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Landsat Education and Outreach

*LDCM Science Team Meeting, Mountain View, CA
January 2010*

NASA
Education
Outcomes

Landsat: Improving and expanding an unparalleled record of Earth's changing landscapes...for the benefit of everyone

*2A. Building
Elementary
& Secondary
Teachers
Skills*

Teacher training in summer 2010 (support of GSFC and NASA HQ); train AESP

*2B.
Elementary
and
Secondary
Resources*

Image pairs and descriptions created for use by 30 NASA Explorer Schools

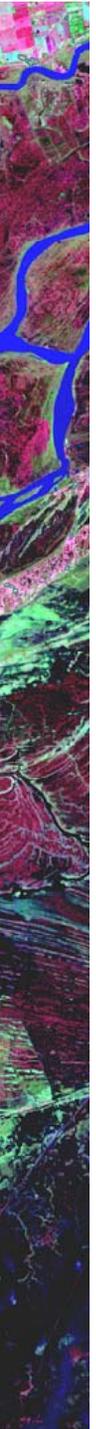
Climate Change, Wildlife, and Wildlands: A Toolkit for Formal and Informal Educators CDs being distributed

<http://www.globalchange.gov/resources/educators/toolkit>

Landsat Image Mosaic of Antarctica <http://lima.nasa.gov>

landsat.nasa.gov

Over 215 news briefs and 60 feature articles



GLS Downloads

To download GLS data using the USGS [GloVis](http://glovis.usgs.gov) interface, go to glovis.usgs.gov.

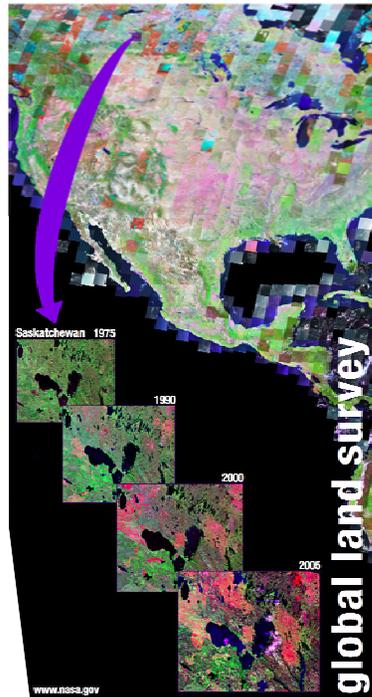
1. Select the geographic region of interest using the map interface
2. Under the "Collection" pulldown menu select "Landsat Decadal," and any of the GLS data sets (GLS1975, GLS1980, GLS2000, GLS2005)

Further Information

Details about the GLS data set can be found at the following web sites:

University of Maryland/ NASA Land Cover site:
glc.umd.edu

USGS Landsat site:
landsat.usgs.gov/science_GLS2005.php



global land survey

www.nasa.gov

Improving and expanding an unparalleled record of Earth's changing landscapes... for everyone's benefit.

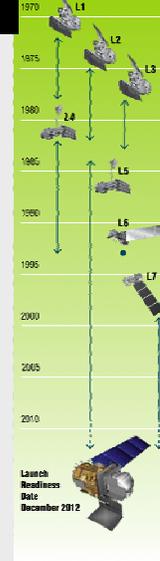
- NASA leads**
- Development of space systems—operational and experimental
 - Mission system engineering
 - The launch activities
 - Launch
 - On-orbit check-out of space systems

- USGS leads**
- Development of ground systems
 - Post-launch activities
 - Scientific operations
 - Data processing/analysis
 - Data archiving
 - Landsat science team

More Information
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www.nasa.gov / www.usgs.gov



After the launch, the LDCM instrument was successfully calibrated on October 25, 2012.



Landsat Refreshes Reel December 2012



Landsat Data Continuity Mission

www.nasa.gov

National Aeronautics and Space Administration

Landsat's Critical Role in Agriculture

Worldwide, millions of people are helped by Landsat-data-based decisions that impact food and water management. Food and farming organizations rely on the unbiased, accurate and timely information provided by Landsat estimates. The data enable people to analyze the health and vigor of crops as they mature over the growing season; the needs of specific fields for fertilizer, irrigation and other inputs; acreage amounts for use in forecasting crop production and fighting crop insurance fraud; amounts of water used in irrigation; and the impacts of drought.

Monitoring and Managing Crops

Farmers download free Landsat data to monitor crop health and pinpoint signs of crop stress, which affects yields. "We'd have to walk our entire 1,200 hundred-acre farm on a regular basis to see the same things we can see by just downloading satellite images," said Noreen Thomas of Moorhead, MN. With a little training, Thomas has learned to interpret the false color images, showing yellows where crops are infested with disease or pests, shades of red indicating crop health, black where flooding occurs, and

Data Unmatched in Quality, Coverage, Detail and Value

Landsat provides unbiased views of how our farmland and environmental conditions are changing over time. Each Landsat satellite observes the same place on Earth every 16 days. With two satellites in orbit (Landsat 5 and 7), the same place may be observed every 8 days.

