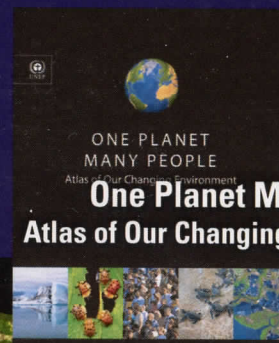


National Center for Earth Resources Observation and Science



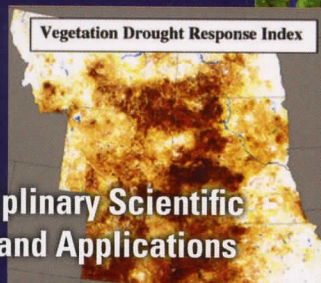
Real-Time Satellite Operations



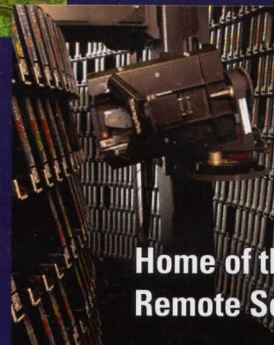
**ONE PLANET
MANY PEOPLE**
Atlas of Our Changing Environment
One Planet Many People:
Atlas of Our Changing Environment



Supporting Wildland Fire Modeling



**Inter-disciplinary Scientific
Research and Applications**



**Home of the Nation's Land
Remote Sensing Archive**

USGS Long-Term Archive: Documenting Our Changing Planet

USGS National Center for Earth Resources Observation and Science

Strategic Plan 2005-2010

Vision

EROS is the world's leader in monitoring and assessing the Earth's landscape.

Mission

EROS resources are dedicated to greater understanding of the Earth's land resources through excellence in science, data management, infrastructure, and facilities devoted to evaluation and assessment of land changes and their impact on our society. Key elements of this mission include:

- **Earth Observation:** Observe the Earth at all scales to ensure availability of historical and current observations.
- **Terrestrial Monitoring:** Characterize and quantify land surface status and trends to provide a framework for studies at local to global scales.
- **Vulnerability Assessment:** Study impacts of population, environment, and economy to assess vulnerability to changes in climate, water, carbon cycle, ecosystems, invasive species, and other societal concerns.
- **Emergency Response:** Apply remote sensing technology and geospatial information to enhance the scientific basis for risk assessment and emergency response related to natural and human-induced hazards.
- **Data and Information Management:** Preserve remote sensing and geospatial data and information and provide timely and ready access for a broad range of users and applications.
- **Training and Assistance:** Promote the use of remote sensing technology by government, academia, private sector cooperators, state and local institutions, the international community, and customers through training and assistance to our partners.

To accomplish our mission, EROS will acquire, develop, evaluate, and apply information technology, advanced systems and tools for processing and disseminating remote sensing data and information in partnership with U.S. Geological Survey (USGS) disciplines, other Department of the Interior (DOI) bureaus, other government agencies, international scientists, academia, and industry.

