Landsat Education and Public Outreach (EPO) 2007

- Anita Davis (lead at GSFC; informal education)
- Jeannie Allen (formal education)
- Laura Rocchio (web; writing; training; image processing; graphics for Queens)
- Frank Niepold (occasional guest teacher)
- USGS Partners (Ron Beck, Rachel Kurtz)
Landsat EPO Approach

- Formal Education
- Informal Education
- Outreach (news, community day, peer communications, HQ requests, etc.)
- Collaborations and Partnerships
- Opportunistic (ROSES Ed. Supplements)
- Strategically work at hubs (not spokes!)
What’s the Big Idea?

Landsat/LDCM provides a unique and critical (essential? useful? valuable?) contribution to humanity’s understanding of our home planet.

- Continuity of data over 35+ years
- Global data set (annually)
- High quality of data (even higher with LDCM)
- Spatial scale commensurate with human intervention/activity/impact
Who’s the **Audience**?

General Public
Formal Educators
Informal Educators
Journalists/Media
Resource Managers
Other Professionals (science peers, data users)
Policy Makers
Internal NASA
What are the best **Opportunities** to reach each audience?

Classroom
Internet
News media/PAO
Short Courses
Distance Learning
Radio Shows
Pod casts
TV Shows
Parks/Nature Centers
Science Cafés
Museums/Science Centers
Libraries
After school programming
Conferences/ Pro Dev Workshops
Youth Groups (4-H, GSA, BSA, etc)
Events (*Earth Day, RS of Earth Day etc.*)
What are the best *Techniques* to reach each audience?

Printed Publications  
*Posters*  
*Flyers*  
*Brochures*  
Canned presentations  
Visualizations  
Image Gallery  
Classroom Activities  
Exhibits  
Audio spots  
Games  
Informal Ed Activities  
Electronic Field Trip  
Blog  
WebCam  
DLN/other distance learning  
WebCast
Getting Data into the Hands of Educators is Challenging!

Making & Using Landsat Images

DATA

SOFTWARE

MULTISPEC

LINKING BANDS

IND. BANDS

LINKED .LAN

SUBSETTING

FULL SCENE

YES

NO

LAND COVER MAPPING

CHANGE DETECTION

GEOREFERENCED PAIR

YES

EDUCATIONAL APPLICATIONS

NO

GROW SMARTER

EXPLORER SCHOOLS

GLOBE PROTOCOL

FREE

YES

NO

GEOREFERENCING

GEOSPATIAL SPECIALIST

FULL COST

USGS EDC

LOW COST

LANDSAT. ORG

FREE

GLCF

EOS-WEBSTER

OTHERS

FULL SCENE

YES

NO
Change Detection Web Site

Supports Numerous Efforts

Explorer Schools
GLOBE Schools
Interested Schools
National Park efforts, etc

http://change.gsfc.nasa.gov
Formal Education Projects

- Geospatial Workforce Development at Two-year Colleges
- Delaware River Basin
- Salish-Kootenai Tribal College Interns
- Classroom Activities (ex., *Quantifying Change*)
- Teacher workshop training materials
Integrated Geospatial Education and Technology Training (iGETT)

NSF - Funded 3-year Professional Development program (2007-2010)
Partner with 40 GIS faculty at 20 Two-Year Colleges

Produce and Disseminate:
- faculty learning program
  replicated using resources on the iGETT Web site
  and iGETT-recommended on-line courses
- model instructional programs
  two-year geospatial technologist education
  short-term training for working professionals

http://ncge.org/publications/gew
iGETT participants will receive training, mentoring, and financial support to --

- participate in two consecutive summer institutes at Delmar College in Christi, TX to learn remote sensing, GIS, and other geospatial technologies; workforce applications; and program development

- develop their own strategic plans to meet the specific needs of their institutions and communities

- receive further enrichment, mentoring, and communications during the academic years

- enhance/develop courses, course modules, and programs that integrate remote sensing, GPS, GIS, and other technologies

- participate in a final meeting in association with a major national conference or conduct regional seminars of their own.

iGETT staff: iGETT is managed through an interagency partnership of the National Council for Geographic Education (NCGE), Environmental Systems Research Institute (ESRI); Del Mar College; Science Systems and Applications, Inc. (SSAI) at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center; and the U.S. Geological Survey (USGS) Land Remote Sensing Program.
Delaware River Basin

