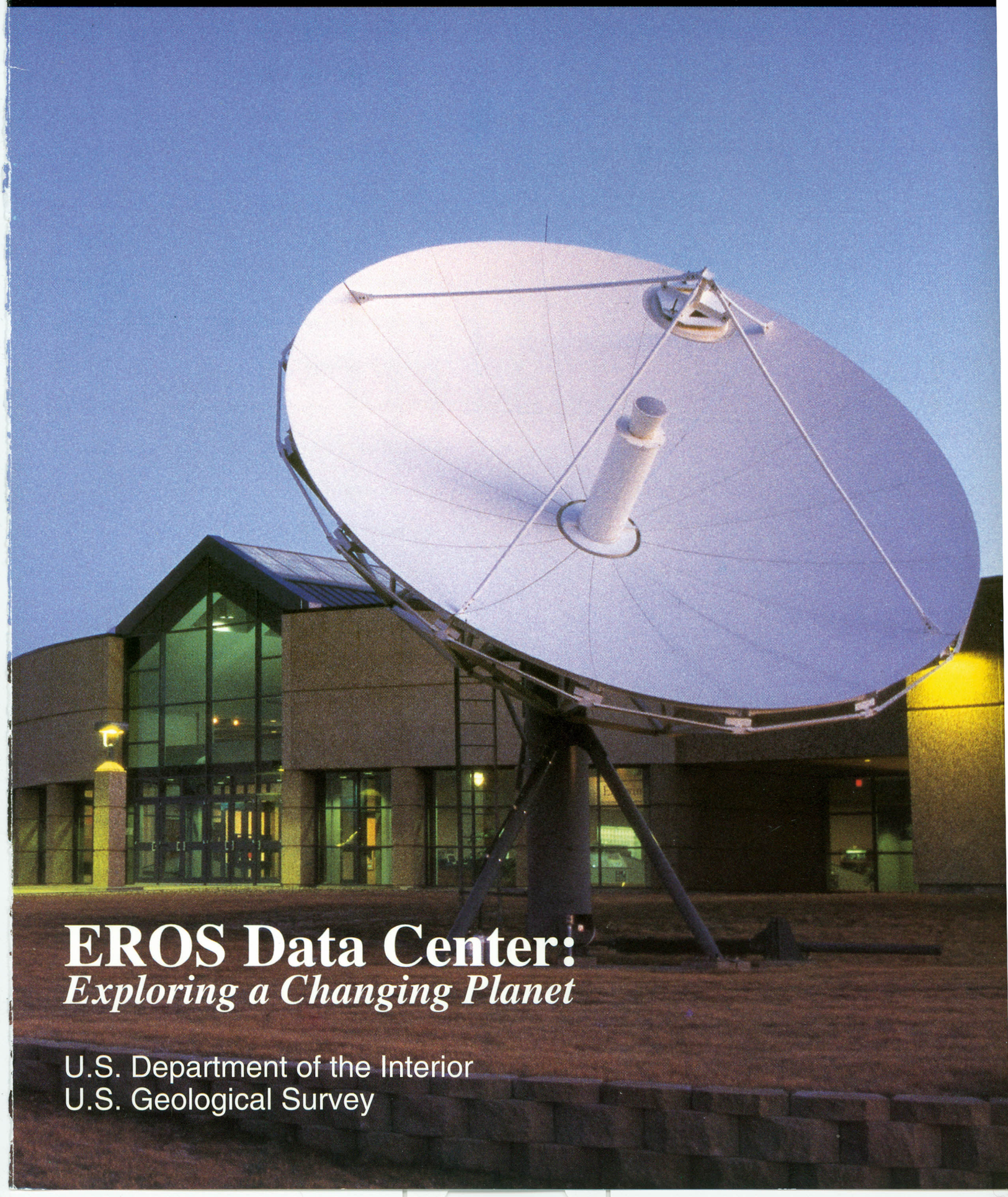
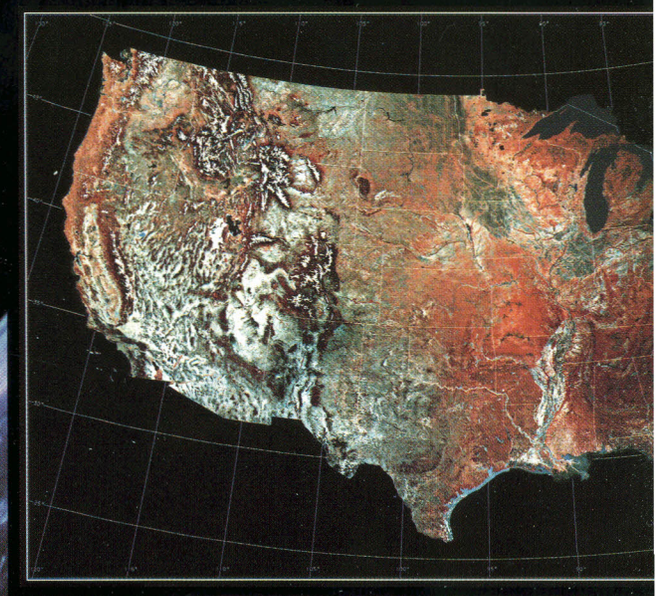
USGS
science for a changing world



