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Department of the Interior  
U.S. Geological Survey

## Hail Damage to EROS Data Center Facilities Sioux Falls, South Dakota

Storm on July 13, 1997

### 1. What happened?

A severe thunderstorm moved through Minnehaha County in Southeastern South Dakota during the late afternoon hours on July 13, 1997. The storm caused extensive damage to the U.S. Geological Survey (USGS) EROS Data Center. Baseball to softball size hail, pushed by 55-knot winds, struck at 4:18 pm causing extensive roof and atrium damage, smashing skylights and windows, and destroying government and privately-owned vehicles. The hail also severely cracked and dented satellite data receiving antennas and completely demolished a 1-acre, 504 panel solar array. Nearby agricultural fields were stripped of vegetation and farmers' fields were cratered by the falling chunks of ice. For more information on the storm, see the National Weather Service website at "[www.crh.noaa.gov/fsd/eros.htm](http://www.crh.noaa.gov/fsd/eros.htm)".

### 2. What are the damage cost estimates?

Total damage to the EROS Data Center facilities is estimated at \$1.<sup>29</sup>~~32~~ million. (In addition, the recently installed Landsat 7 data reception antenna, owned by NASA and its contractors, sustained damage estimated at \$1 million.

### 3. What was affected?

Although significant facility damage occurred, there were no injuries to people, and Data Center operations continue. However, the next inclement weather could take a much more serious and costly toll on the facility, its contents, and USGS programs.

- Numerous cracks and tears in the roof's surface membrane are being spot patched. Water leaks from recent rains (on July 16 and July 20) occurred over many areas of the facility, including the computer center with equipment valued at over \$60 million. Permanent and comprehensive roof repair is required.
- Temporary plastic has been draped over the broken and cracked atrium and skylights. Total replacement of the atrium and skylights is required.

This work should be done as soon as possible, and certainly before the onset of winter.

- USGS and NASA satellite data reception antennas were severely damaged. Key antenna components were damaged beyond repair, exposing the signal amplifiers to the storm and allowing water penetration. Reflectors were dented, and replacement is required. At no cost to the USGS, NASA's Landsat 7 antenna will be disassembled, returned to the manufacturer, reconstructed and delivered to the Center by Spring, prior to the launch of Landsat 7 scheduled for July, 1998. Data are being received by the USGS antennas, however signal strengths are at all-time lows, and loss of incoming data is highly probable. Engineers are concerned about winter's ice forming on dented reflectors, further reducing signals.
- Seven government vehicles (three passenger and four maintenance vehicles) were totally destroyed and replacement is required. The Center is highly dependent on these vehicles because of its responsibility for all ground maintenance, coupled with its remote location. The passenger vehicles should be replaced via leasing; the maintenance vehicles via purchase.
- Other items damaged or destroyed were air conditioning units, security cameras, signage, the water tower, and light fixtures.

**4. What replacements and repairs are needed?**

An itemized list is attached.

**5. What are the immediate, short-term, and long-term repairs?**

See attached list.

**6. What are the threats to the Data Center if funds are not provided?**

The Data Center's facility damage threatens the ability of the USGS to ensure the availability of the nation's federally owned digital cartographic and remotely sensed data, and contribute to the U.S. Global Change Research Program, NASA's Mission to Planet Earth Program, and other science programs of the administration. In addition to being the steward for more than 10 million frames of aerial photography, the Center is the home for the National Satellite Land Remote Sensing Data Archive, a one-of-a-kind repository for over 3 million frames of land satellite data acquired globally since 1960. The Center is also the single distribution center for the National Mapping Division's digital cartographic data.

Repairs and replacements of roof structures are needed to avoid further water and structural damage which would have devastating affects on tens of millions of dollars of data processing computer equipment. If funds are not provided, repairs are not made, and inclement weather occurs, computer room equipment will need to be shut down and covered. This would essentially shut down the Data Center, and render the USGS incapable of providing land remote sensing, digital cartographic and associated spatial data to any users.

Any loss in the use of the satellite data reception antennas would mean interruptions in the acquisition of 1-km Advanced Very High Resolution Radiometer data collected by NOAA's polar orbiting meteorological satellites. These global data, acquired daily at multiple times, are used by:

- U.S. Forest Service, Bureau of Land Management, and others for continuous production of fire danger rating indexes in the Lower 48 States and Alaska;
- U.S. Department of Agriculture, other Federal agencies, and private grain commodity brokers for agricultural forecasting;
- Global change scientists for vegetation monitoring and land cover mapping worldwide;
- Researchers for modeling, validation and testing for future Mission to Planet Earth data processing algorithms; and
- International users for a variety of applications worldwide.

**7. How would the USGS address the damage requirements if new appropriated funds are not provided?**

The USGS would have to reprogram funds. In the event of emergencies, Section 101 of the Department of the Interior General Provisions allows for the use of existing Bureau funds, but these funds must be restored at a later date.

**8. What source of funds does the USGS usually turn to for its facility requirements, and why can't that source be used to address these needs?**

The USGS budget includes a facilities line item to fund, principally, GSA lease costs. The EROS Data Center, however, is owned by the USGS. All space and facilities costs at the Data Center are funded from the bureau's operational budget. Neither the USGS facilities line item, nor the Data Center's budget, is able to fund the Center's facility repair and replacement costs.