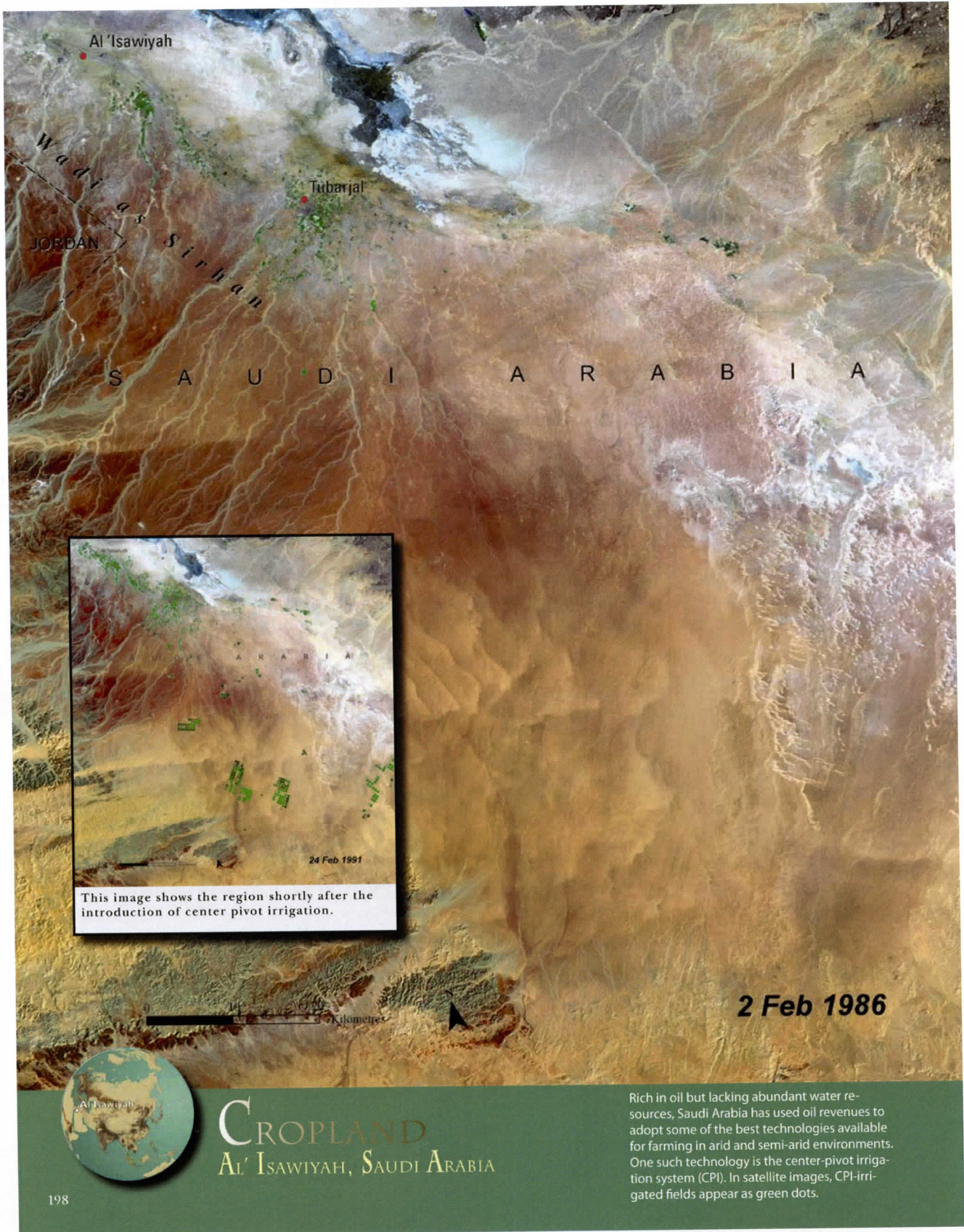
USGS National Center for Earth Resources Observation and Science

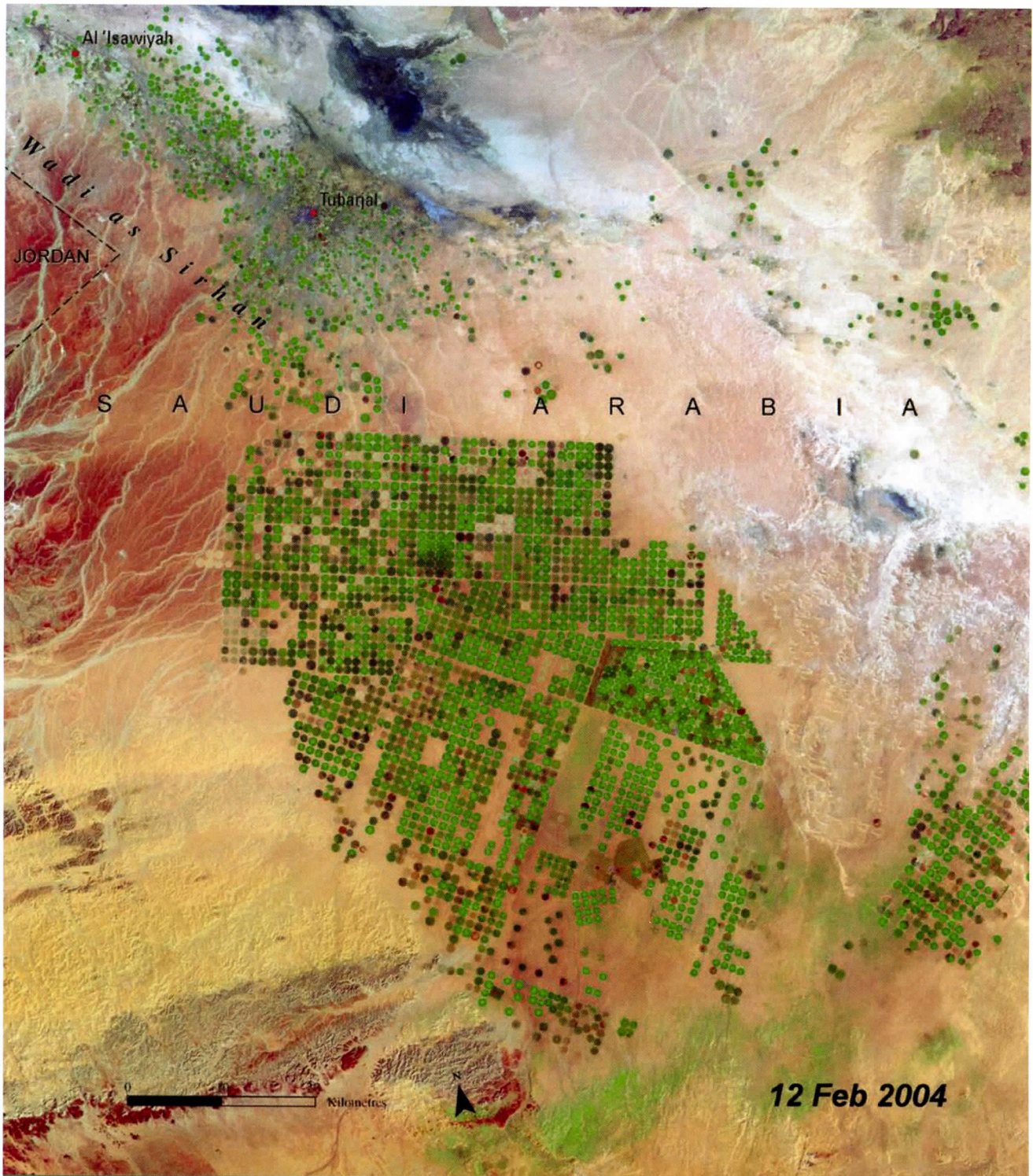
EROS is the home of the:

- **National Satellite Land Remote Sensing Data Archive** – housing the world's largest collection of civilian land remote sensing data, representing over 4 decades of earth images and the principle source for documenting our Nation's fire history.
- **NASA's Land Processes Distributed Active Archive Center** – home to nearly 2,000 terabytes of earth imagery from NASA's Earth Observing Systems (Terra and Aqua).
- **Multi-mission satellite operations center** – Landsat 5, Landsat 7, NASA's MODIS and ASTER data, NASA's Earth Observing-1, and NOAA's AVHRR data – critical for operational fire monitoring.
- **Real-time access to remote sensing data supporting emergency response activities** – fires, hurricanes, floods, tsunami, landslides, earthquakes, volcanoes, droughts, etc.
- **USGS Land Cover Institute** – advancing the science, applications, and knowledge of land use and land cover.

Significant R&D capabilities and activities supporting next-generation mapping and monitoring for our Nation's resources and environment.



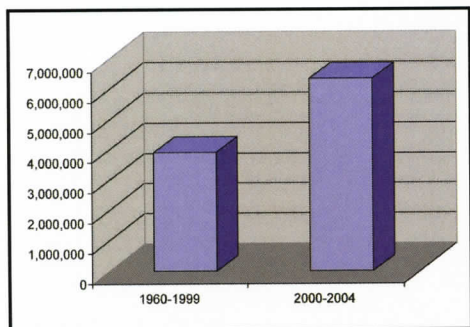




These three images, from 1986, 1991, and 2004, reveal the effects of this irrigation strategy in a vast desert region in Saudi Arabia known as Wadi As-Sirhan. This region was once so barren that it could barely support the towns Al 'Isawiyah and Tubarjal that can be seen in the upper left of each image. Following the introduction of center-pivot irrigation, however, barren desert was gradually transformed into a greener, food-producing landscape.

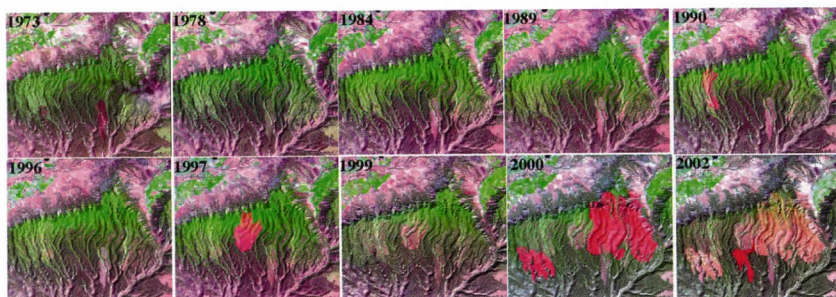
The irrigation system draws water from an ancient aquifer—some of the water it contains may be as much as 20 000 years old. Judicious use of water resources, and climate-appropriate technology, has in this situation helped improve food production without being detrimental to the environment.