EROS Data Center:
Exploring a Changing Planet

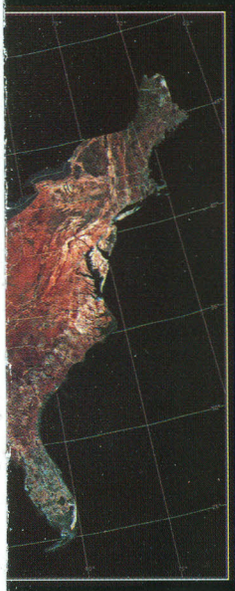
U.S. Department of the Interior
U.S. Geological Survey

The U.S. Geological Survey (USGS) Earth Resources Observation Systems (EROS) Data Center holds one of the world's largest collections of images of the Earth's land surface. EROS staff manage and distribute these data, acquired by civilian satellites and aircraft, to scientists, policy makers, and educators worldwide. These data are used to study a wide range of natural hazards, global environmental change, and economic development and conservation issues.



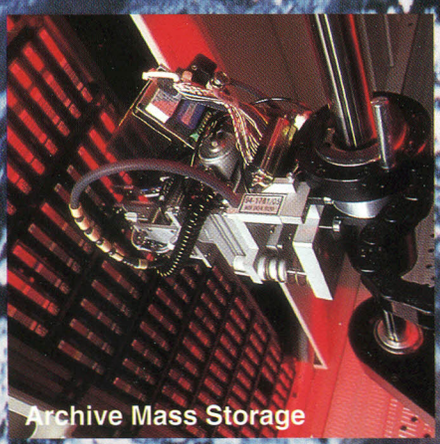
Federal Fit

EROS Data Center is one of five field centers operated by the National Mapping Division of the USGS, a bureau of the Department of the Interior. EROS staff manage and distribute aircraft data blanketing the United States and satellite data covering the world. The staff also conduct applications research, develop data processing and information extraction systems, and provide user training.



EROS staff compiled this false-color infrared satellite view of the land surface of the lower 48 United States using data from the Advanced Very High Resolution Radiometer (AVHRR) sensor aboard a weather satellite. The original image data have a ground resolution of 1.1 km (about 3/4 of a mile).

Florida

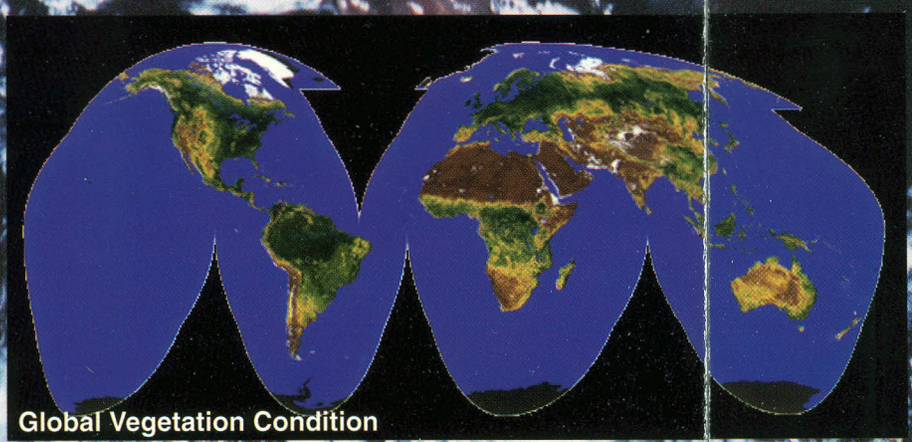


Archive Mass Storage

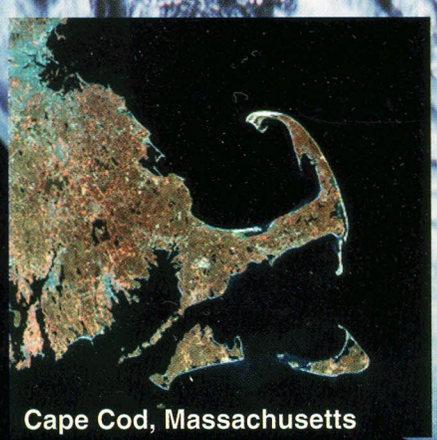
National Archive

EROS is home to the National Satellite Land Remote Sensing Data Archive. This Archive is an immense storehouse of satellite imagery which provide an impartial record of the planet's land surface. EROS staff take care of:

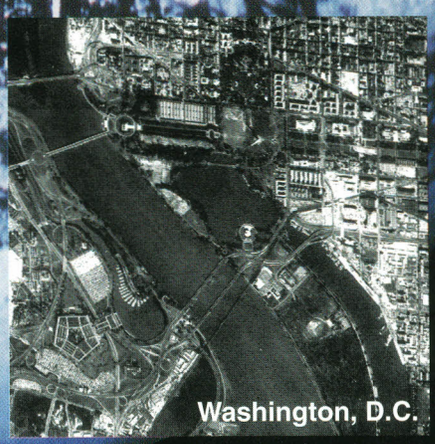
- more than 4 million images acquired by several series of satellites
- more than 8 million photos taken by cameras aboard aircraft



Global Vegetation Condition



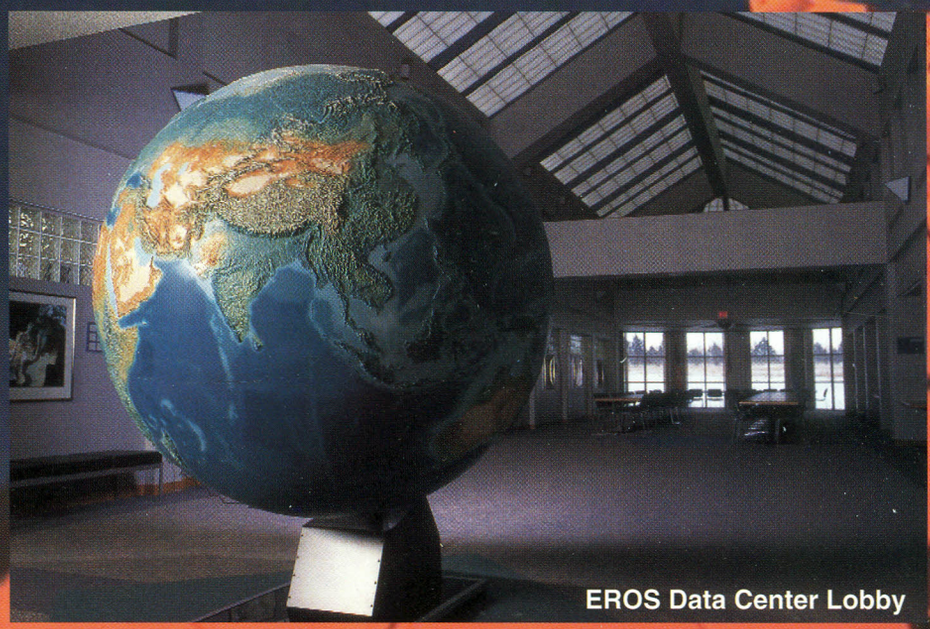
Cape Cod, Massachusetts



Washington, D.C.

History

The U.S. Department of the Interior created EROS in 1966 as a program of the USGS aimed at gathering facts about the natural resources of the Earth using earth-orbiting satellites. USGS officials chose Sioux Falls as the site for the EROS Data Center because of its central location in the United States.

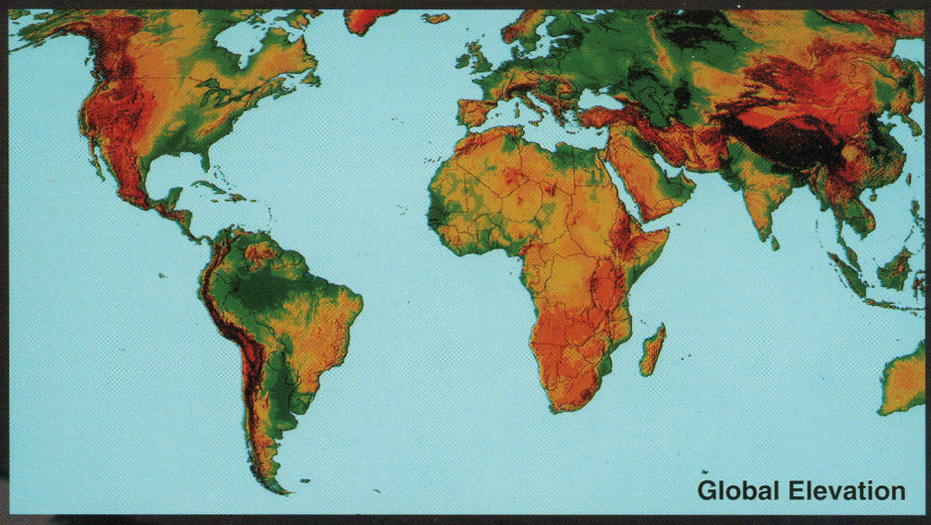


EROS Data Center Lobby

Why Satellites?

