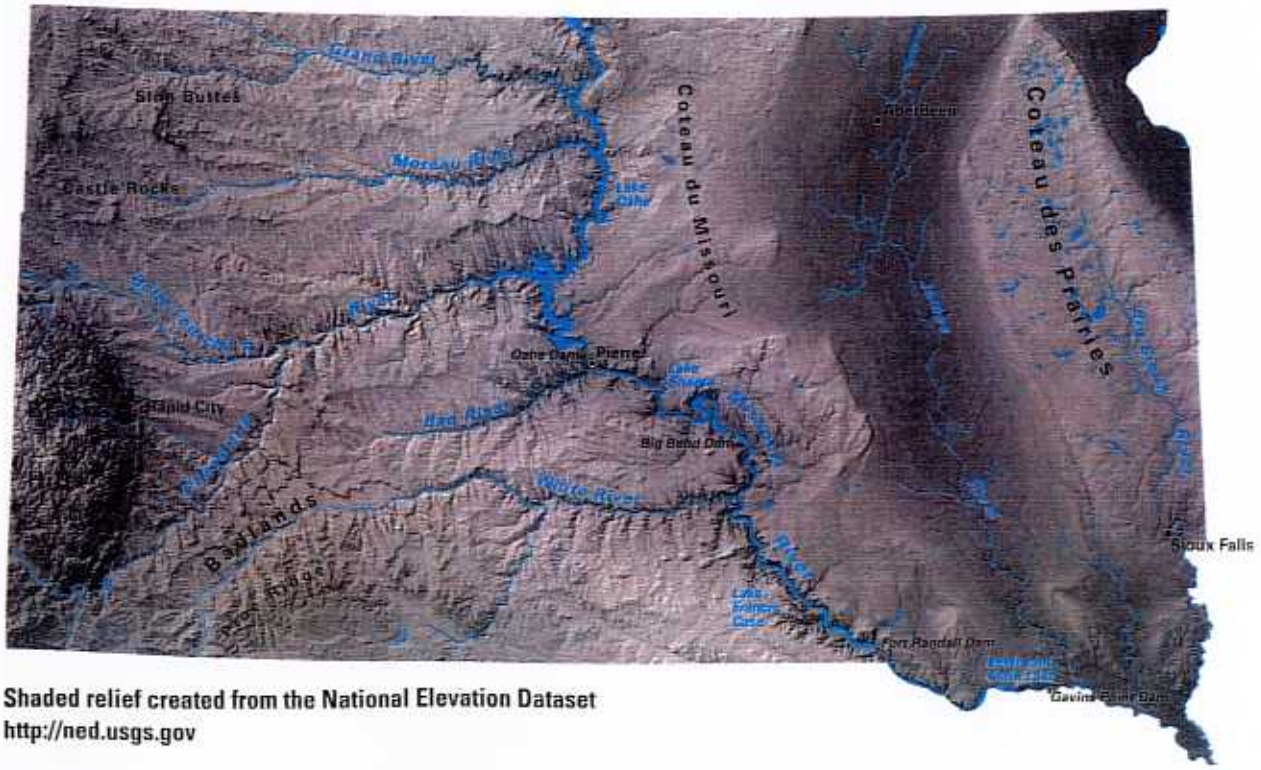
The Black Hills uplift occurred between 65 million and 55 million years ago as subsurface geological forces pushed up a dome-like mass of rock that forms the present-day Black Hills. The oldest rocks that have been exposed by erosion of the dome are located in the center of the Black Hills, including the 1.7 billion-year-old granite that forms South Dakota's highest point, Harney Peak (7,242 feet or 2,207 meters above mean sea level).

The U.S. Geological Survey (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. As the Nation's largest water, earth, and biological science and civilian mapping agency, the USGS collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems.

The USGS Center for Earth Resources Observation and Science (EROS) is located northeast of Sioux Falls, South Dakota. Established in 1971, EROS is responsible for gathering, archiving, and distributing satellite imagery and data about the Earth. Scientists use this information to better understand our changing world.