Wildfire and Landscape Monitoring



National policy makers and land managers require information about long-term trends about wildfire occurrence and impacts. Current trends indicate more areas are burned each year.

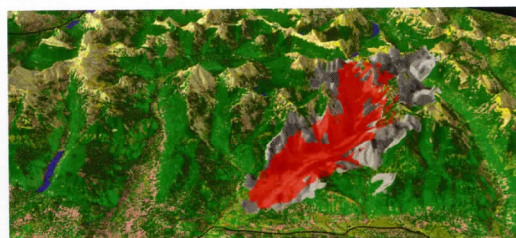
Average Annual Acres Burned 1960 to 1999 and 2000 to 2004



Mesa Verde National Park fires as recorded on a time series of Landsat imagery between 1973 and 2002.

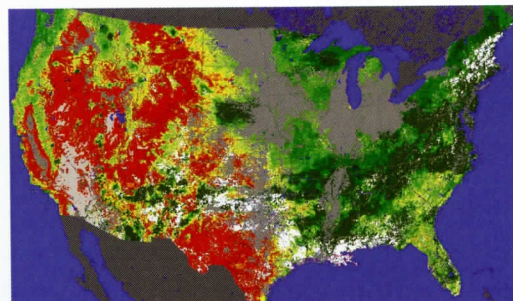
EROS is a partner in an interagency effort to develop a national fire atlas using the 33 year record of fire history recorded by Landsat.

EROS provides the satellite imagery and geospatial analysis for LANDFIRE, a nationwide mapping of wildfire fuels and hazards. LANDFIRE will be used by land managers for prioritization of fire fuel treatments and prediction of fire behavior.



Rampage Fire: Visualization model for wildfire spread and fire perimeter

EROS provides daily satellite information for monitoring the vegetation condition of the conterminous United States and Alaska for fire danger monitoring and forecasting.



Fire Potential Index

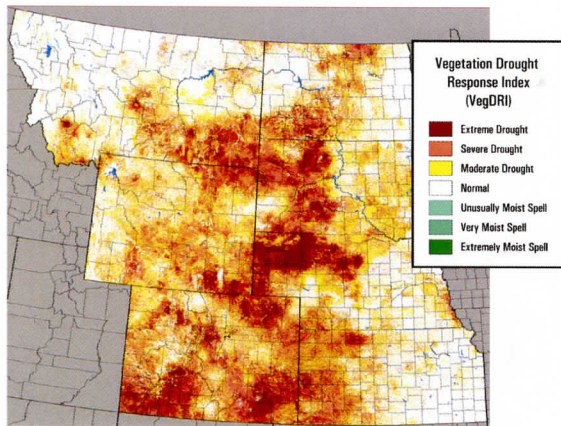
Satellite Data in Drought Monitoring



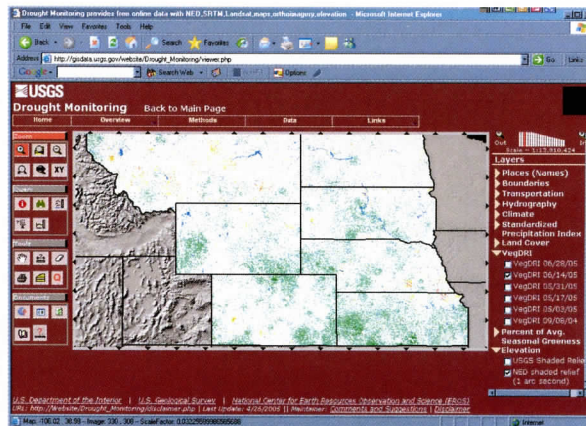
Wind blown soil over a dry field in Nebraska in 2002.

The annual economic cost of drought in the U.S. is often greater than all other natural disasters combined. Drought risk management is improved with timely, detailed information on drought conditions.

EROS is participating in a joint effort with the National Drought Mitigation Center to develop a unique experimental drought indicator with a 1 km resolution, the Vegetation Drought Response Index (VegDRI). VegDRI integrates satellite observations and climate-based drought measurements. The partnership plans to expand the use of these tools and techniques to monitor drought conditions over the lower 48 states.



VegDRI map for July 25, 2002.