Remotely sensed data are data acquired by instruments at some distance from the objects at which they are aimed. Aerial photos have been used for more than 70 years to make maps and study the land surface. Since the 1960's, satellite imagery have served as tools to "see" large areas of the Earth's surface, such as forests or deserts. Because satellites orbit the Earth regularly, environmental changes that take place naturally, or from human activities, can be detected.

San Diego, California



Global Elevation

Customers

EROS has a wide range of customers – from the farmer in Nebraska who wants an aerial photo of his land to the global change scientist in Nairobi, Kenya who seeks elevation data.

Cooperators

EROS participates in cooperative projects with many private and government organizations. EROS staff work with the National Aeronautics and Space Administration (NASA) to manage worldwide Earth Observing System (EOS) data. EROS expanded the physical size of its building by 60,000 square feet in 1996 to house equipment and people to support EOS, Landsat 7, and other programs. Other important partnerships exist with the National Oceanic and Atmospheric Administration (NOAA), the Environmental Protection Agency (EPA), State governments, the United Nations, the U.S. Agency for International Development (USAID), and colleges and universities.

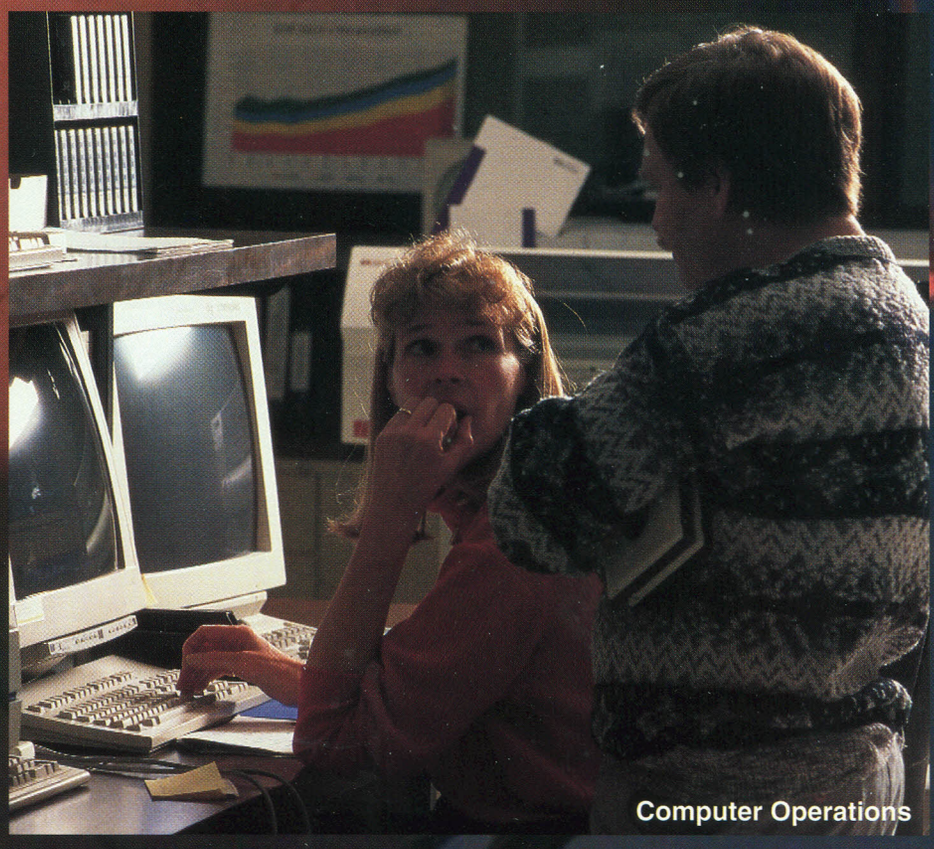
Budget

EROS operates with an annual budget of over $40 million. About half of EROS' budget comes from work it does for customers and cooperators. The other half comes from funds appropriated to the USGS by Congress.