U.S. Geological Survey
http://www.usgs.gov

USGS Center for Earth Resources Observation and Science
http://eros.usgs.gov



Shaded relief created from the National Elevation Dataset
http://ned.usgs.gov

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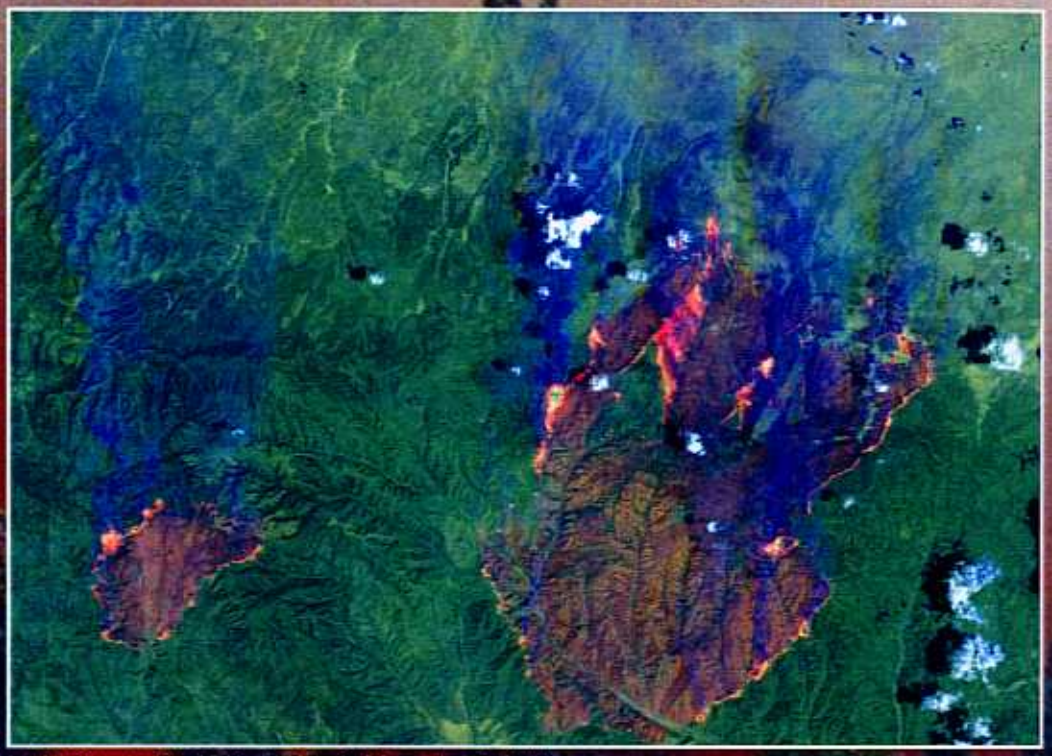
125 years of science for America ★ ★ ★ ★ ★ 1879–2004

When Can A Picture Save A Thousand Homes?

"Each morning we would check the situation reports on fires. Landsat data, as part of a large information system, have proven valuable in monitoring daily changes in fire conditions."

— T.M. Murphy, Bureau of Land Management



Landsat imagery of Rodeo/Chediski fire in Arizona, June 21, 2002.

In 2002 there were 88,458 wildfires in the U.S.

In 2002 almost 7 m[illegible] acres burned.

As the wildland-urban interface expands. more people than ever are at risk from wildland fire. Landsat is a crucial tool in the Government's fight to protect lives, property, and natural resources from this growing threat.

In 2002, 815 structures burned.

In 2002 fire suppression cost $1.6 billion.

U.S. Department of the Interior
U.S. Geological Survey

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Space Beans

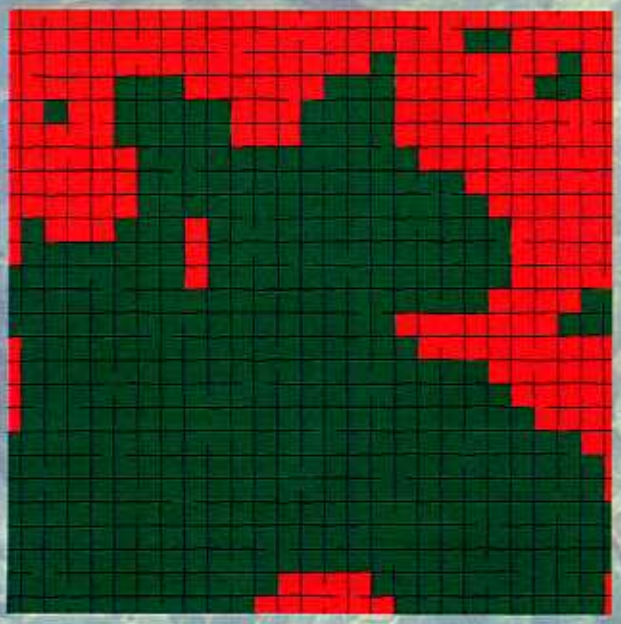
North Dakota and Minnesota produce over 31% of the Nation's supply of dry edible beans.