- Upper Delaware Scenic & Recreational River
- Delaware Water Gap National Recreation Area
- PA, NY, NJ education systems
- Wallenpaupack Middle & High Schools
- GLOBE model for students
- New Investigator Grant Funded
Tribal College Internships

• Three interns per summer
• Supported through Headquarters Minority Office, Goddard University Affairs, and LDCM funds
• One-on-one mentor relationships
• Tailored to meet unique needs of tribal students
• Interns moving forward in careers

Observing Land Cover Changes from 1989 to 2000 in Shiprock, New Mexico

Vegetation Coverage on Ft. Defiance Agency

Potential Fire Threats to Sacred Sites and Materials of the Blackfeet Nation
Informal Education Projects

- NASA Explorer Institute, *Earth to Sky NASA-NPS Partnership*
- International Polar Year Landsat Image Mosaic of Antarctica (LIMA) Website
- NPS Views Website Modules
- *Earth from Space* Smithsonian Institution Traveling Exhibit (USGS)
- Science Cafes? (coming to a pub near you!)
Earth to Sky: An Innovative Partnership

http://www.earthtosky.org

Actively fostering collaborative work between the science and interpretation/education communities of NPS and NASA. Ultimately enriching the experiences of millions of park visitors.
Millions of Visitors are Learning about NASA Science at Parks throughout the Nation

Jr. Space Ranger Activities and Badge
Delaware Water Gap

Never Summer, Ever Summer
Rocky Mountain National Park Interpretive Program

Climate Change in Parks brochure, tutorial, and display for use nation-wide

Life/Water Connections on Earth and Mars, K-12 Curriculum
Amistad National Recreation Area

Night Watch/Sky Watch: The Universe Through the Lens of Science and the Native American Perspective
Canyon de Chelly
Faces of Antarctica: Education and Outreach during the International Polar Year using the new Landsat Image Mosaic of Antarctica

Principal Investigator:
Robert Bindschadler (NASA)

Co-Investigators:
Adrian Fox (British Antarctic Survey)
Robert Ridky (USGS)
Goran Halusa (SSAI)
Brian Campbell (SAIC)
Anita Davis (SSAI)
Jessica Robin (SSAI)
Kevin Ward (SSAI)
LIMA Landsat Image Mosaic of Antarctica

(scientist slideshow)

- Antarctic Mysteries
- Polar People
- Let's Go to School!
  - For Students
  - For Teachers
- Get Data Here
  - How Data are Collected
- IPY Locator:
  What Else is Going On?
- Library:
  A Gallery of Animations, Graphics, and Movies

Responsible NASA Official: Robert Bindschadler
Webmaster: Goran N. Halusa
Last Updated: December 19, 2006
National Park Service Views Website

• Knowledge Center
• Virtual Experiences

Bring National Parks into Classrooms
Make Connections to Americans
Inspire people to visit parks

American Geological Institute
16,000 Earth Science Week packets 2006

Geological Society of America,
George Wright Society Conferences

Grand Canyon; Chesapeake Bay;
Comparative Planetology

www2.nature.nps.gov/views
Beer, Wings, and Cutting-Edge Research: Reaching New Audiences with Science Cafes!

- Short presentation by a scientist
- Focus on creating a conversation actively involving everyone present
- Most meet in casual public venues, such as pubs and coffeehouses, where people are accustomed to meeting with friends
- Emphasis on conversation in a comfortable space (effectively engage people that do not consider themselves science enthusiasts)

Some science cafes have shown that the format can make scientific research relevant enough to occupy the same cultural space as popular forms of entertainment, such as live music and sporting events.

Ben Wiehe
Outreach Coordinator for the WGBH Educational Foundation, a leading producer of content for the PBS and NPR systems

http://www.pbs.org/wgbh/nova/sciencenow/
Outreach Projects

- Brochures/handouts
- Conference attendance/support
- Support for HQ requests
- Peer communications (NARSEC; GWS; etc.)
- Web site; Change Detection; tutorials
The Landsat Program

The Landsat Program is a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey. Since 1972, Landsat satellites have collected information about Earth from space. This source, known as remote sensing, has matured with the Landsat Program.

Landsat satellites have taken specialized digital photographs of Earth’s continents and surrounding coastal regions for over three decades, enabling people to study many aspects of our planet and to evaluate the dynamic changes caused by both natural processes and human practices.