Our Staff

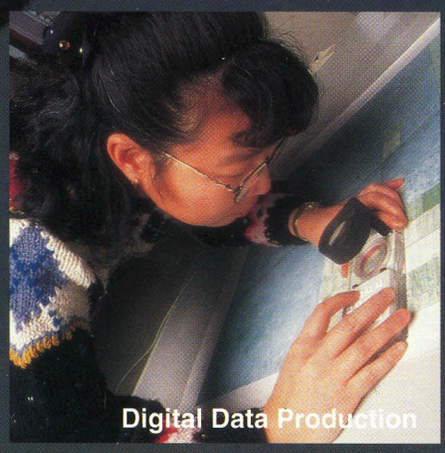
EROS staff include about 70 Federal civil servants. However, the majority of staff work for private businesses, under contract to perform work for the USGS. EROS has about 600 employees, of which 90% work for contractors. More than half of EROS employees hold degrees in earth sciences or computer technologies.

Computer Science



Computer Operations

Customer Services



Digital Data Production

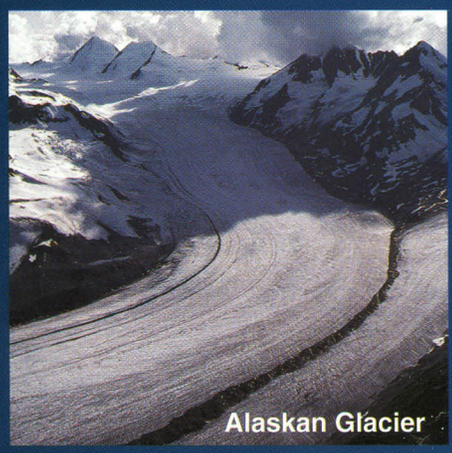
Applications

Earth scientists, land managers, planners, and decision makers use data from EROS to inventory, model, and monitor the changing conditions on the Earth's surface. EROS data are used to study:

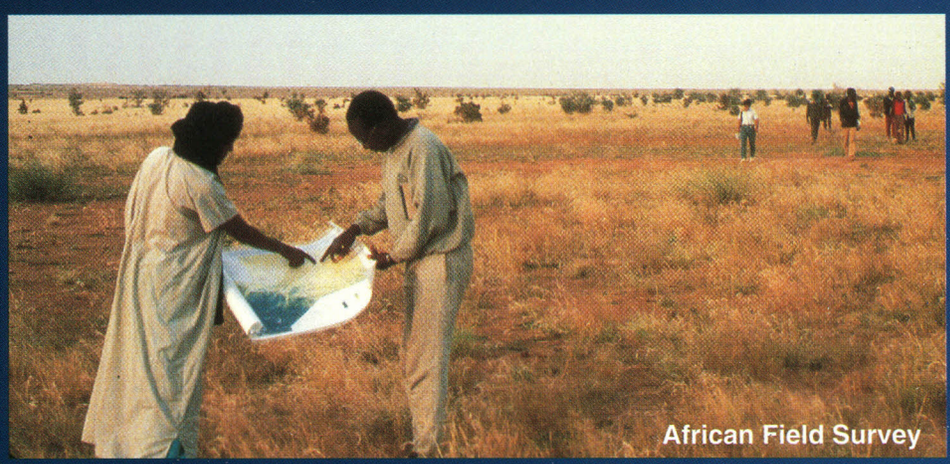
- types of vegetation
- tree canopies
- wildlife habitats
- how farmers and ranchers can improve use of their land
- the growth of cities and towns
- damages caused by fires, volcanoes, floods, and storms
- snowpack for water supply or flood potential
- irrigation potential
- climate effects
- global environmental change
- changes along shorelines
- the levels of lakes
- the conditions of grasses, shrubs, and timber as wildfire fuels

Research

EROS scientists work closely with colleagues within USGS and staff at other government and international agencies to study a variety of earth science issues. EROS staff routinely contribute to studies ranging from the potential danger of summer wildfires to spring floods. A major program now under development at EROS is the multi-resolution land characteristics monitoring system. Data featured in this system allow scientists to look at land surface phenomena in new ways. Understanding how features on the land (vegetation type, surface water, urban areas) interact with the atmosphere may help meteorologists improve long-range weather forecasts.