White mold, a fungal disease that develops in humid and rainy weather, is one of the most serious crop diseases in the Red River Valley, and can cause substantial yield losses.

"The near real time Landsat imagery we get through the Upper Midwest Aerospace Consortium, NASA, and the USGS helps us make key decisions, resulting in considerable cost savings and increased productivity. More importantly, we apply less chemicals, helping the environment."

—Gary Wagner, President, AWG Farms, Crookston, Minnesota

By identifying very wet areas, this farmer was able to apply fungicide to his crops only where necessary.



Spray application map created from the Landsat data.

This example was done in cooperation with the Upper Midwest Aerospace Consortium, University of North Dakota, Grand Forks, ND.

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U.S. Geological Survey

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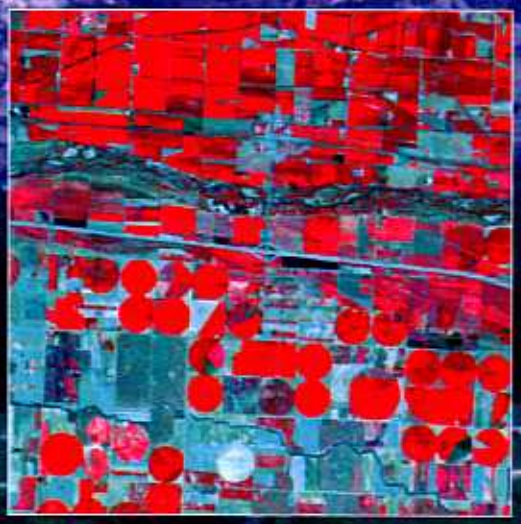
What Does This ... Have To Do With This?

"We are using Landsat satellite images to try to assess pesticide exposure beyond the farm. With the use of this technology, we've moved to a much more integrated view of exposures for the entire population."

— Dr. J.R. Nuckols, Department of Environmental and Radiological Health Sciences, Colorado State University, Fort Collins, CO



Human exposure to agricultural chemicals has long been associated with cancer, birth defects, and neurological disorders. Today, the USGS collaborates with the National Cancer Institute and Colorado State University to evaluate the potential use of remotely sensed satellite imagery to study agricultural chemical exposure in Iowa, Nebraska, and Colorado.

U.S. Department of the Interior
U.S. Geological Survey

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How Full is the World's Breadbasket?

"Landsat 7 is a key operational tool for assessing global agricultural economics which affects billions of dollars in agricultural trade and income every month." —USDA

Established center pivot irrigation.

Wadi as Sirhan region of Saudi Arabia.

Shortly after the introduction of center pivot irrigation for wheat production.

Landsat satellite data are a critical component used in making crop production and condition estimates.

U.S. Department of the Interior
U.S. Geological Survey

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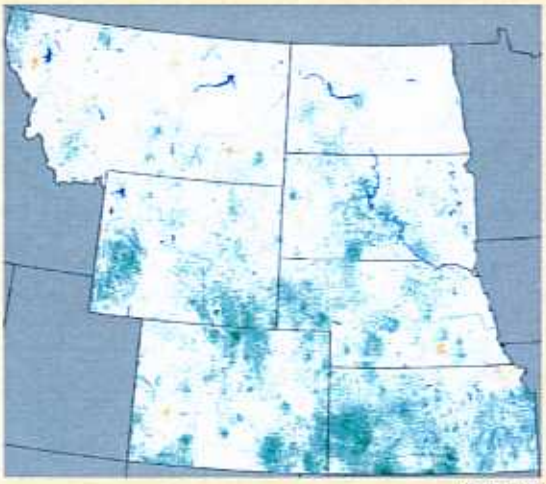
National Drought Mitigation Center

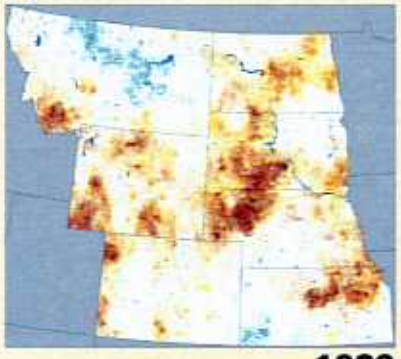
Monitoring Drought Conditions with the Vegetation Drought Response Index