Current VegDRI maps can be found at http://gisdata.usgs.net/website/Drought_Monitoring/

USGS National Center for Earth Resources Observation and Science (EROS) Collaboration with South Dakota Universities



South Dakota State University
You can do anything from here

Geographic Information Science Center for Excellence (GIScCE)

The GIScCE is a unique partnership between South Dakota State University (SDSU) and the USGS National Center for EROS. The primary focus of the collaboration is the science of Earth observation and monitoring. The purpose of the program is to enable SDSU faculty and students, along with EROS scientists, to develop professionally through carrying out collaborative research and to develop and implement education programs in the application of geographic information science. The GIScCE is housed on the SDSU campus in Brookings, SD.



Partnership for Technology Development

Dakota State University (DSU) and the USGS National Center for EROS signed a cooperative agreement to benefit technology development and research activities at both institutions. The partnership grew from a conversation initiated by South Dakota Governor Mike Rounds between DSU and USGS officials. The 5-year agreement enables DSU faculty and students to work with USGS staff to develop, apply, and deliver emerging computer and information systems technology to benefit scientists, planners, educators, and decision makers worldwide.



South Dakota School of Mines and Technology (SDSM&T) Memorandum of Understanding (MOU) with USGS EROS

Building on the success of past collaborations and recognizing their mutual interests in the Earth sciences and related technologies, SDSM&T and the USGS National Center for EROS formally agreed to coordinate their research, education, and technology development activities. Such activities include research projects, technical assistance, technology transfer efforts, exchange programs, training, professional development, data exchange, program development, consultation, co-participation in meetings, seminars, workshops, or colloquia, and outreach efforts.



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 National Center for EROS – Sioux Falls, SD



Experimental Program to Stimulate Competitive Research (EPSCoR) Collaboration

The National Center for EROS attends EPSCoR sponsored meetings and is a member of the REACH (Research Excellence: A Critical Hallmark) Committee.



NASA EPSCoR Research Projects

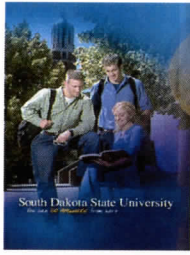
The focus is on Earth system science projects that incorporate both remote sensing technology and strong collaboration with the National Center for EROS, NASA centers, Horizons Incorporated, and others. Projects include “Leaf Area Index for Fire Chronosequences of the Black Hills and Southern Siberia: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



USGS EROS Adjunct Professors at South Dakota Universities

Twenty EROS 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 staff serve on numerous graduate student committees at SDSU and SDSM&T.

Each semester for the past 10 years, USGS EROS 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.



Land Resources Mapping and Monitoring at SDSU

For over 10 years, the SDSU Engineering Research Center and the National Center for EROS 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 EROS, SDSU provides office space for a USGS geographer.



Convention and Meeting Planning Services

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



Collaboration for Wildlife and Fisheries Sciences

The National Center for EROS 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.



Northeast South Dakota Closed Basin Flooding Study

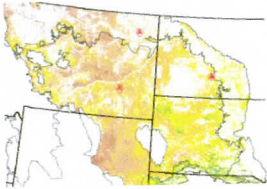
The study covers the development of the Waubay Lakes and the climate issues that led to flooding in the closed basin. The study resulted in a model designed to predict possible future water levels within the watershed.



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.

Beowulf Clustering Investigations



Over the last two years, the National Center for EROS worked with the SDSU Computer Science Department developed algorithms for the Beowulf computer cluster and prototyped a "Cluster of Clusters" concept.

USGS EROS Wide Area Networking to South Dakota Universities



The National Center for EROS has multiple high-speed connections to regional and national networks. For the last five years, EROS has participated in an NSF EPSCoR grant awarded to a consortium of states including ND, SD, NE, KS, OK, MO & AR. The USGS EROS 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 EROS Wide Area Network connectivity exceeds 900 Mbits/sec.

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.

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").



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.



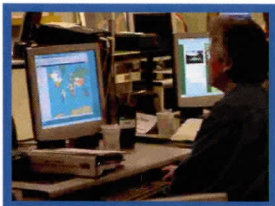
USGS Business Partners Program

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 National Center for EROS 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 also provided SD authorities with complete aerial photo coverage of the Black Hills areas to aid in forest fire suppression.



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.



Workshop for Educators

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

For More Information

USGS National Center for Earth Resources Observation and Science (EROS)
Communication and Outreach
47914 252nd Street
Mundt Federal Building
Sioux Falls, SD 57198

Toll Free: 800-252-4547, ext. 6511
Phone: 605-594-6511
Fax: 605-594-6150
Web: <http://eros.usgs.gov>

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