Alaskan Glacier

Monitoring Wildlife Habitat

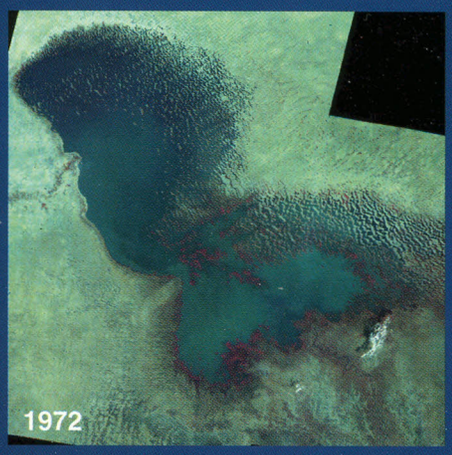

African Field Survey

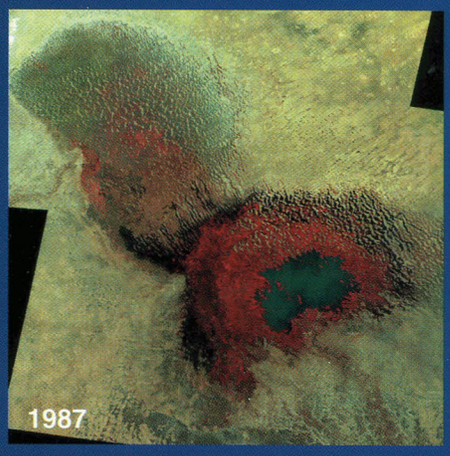
The three Landsat thematic mapper images below show pre- (left), peak- (center), and post- (right) flooding on the Missouri River near St. Louis, Missouri.

October 17, 1991

July 18, 1993

November 7, 1993



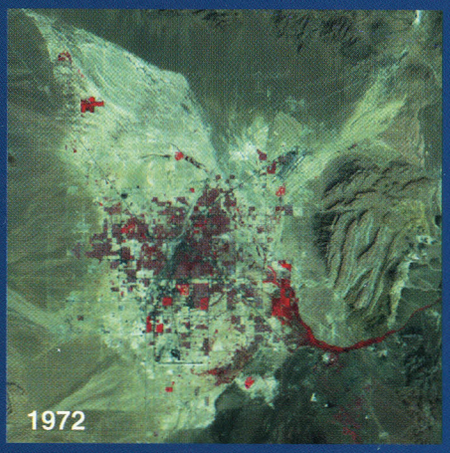


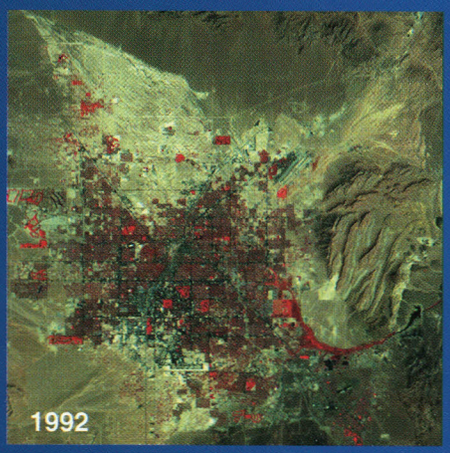
Lake Chad, West Africa

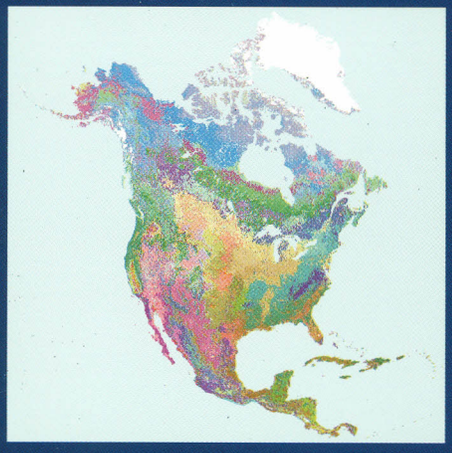
These Landsat images show the effect of a lengthy drought that has shrunk Lake Chad, West Africa.

Las Vegas, Nevada

This pair of Landsat images shows the tremendous growth in population in the Las Vegas, Nevada area over 20 years. The populations for the cities of Las Vegas, North Las Vegas, and Henderson, Nevada grew from 273,000 in 1972 to 863,000 by 1992.

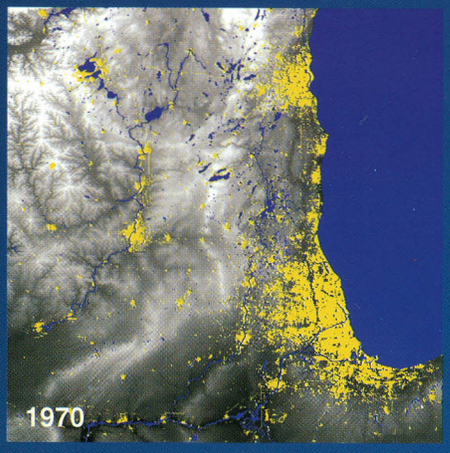


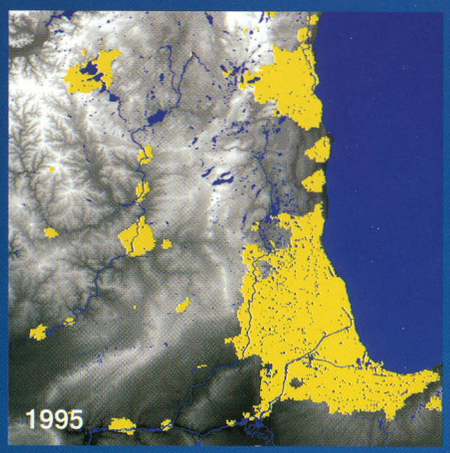




EROS staff process satellite data to form global, continental, and regional views to evaluate what covers the Earth's land surface. Data, such as these images of North America and the state of Georgia, help earth scientists monitor environmental change.