2005

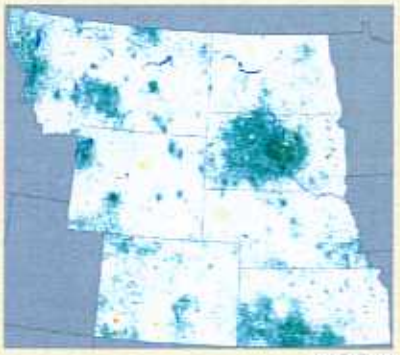
A joint effort by the U.S. Geological Survey's National Center for Earth Resources Observation and Science and the National Drought Mitigation Center is underway to develop and deliver timely geographic information on drought at a 1-km resolution. These maps show an experimental drought indicator, the Vegetation Drought Response Index (VegDRI), developed to provide regional and sub-county scale information of drought effects on vegetation. VegDRI is calculated using data mining techniques that integrate complex information from satellite measurements, climate-based drought indices, land cover types, soils characteristics, and additional environmental factors. Future development is planned to monitor drought over the lower 48 states using these techniques. Further information and maps can be found at:

http://gisdata.usgs.net/website/Drought_Monitoring/

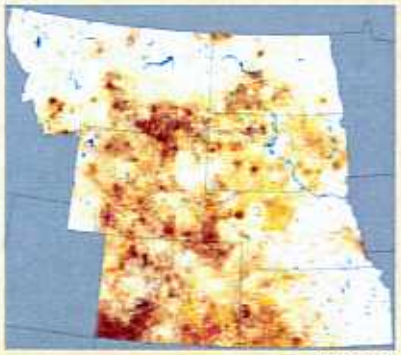


1989

1993

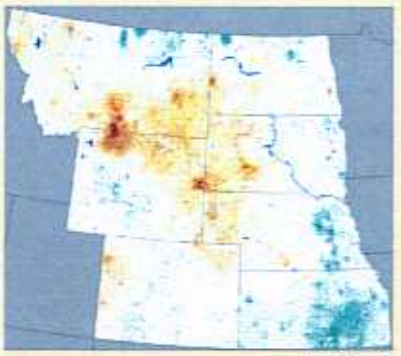


1997



2002

2003



2004

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jfbrown@usgs.gov

U.S. Department of the Interior
U.S. Geological Survey

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The National Map

USGS EROS Data Center Collaboration in South Dakota

The South Dakota Space Grant Consortium (SDSGC)

This program is funded by NASA and led by the South Dakota School of Mines and Technology in Rapid City, South Dakota. It is designed to provide pre-college education, higher education for faculty and students, and public service education in space science, mathematics, engineering, and technology to South Dakota citizens. The program provides a link among members and affiliates and establishes a communication forum for space science, engineering, and technology topics. SDSGC also sponsors the annual South Dakota Space Days.
http://www.sdsmt.edu/space/space.html

Members:
Augustana College – Sioux Falls, SD
South Dakota School of Mines and Technology - Rapid City, SD
South Dakota State University – Brookings, SD
USGS EROS Data Center, Sioux Falls, SD

State and Federal Government Affiliates:
National Weather Service Forecast Office, Aberdeen, SD
Office of Aeronautics, South Dakota Department of Transportation

Educational Affiliates:
Black Hills State University (BHSU), Spearfish, SD
Dakota State University (DSU), Madison, SD
Lake Area Technical Institute, Watertown, SD
Lower Brule Community College, Lower Brule, SD
Northern State University, Aberdeen, SD
Oglala Lakota College, Kyle, SD
Science Linkages in the Community (SLIC), Rapid City, SD
Si Tanka University (formerly Cheyenne River Community College), Eagle Butte, SD
Sinte Gleska University, Rosebud, SD
Sisseton Wahpeton Community College, Sisseton, SD
Sitting Bull College, Fort Yates, ND
University of South Dakota (USD), Vermillion, SD
Teaching SMART (Girls, Inc.) Rapid City, SD
Badlands Observatory, Quinn, SD
Black Hills Astronomical Society
Center for the Advancement of Mathematics & Science Ed. NASA "Educator Resource Center (ERC), Spearfish, SD
Children's Science Center, Rapid City, SD
Kirby Science Discovery Center & ERC, Washington Pavilion, Sioux Falls, SD
South Dakota Discovery Center & Aquarium, Pierre, SD

Experimental Program to Stimulate Competitive Research (EPSCoR) Collaboration

The USGS EDC attends EPSCoR sponsored meetings and is a member of the REACH (Research Excellence: A Critical Hallmark) Committee.