Important News
Landsat helps assess industrial logging impacts
Jun. 28 • Landsat-derived maps show logging and road expansion in more
Landsat helps manage water
+ more

When it happened

JUNE 2007
Jun. 12 • Landsat watches as China constructs giant dam
Jun. 8 • Landsat helps assess impacts of industrial logging in Central Africa
Jun. 5 • LTWG 16 meeting summary available
Jun. 3 • USGS Associate Director for Geography’s letter to the editor regarding Landsat
Jun. 1 • Updated draft LDGM Mission Operations Element Requirement Document available

MAY 2007
May 31 • Landsat data show trailing “mud tracks”
May 20 • Landsat part of NASA’s IPY cutting-edge polar exploration and research
May 19 • USGS pilot project makes high-quality Landsat data available for download
May 23 • Michigan State University uses Landsat to monitor global climate change
May 16 • USGS Landsat Newsletter published
May 15 • Rainforest monitoring improved by data fusion

Landsat Program Web Site
landsat.gsfc.nasa.gov

90 news briefs, 31 feature articles
Landsat Helps Assess Impacts of Industrial Logging in Central Africa

Source: Elizabeth Braun, Woods Hole Research Center

Posted: Jun. 8, 2007

Though the dense humid forests of Central Africa have been regarded as among the most pristine on Earth, the expansion of industrial logging and the accompanying proliferation of road density are threatening the future of this important ecosystem. Woods Hole Research Center scientists are using Landsat satellite imagery taken from 1975 to 2003 to study the development of industrial logging and road density in Central Africa so that scientists, conservation agencies and other organizations can better understand the trends and implications of such expansion. The work is profiled in the current issue of Science.

According to Nadine Laporte, an associate scientist at the Woods Hole Research Center.

Road constructed through swamp forest to reach the Loudougu concession in Northern Congo. Photo credit: Nadine Laporte

Recent Publications

2007


2006


Determining range readiness, biomass and health

Contributor: Curtis E. Woodcock, Boston University

Fire, drought, and humans all can destroy forests and their ecosystems. While much attention is paid to deforestation in tropical rainforests, very few comprehensive studies have been done to address changes in the Earth's temperate conifer forests. Temperate conifer forests lie at latitudes above tropical forests and below boreal forests and account for much of the forested area in the United States and Europe.

Understanding changes occurring in temperate conifer forests is important for understanding environmental issues including wildlife habitat protection, watershed management, timber harvest, and understanding the role of human activities on changes in regional climates.

Previously, researchers have only been able to monitor changes in specific locations with Landsat data due to its limited availability. Boston University geographer Curtis E. Woodcock and colleagues used Landsat to monitor how drought in the late 1980s and early 1990s affected forests in California's Sierra Nevada. During the drought, Woodcock found that Landsat images could recognize areas where trees were dying due to lack of water. Using Landsat images of Washington's Olympic Peninsula like the one above, Boston University researchers can keep track of what areas are being cut, and what areas of forest are regrowing. The square box in this 1990 image marks an area of regrowth that had been subject to long-term logging.

Precious Resources: Water & Landsat's Thermal Band

Contributor: Laura Pacchiola

Posted: April 17, 2007

"Chronic water supply problems in many areas of the West are among the greatest challenges we face in the coming decades," Mark Lambert, the U.S. Department of the Interior's (DOI) Assistant Secretary for Water and Science, told U.S. Senators in 2006.

He was largely echoing the findings of the DOI's Water 2020 report. The report explains that if future conflict over water in the West is to be avoided, water efficiency needs to improve. Until then, conflict and environmental degradation will be the core of the increasing demands—dominated by agricultural irrigation and swelling city populations—on limited water supplies.

Irrigation: a numerical explanation

Irrigation accounts for 80% of fresh water use in the U.S. and worldwide, the World Bank estimates 70% of fresh water use is for agriculture. The U.S. irrigates over 50 million acres of agricultural land and 12 million acres of recreational landscapes (lawns, golf courses, etc.). The total volume consumed by agriculture and landscape irrigation is 36 million gallons per year, western states are responsible for 90% of that consumption.

A growing problem

The arid U.S. West is experiencing explosive population growth. The 2000 Census reported a third of all
Landsat and Landsat Data Continuity Mission

Education and Public Outreach

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http://landsat.gsfc.nasa.gov/education.html

http://ldcm.gsfc.nasa.gov