Between 1970 and 1990 the population of the Chicago metro area increased by only 4%, while land used for housing increased by 46%. Land used for commercial development increased 74%.





DAAC
(Rhymes with Back)

In recent years, EROS has become the Distributed Active Archive Center, or DAAC, for land processes data for the National Aeronautics and Space Administration's (NASA) Earth Sciences Enterprise. The Earth Observing System of NASA's Earth Sciences Enterprise advances scientific understanding of the entire earth system and how it is changing. EROS staff manage data used to study land processes including changes in land use and land cover.

Digital Archive

Digital Map Data

EROS staff manage the USGS Sales Data Base of digital cartographic data, and distribute these data through the Internet and by other means. The Sales Data Base includes:

- Digital Orthophoto Quadrangles (DOQ)
  DOQ's are scanned versions of aerial photos, which have the accuracy of a USGS map.

- Digital Raster Graphics (DRG)
  DRG's are digital versions of USGS topographic maps -- maps with contour lines that show land elevations.

- Digital Line Graphs (DLG)
  DLG's are digital map data derived from USGS topographic maps. Several categories are available including water, elevation, human-made features, and boundaries.

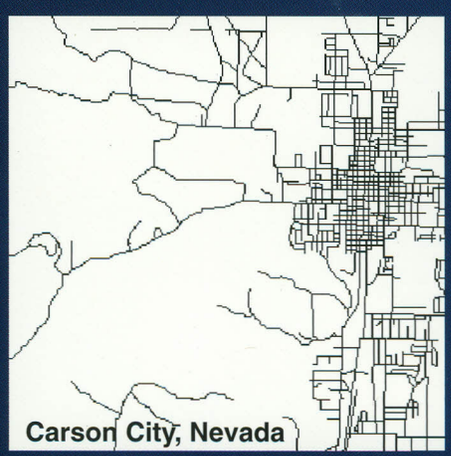
- Digital Elevation Models (DEM)
  DEM's are arrays of regularly spaced elevations, derived mainly from DLG elevation or directly from aerial photographs.

Carson City, Nevada

Digital Orthophoto Quadrangles

Carson City, Nevada

Digital Raster Graphics



Carson City, Nevada

Digital Line Graphs

Carson City, Nevada

Digital Elevation Models

Pioneering Technologies in Space and Cyberspace

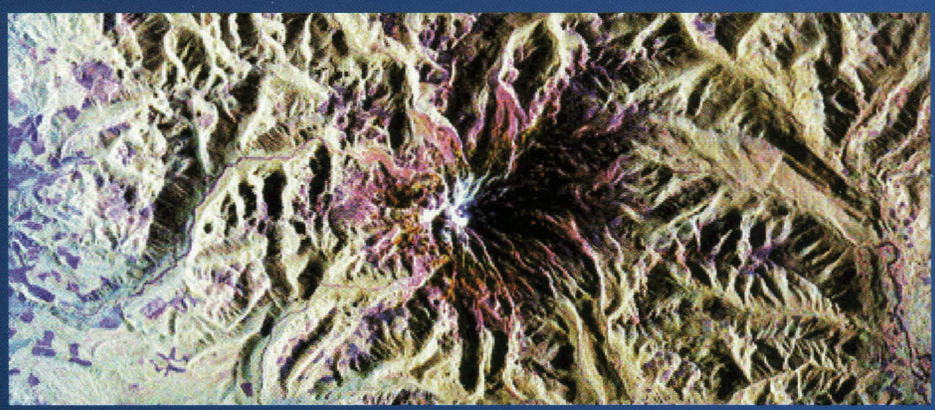
EROS staff use a variety of complex computer systems to process earth science data. The staff have developed systems to deliver massive amounts of data to scientists, planners, educators, and decision makers across South Dakota, America, and around the world through the Internet as well as other methods.

Computer Room One

Archive Mass Storage

Down the Road

In the future, EROS staff will continue to safeguard and expand the world's largest civilian archive of remotely sensed land data, stay current with earth system science and technologies, supply scientists, businesses and decision makers with earth information, and promote new uses and new understanding of remotely sensed data so others can better understand the Earth.