* EPSCoR

NASA EPSCoR Research Projects

The focus is on Earth system science projects that incorporate both remote sensing technology and strong collaboration with USGS EROS Data Center, NASA centers, Horizons Incorporated, and others. Projects include "Leaf Area Index for Fire Chronosequences of the Black Hills and Southern Siberia: A Comparative Study" and "Cross-Calibration of Landsat and IKONOS Sensors for Use in Precision Agriculture".

* SDSM&T, SDSU, Augustana College

USGS EDC Adjunct Professors at South Dakota Universities

Twenty EDC scientists and engineers are adjunct professors at SD Universities. In 2004, staff scientists will teach courses on remote sensing and conservation biology at South Dakota colleges. USGS EROS Data Center staff serve on numerous graduate student committees at SDSU and SDSM&T.

Each semester for the past 10 years, USGS EDC scientists have made presentations to many SDSU classes on a wide range of topics ranging from natural resources management and conservation biology to the importance of foreign language skills.

* Augustana College, SDSM&T, SDSU, DSU

Washington Pavilion of Arts and Science

The EROS Data Center has membership on the Board of Directors for the Pavilion Kirby Science Discovery Center, and supports the science and education objectives of the Pavilion with exhibits, guest speakers, and collaboration in community outreach.

* Washington Pavilion of Arts and Science

Land Resources Mapping and Monitoring at SDSU

For over 10 years, the SDSU Engineering Research Center and the EROS Data Center have collaborated in the field of applying satellite remote sensing to land resource mapping and monitoring. In order to facilitate the exchange of information and maintain close ties with the USGS EDC, SDSU provides office space for a USGS geographer.

* SDSU

USGS Data Exhibit at the Washington Pavilion of Arts and Science

To commemorate the 200th anniversary of Lewis and Clark's Corps of Discovery, staff at the USGS EDC designed an exhibit titled, "The Voyage of Discovery Continues: Another View of the Journey of Lewis and Clark". This exhibit featured satellite and elevation data that traced the route from St. Louis, Missouri to the Pacific Coast. Today, the USGS uses modern surveying technologies to continue the legacy of exploring our natural resources that began with Lewis and Clark.

* Washington Pavilion of Arts and Science

Creating Leaders for a Changing World.
AUGUSTANA COLLEGE

Convention and Meeting Planning Services

Augustana College is under contract with the USGS EDC to furnish convention and meeting planning services in support of initiatives and projects. In cooperation with the USGS EDC, Augustana plans for, hosts, and supports conventions, meetings, and working groups in the U.S. and abroad.

* Augustana College

Minnehaha County GIS

Joint Agency Commercial Imagery Evaluation (JACIE)

The USGS EDC is working with the city of Sioux Falls and Minnehaha County Geographic Information Services (GIS) departments as part of the Joint Agency Commercial Imagery Evaluation (JACIE) effort to evaluate commercial remote sensing products obtained from aerial mapping and satellite sensors. As part of this effort, the USGS, City of Sioux Falls and Minnehaha County have developed and established an In situ calibration test range.

* City of Sioux Falls, Minnehaha County

Wildlife and Fisheries Sciences
South Dakota State University

Collaboration for Wildlife and Fisheries Sciences

The USGS EDC is collaborating with faculty and students in the Wildlife and Fisheries Sciences Department at SDSU on a variety of geospatial applications involving research and management of wildlife populations and their habitats.

* SDSU, USFS, NPS, SDGF&P

Northeast South Dakota Closed Basin Flooding Study

The study covers the development of the Waubay Lakes and the climate issues that led to flooding in the closed basin. The study resulted in a model designed to predict possible future water levels within the watershed.

* FEMA, COE, SDDENR, SDSU, and WRD

GeoWall

Visualization

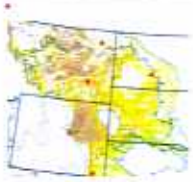
The USGS collaborates with universities in pursuing new technologies and techniques for visualization of Earth science data and high-bandwidth network access to information.

* SDSU, SDSM&T, USD, DSU

Beowulf Clustering Investigations

Over the last two years, the USGS EDC worked with the SDSU Computer Science Department developing algorithms for the Beowulf clustering and prototyped a "Cluster of Clusters" concept.

* **SDSU, SDSM&T**



Gross Primary Productivity Carbon in the Northern Great Plains 2001 Growing Season

This project focuses on scaling up carbon flux measurements from local to regional scales. The derived regional and temporal maps are useful for improving carbon budgets and understanding terrestrial carbon sources and sinks. Web site: http://edc.usgs.gov/carbon_cycle/FluxesResearchActivities.html

* **SDSU, USDA Agricultural Research Service, USAID-CRSP**

South Dakota Crop Maps

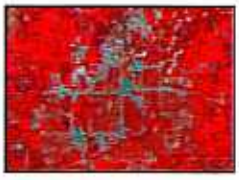
Using satellite imagery, crop maps of South Dakota are being developed to assess the impacts of fertilizers and pesticides on water quality.