Landsat views individual farms and fields, providing critical data for management of food resources. For instance, the sensor's ability to see infrared light enables analysts to discern when crops are stressed, even sometimes when plants appear healthy to the naked eye.

Landsat Data for Local and Global Decision-making

- monitoring and managing crops
- forecasting crop production
- measuring and managing water use
- monitoring drought
- fighting crop insurance fraud



People can benefit from healthy crops monitored by Landsat.

NASA
USGS
science for a changing world
landsat and agriculture

Visual Media and Web Site

Copenhagen 15 Summit

- Five Landsat time series consisting of at least 30 images total were developed for use on the Science on a Sphere exhibit. These images were used in public outreach at COP, and proved to be very popular. The final Landsat animation will be available for use by the other Science on a Sphere installations worldwide.

New Landsat Promotional Movie

- Movie short developed in collaboration with GSFC PAO (Jen Shoemaker videographer), premiered at AGU. Future movies to highlight societal benefits series.

Coverage of Ash Institute Award

Two new images posted monthly to landsat.gsfc.nasa.gov

Updating of Landsat data users handbook underway

LEDAPS website coming soon!





EARTH to SKY

an innovative partnership



Purpose

Actively foster collaborative work between the science and interpretation/education communities of NPS, USFWS and NASA. Ultimately enrich the experiences of millions of park and refuge visitors.

Audience

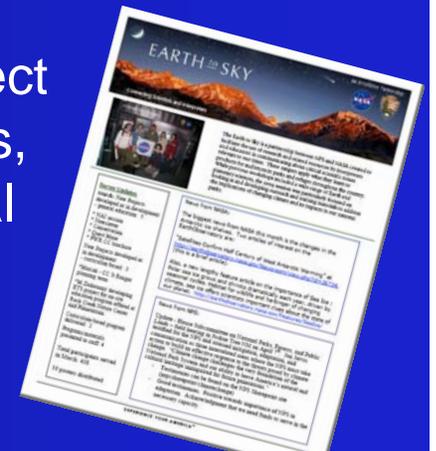
Interpreters, Education specialists and environmental educators in National Parks, Wildlife Refuges and similar organizations, whose audiences in turn include the public and classroom educators.

Distribution Mechanisms

Series of professional development workshops, project website, distance learning events, follow-up telecons, monthly newsletter, and presentations at professional conferences.

Project Category

3A. Earth & Space Science: Informal Education Resources 3B. Earth & Space Science: Building Informal Educator Skills





Earth to Sky III: Interpreting Climate Change Workshop

January 2009

National Park Service's Mather Training Center and NASA Goddard Space Flight Center

Result

29 Participants (NPS, USFWS, CA State Parks, Cleveland Metro Park Zoo)
9 NPS facilitators, 26 NASA presenters (19 scientists, 7 E/PO)
22 Parks, 3 USFWS Sites 2 NPS Regional Offices, USFWS & NPS National Level Training Leadership

Over 1100 educators trained by participants, based on ETS III
Over 15 million visitors reached through live presentations, exhibits, and written material

Selected Products:

- Series of audio podcasts
- Visitor center exhibits at Apostle Islands
- Wayside exhibit Golden Gate NRA
- Regional training event (USFWS)
- Public outreach campaign at a leading

Major projects under development:

- Podcast series; climate change blog
- Jr. Ranger project (Biscayne and others)

San Francisco Chronicle

SFGATE.COM | Thursday, December 3, 2009 | PRINTED ON RECYCLED PAPER \$1.00 *****



Michael Vincent Gutierrez and Amber Marie True are accused of looting the home.

CRIME

2 held in theft at home of victims

By Henry K. Lee
CHRONICLE STAFF WRITER

After John and Susan Maloney and their two young children died in a crash on Highway 37, news crews flocked to their street in Sonoma. A memorial of flowers sprung up on their doorstep, and pictures of their three-bedroom home were featured on TV.

Among those who followed the story, authorities believe, were a Redwood City man with a history of grand theft and his girlfriend.

Smelling opportunity, the couple drove 70 miles to Sonoma, broke into the dead family's empty house, ransacked it of jewelry, electronics and financial records and drove off in the Maloneys' 2006 Nissan 350Z, police said Wednesday.

Michael Vincent Gutierrez, 26, and his girlfriend, Amber Marie True, 29, were arrested Tuesday, just hours after a neighbor discovered the garage door to the Maloneys' home wide open.

Inside, the house was a mess. "Drawers had been opened and turned over. Bookcases had been turned over,

Arrest continues on A18

CLIMATE CHANGE

Worst-case planning

How high the sea?