Mt. Rainier, Washington

For general information on EROS, contact:

U.S. Geological Survey
EROS Data Center
Sioux Falls, South Dakota 57198

Phone: (605) 594-6511

e-mail: erosreception@edcmail.cr.usgs.gov

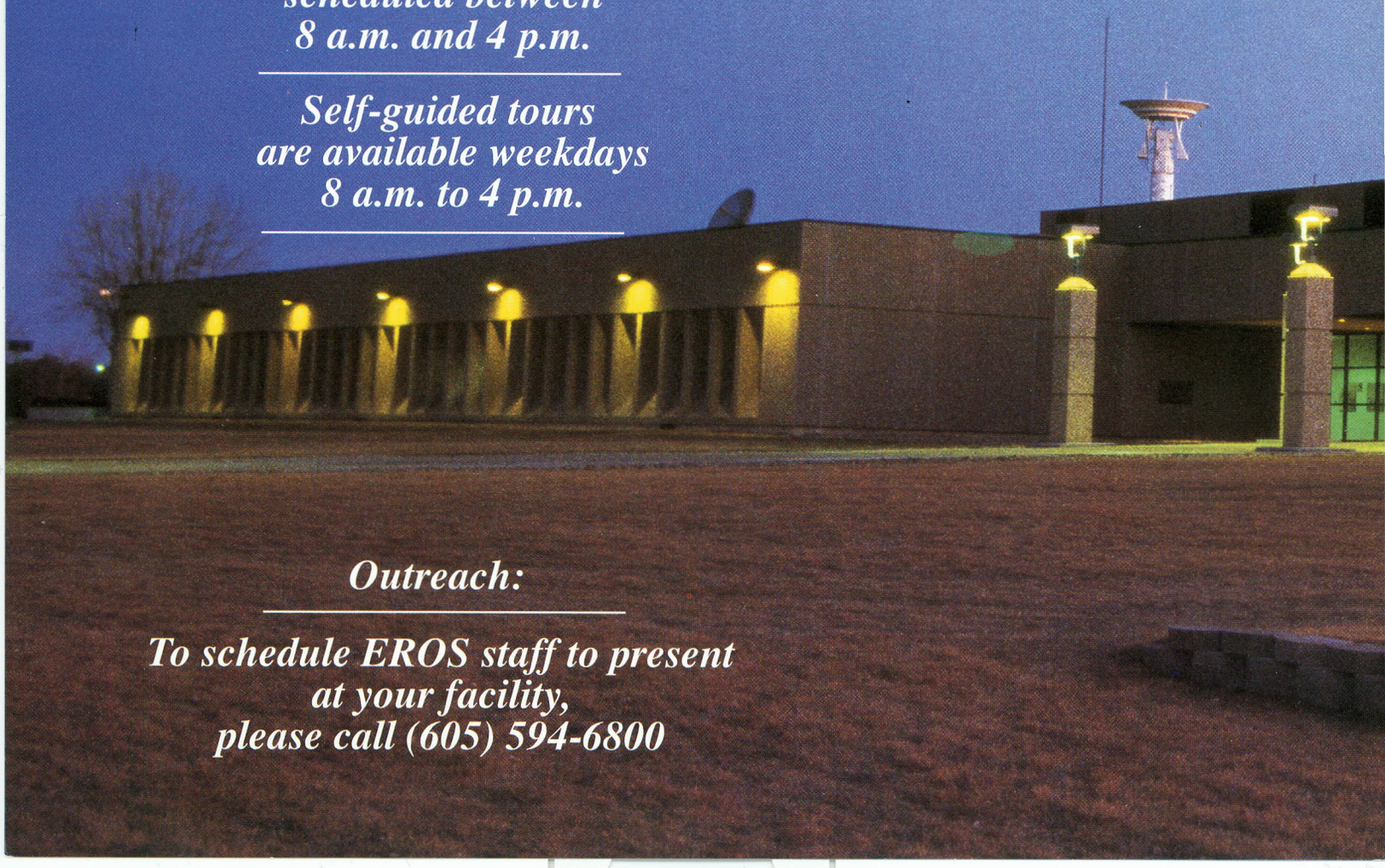
Internet: http://edcwww.cr.usgs.gov

Tours:

Group tours are available Monday through Friday 10 a.m. and 2 p.m. (CT)

Special group tours can be scheduled between 8 a.m. and 4 p.m.

Self-guided tours are available weekdays 8 a.m. to 4 p.m.



Outreach:

To schedule EROS staff to present at your facility, please call (605) 594-6800