* **SD-DENR, SD-EDWDD**

USGS EDC Wide Area Networking to South Dakota Universities

The USGS EDC has multiple high-speed connections to regional and national networks. For the last five years, the USGS EDC has participated in an NSF EPSCoR grant awarded to a consortium of states including ND, SD, NE, KS, OK, MO & AR. The USGS EDC provides the termination point, rack space, and engineering support for all of the Internet2 connected universities within South Dakota including: SDSU, USD, SDSM&T, BHSU, NSU, DSU. The staff configure all university network connections. The total EDC Wide Area Network connectivity exceeds 900 Mbits/sec.

* **SDSU, USD, SDSMT, NSU, BHSU, DSU**



Landsat Calibration

Cooperative research between SDSU and the Landsat Project provides a unique opportunity to enhance the calibration of USGS Landsat data and to further SDSU's satellite image data calibration research and education activities.

* **SDSU**

American Indian Services, Inc.

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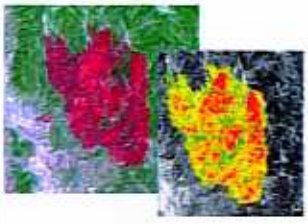
* **American Indian Services, Inc.**



Providing Fire Maps for South Dakota

The USGS has responded with data and data analysis for post-fire assessments on South Dakota wildland fires.

* **NPS:** Jewel Cave National Monument – Jasper Fire, Wind Cave National Park – Highland Creek Fire, Badlands National Park – West Sage Fire, Dillon Fire
* **USFS:** Jasper Fire, Grizzly Gulch Fire, Roger's Shack Fire, Battle Creek Fire, Elk Mountain Fire
* **Custer State Park:** Galena Creek Fire

Sinte Gleska University (SGU) Memorandum of Understanding with the USGS

This MOU promotes Earth science careers and professional development among SGU students, builds and strengthens relationships among Federal programs, private industry, and SGU, and establishes a link between traditional Lakota and western science views of the landscape ("two views, one landscape").

* **SGU**

NativeView

NativeView is an initiative aimed at improving resource management, agriculture, economic development, and education on tribal lands through the use of Federal data and technology by developing prototype applications based on scientific and traditional descriptors of tribal landscapes.

* **SGU, Tribal College Consortium**

Sioux Falls School District Native American Connections Program

The Native American Liaison from the USGS EDC meets weekly with students from the American Connections Program to inform, educate, and mentor them.

* **Sioux Falls Middle and High Schools**

Land Cover Trends

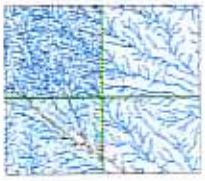
The USGS conducts a national analysis of the rates, causes, and consequences of land use and land cover change.

* **EPA, SDSU, State University of New York - Environmental Science and Forestry, University of Southern Mississippi**

MODIS Reprojection Tool

The LP DAAC collaborated with SDSM&T on the development of the MODIS Reprojection Tool software that is used to reproject, mosaic, subset, and reformat MODIS land gridded products. The project team was recognized with a NASA Goddard Technology Commercialization Program award in 2001.

* **SDSM&T**



Perennial / Intermittent / Ephemeral Streams for *The National Map* of the Future

Through a research prospectus, the USGS EDC funded the South Dakota State University geography department to conduct research and produce publications on the legal ramifications of misclassification of streams on USGS maps. SDSU is conducting the work that began in 2003 and will extend through September 2004.

* **SDSU**

South Dakota Center for Biocomplexity Studies (SDCBS)

SDCBS was established by South Dakota EPSCoR to promote integrated research in environmental systems. Biocomplexity stresses the richness of biological systems and their capacity for adaptation and self-organizing behavior. The Director provides coordination and the academic infrastructure includes researchers distributed across South Dakota.

* **EPSCoR, SDSU, SDSM&T, USD**

USGS Business Partners Program

The USGS Business Partners Program serves the Government, private industry, and the general public by enabling and encouraging the distribution of Federal data resources through commercial entities such as Horizons, Inc. of Rapid City, SD. The USGS EDC and Horizons, Inc. worked together to compile maps and aerial photo resources that aid in environmental cleanup of many abandoned military bases. As Business Partners, they provided SD authorities with complete aerial photo coverage of the Black Hills areas to aid in forest fire suppression.