What the balls on the pole at right represent:

19 feet, 8 inches
Sea level if Greenland Ice Cap melts (if the ice at both poles melted, the ocean would reach the road deck of the Golden Gate Bridge)

9 feet, 6 inches
100-year flood level with a 4-foot, 6-inch rise in sea level and a storm surge

4 feet, 7 inches
High end of predicted sea level rise by 2100

3 feet, 3 inches
Moderate estimate of predicted sea level rise by 2100 (approximately today's 100-year flood level)

1 foot, 8 inches
Low end of predicted sea level rise by 2100

Source: March 2009, Pacific Institute study



Michael Macor / The Chronicle

On the waterfront path at San Francisco's Crissy Field, a pole marks the different levels of rising ocean waters that might occur due to global warming over the next century.

Governor's new panel to suggest actions in case warming can't be stopped

By Wyatt Buchanan
CHRONICLE SACRAMENTO BUREAU

SACRAMENTO — California has set an ambitious agenda to combat climate change, but on Wednesday Gov. Arnold Schwarzenegger said the state needs to prepare for the worst if human action cannot stop global warming and the rise of sea levels.

In an announcement on San Francisco's Treasure Island, Schwarzenegger said he is creating a panel of 23 California leaders to recommend specific actions to prevent the destruction of infrastructure and deal with a depleted snowpack, the spread of disease, intense wildfires and other calamities that would result within the century from climate change.

"I normally never make a Plan B because then you start concentrating on that and

Climate continues on A19



Source: San Francisco Bay Conservation and Development Commission

The Chronicle

IPHONES

Reagan — pioneering political app

BAY AREA ECONOMY

A hint of optimism

Limiting Impacts of Climate Change

National Park Service
U.S. Department of the Interior



If I Could Change the World...

We already have, but...

There is little scientific doubt that most of the temperature increases since the mid 20th century are due to greenhouse gases produced by human activities. Taking action now will diminish the risks associated with climate change, and reduce the likelihood of catastrophic and far more expensive consequences.



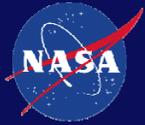
...We CAN make a difference. Look at the possibilities!



NASA Landsat photo from: <http://gisweb.usgs.gov/imgviewer/arc2imgviewer.html?im=1&lon=-91.42>
@satim=LANDSAT_ARCHIVESENSOR=SLCOPR&dt=61.2&lon=-91.5



**Four Panel
Exhibit at
Apostle Islands
National
Lakeshore**



Building Climate Literacy for Informal Educators: Expanding the Earth to Sky Partnership (NASA ROSES funded)



PI Anita Davis, Sigma Space, Landsat E/PO; Co-Investigator John Morris is NPS leader on climate change training, and an alumnus of all ETS efforts

- NASA scientists and education staff present content
- Returning leadership and facilitators from previous ETS efforts
- USFWS and NPS training leadership
- Lead evaluator Dr. Theresa Coble, Stephen F. Austin University
- NASA Science advisors: Dr. Peter Hildebrand and Dr. Peter Griffith

Year One: One week workshop
Mather Training Center (February
2010)

Year Two: Distance learning

Year Three: Develop and run
course at USFWS National
Conservation Training Center
(September 2012)





NSF DUE-
0703185



Integrated Geospatial Education and Technology Training (iGETT)

Program/Purpose: *3 years of professional development to enable integration of remote sensing DATA (not images) with existing GIS programs to serve specific workforce needs*

Audience: *40 community college and Tribal college instructors* from nationwide pool

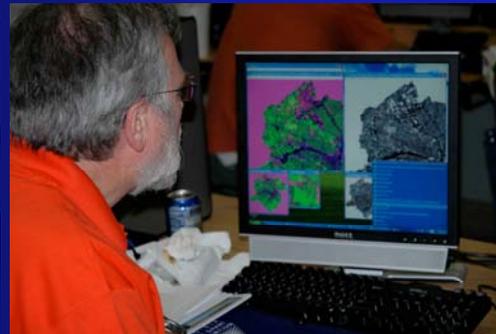
Content: federal land remote sensing data for agriculture, disaster management, & environmental sciences





iGETT participants --

- ✧ *receive training in two consecutive Summer Institutes*
- ✧ receive further enrichment, mentoring, and communications during the academic years
- ✧ *develop their own Learning Units that integrate remote sensing, GPS, GIS, and other technologies, **35 are already publicly available***
- ✧ *disseminate model programs and lessons learned at regional and national seminars*





Partners

- National Council for Geographic Education
- → SSAI for Landsat at NASA
- → U.S. Geological Survey Land Remote Sensing Program
- Del Mar College
- Environmental Systems Research Institute (ESRI),



Osa Brand, PI



ASPRS Executive Director Jim Plasker →



Proposal to NSF, Oct 2010



iGETT)-2

- ◇ Occupational analyses in each of 4 regions of the U.S., in agriculture, disaster management, environmental sciences, and urban planning
- ◇ Development of Core Competencies for the Remote Sensing Technician vetted with professionals in industry and government at a national scale
- ◇ Professional development for 40 community college faculty and 44 high school teachers using materials developed by iGETT-1.