* **SDSU, Horizons, Inc.**

Commercial Imagery Calibration, Evaluation, and Application

The USGS works with academia and industry to evaluate and develop sensor calibration and image data standards and image applications with respect to commercial imagery. Collaborative efforts include involvement with the Joint Agency Commercial Imagery Evaluation (JACIE), South Dakota 2010 Research initiative, USGS Cartographic Services Contracts for image collection, and USGS camera calibration contracts.

* **SDSU, Horizons, Inc.**

Workshop for Educators

USGS EDC staff and the Upper Midwest Aerospace Consortium (UMAC) Educational Public Access Resource Center (EdPARC) host workshops at the USGS EDC titled, "Earth Science Tools for Educators."

* **SDSU, Axtell Park Middle School, UMAC/EdPARC, Educators across SD**

"Science to Kids" Distance Learning

USGS EDC scientists make presentations and provide opportunities for questions from students in grades 6-12 through the Digital Dakota Network distance learning technology. Scientists have offered two presentations a month during the school calendar year. Web site: http://www.ddnnet.net

* **DECA, SD Middle and High Schools**

Earth Imagery for Education

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Web site: http://earthscience4kids.cr.usgs.gov

* **SD Elementary, Middle, and High Schools, SDSM&T**

Other K-12 Educational Presentations and Outreach

- Student Shadowing/Mentoring Coordination – through the East Dakota Educational Cooperative, United Way School-based Mentoring, ShadowED, Rural Shadow Program, Business Leadership Network, and Connecting Educators to the Workforce
- Science Fairs – provide judges
- Water Festivals – staff booths and give presentations on "Water From Space"
- Elementary Career Days – exhibit and give presentations as part of "Fabulous Fridays"

* **SD Elementary, Middle, and High Schools, SDSM&T, Sioux Falls Chamber of Commerce, Sioux Falls United Way**

* **Indicates USGS Collaborator**

For More Information

USGS EROS Data Center
USGS Customer Services
Mundt Federal Building
Sioux Falls, SD 57198

Phone: 800-252-4547
Phone: 605-594-6151
TDD: 605-594-6933
Fax: 605-594-6589

General information on products products and services may be obtained by calling 1-888-ASK USGS
http://ask.usgs.gov

USGS EDC External Website

http://edc.usgs.gov/

The National Map

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Note: The pictures have been added for interest and only to draw your attention to the text.

ACRONYMS

BHSU	Black Hills State University
COE	Corps of Engineers
DSU	Dakota State University
EDC	EROS Data Center
EPA	Environmental Protection Agency
EPSCoR	Experimental Program to Stimulate Competitive Research
ERC	Educator Resource Center
FEMA	Federal Emergency Management Agency
NPS	National Parks Service
NSF	National Science Foundation
NSU	Northern State University
REACH	Research Excellence: A Critical Hallmark
SDDENR	South Dakota Department of Environment and Natural Resources
SD-EDWDD	South Dakota East Dakota Water Development District
SDGF&P	South Dakota Department of Game, Fish, and Parks
SDSGC	South Dakota Space Grant Consortium
SDSM&T	South Dakota School of Mines and Technology
SDSU	South Dakota State University
SGU	Sinte Gleska University
SLIC	Science Linkages in the Community
USAID-CRSP	United States Agency for International Development-Collaborative Research Support Program
USD	University of South Dakota
USDA	United States Department of Agriculture
USDA-FSA	USDA Farm Service Agency
USFS	United States Forest Service
USGS	U.S. Geological Survey
WRD	Water Resources Discipline

USGS
science for a changing world

The National Map

USGS EROS Data Center Collaboration in Sioux Falls, SD

The South Dakota Space Grant Consortium (SDSGC)

This program is funded by NASA and led by the South Dakota School of Mines and Technology in Rapid City, South Dakota. It is designed to provide pre-college education, higher education for faculty and students, and public service education in space science, mathematics, engineering, and technology to South Dakota citizens. The program provides a link among members and affiliates and establishes a communication forum for space science, engineering, and technology topics. SDSGC also sponsors the annual South Dakota Space Days.
http://www.sdsmt.edu/space/space.html

Members:
Augustana College – Sioux Falls, SD
South Dakota School of Mines and Technology - Rapid City, SD
South Dakota State University – Brookings, SD
USGS EROS Data Center, Sioux Falls, SD

State and Federal Government Affiliates:
National Weather Service Forecast Office, Aberdeen, SD
Office of Aeronautics, South Dakota Department of Transportation

Educational Affiliates:
Black Hills State University (BHSU), Spearfish, SD
Dakota State University (DSU), Madison, SD
Lake Area Technical Institute, Watertown, SD
Lower Brule Community College, Lower Brule, SD
Northern State University, Aberdeen, SD
Oglala Lakota College, Kyle, SD
Science Linkages in the Community (SLIC), Rapid City, SD
Si Tanka University (formerly Cheyenne River Community College), Eagle Butte, SD
Sinte Gleska University, Rosebud, SD
Sisseton Wahpeton Community College, Sisseton, SD
Sitting Bull College, Fort Yates, ND
University of South Dakota (USD), Vermillion, SD
Teaching SMART (Girls, Inc.) Rapid City, SD
Badlands Observatory, Quinn, SD
Black Hills Astronomical Society
Center for the Advancement of Mathematics & Science Ed. NASA "Educator Resource Center (ERC), Spearfish, SD
Children's Science Center, Rapid City, SD
Kirby Science Discovery Center & ERC, Washington Pavilion, Sioux Falls, SD
South Dakota Discovery Center & Aquarium, Pierre, SD

Washington Pavilion of Arts and Science

The USGS EROS Data Center has membership on the Board of Directors for the Pavilion Kirby Science Discovery Center, and supports the science and education objectives of the Pavilion with exhibits, guest speakers, and collaboration in community outreach.

* **Washington Pavilion of Arts and Science**

NASA EPSCoR Research Projects

The focus is on Earth system science projects that incorporate both remote sensing technology and strong collaboration with USGS EROS Data Center, NASA centers, Horizons Incorporated, and others. Projects include "Leaf Area Index for Fire Chronosequences of the Black Hills and Southern Siberia: A Comparative Study" and "Cross-Calibration of Landsat and IKONOS Sensors for Use in Precision Agriculture".

* **SDSM&T, SDSU, Augustana College**

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* **EPSCoR, SDSU, SDSM&T, Augustana College**

South Dakota Crop Maps

Using satellite imagery, crop maps of South Dakota are being developed to assess the impacts of fertilizers and pesticides on water quality.

* **SD-DENR, SD-EDWDD**

USGS EDC Wide Area Networking to South Dakota Universities

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Convention and Meeting Planning Services

Augustana College is under contract with the USGS EDC to furnish convention and meeting planning services in support of initiatives and projects. In cooperation with the USGS EDC, Augustana plans for, hosts, and supports conventions, meetings, and working groups in the U.S. and abroad.

* **Augustana College**

USGS EDC Adjunct Professors at South Dakota Universities

Twenty EDC scientists and engineers are adjunct professors at SD Universities. In 2004, staff scientists will teach courses on remote sensing and conservation biology at South Dakota colleges. USGS EROS Data Center staff serve on numerous graduate student committees at SDSU and SDSM&T.

Each semester for the past 10 years, USGS EDC scientists have made presentations to many SDSU classes on a wide range of topics ranging from natural resources management and conservation biology to the importance of foreign language skills.

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* **Sioux Falls Middle and High Schools**

Joint Agency Commercial Imagery Evaluation (JACIE)

The USGS EDC is working with the city of Sioux Falls and Minnehaha County Geographic Information Services (GIS) departments as part of the Joint Agency Commercial Imagery Evaluation (JACIE) effort to evaluate commercial remote sensing products obtained from aerial mapping and satellite sensors. As part of this effort, the USGS, City of Sioux Falls and Minnehaha County have developed and established an In situ calibration test range.

* City of Sioux Falls, Minnehaha County

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USGS Data on Exhibit at the Washington Pavilion of Arts and Science

To commemorate the 200th anniversary of Lewis and Clark's Corps of Discovery, staff at the USGS EDC designed an exhibit titled, "The Voyage of Discovery Continues: Another View of the Journey of Lewis and Clark". This exhibit featured satellite and elevation data that traced the route from St. Louis, Missouri to the Pacific Coast. Today, the USGS uses modern surveying technologies to continue the legacy of exploring our natural resources that began with Lewis and Clark.

* Washington Pavilion of Arts and Science

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USDSU	Consortium of Colleges (in Sioux Falls) University of South Dakota-South Dakota State University-Dakota State University located in Sioux Falls, SD
USFS	United States Forest Service
USGS	U.S. Geological Survey
WRD	Water Resources Discipline