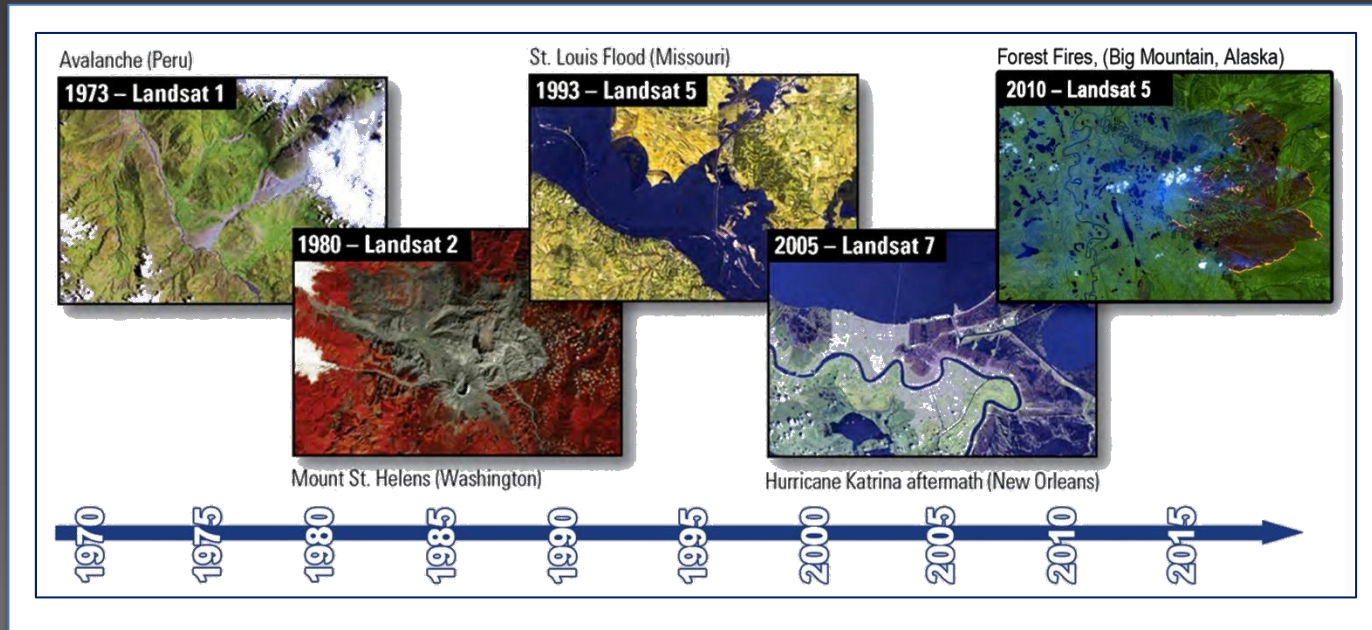
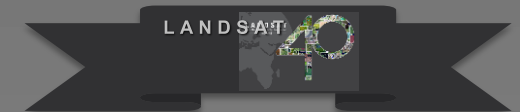


Benefits of Open Availability of Landsat Data

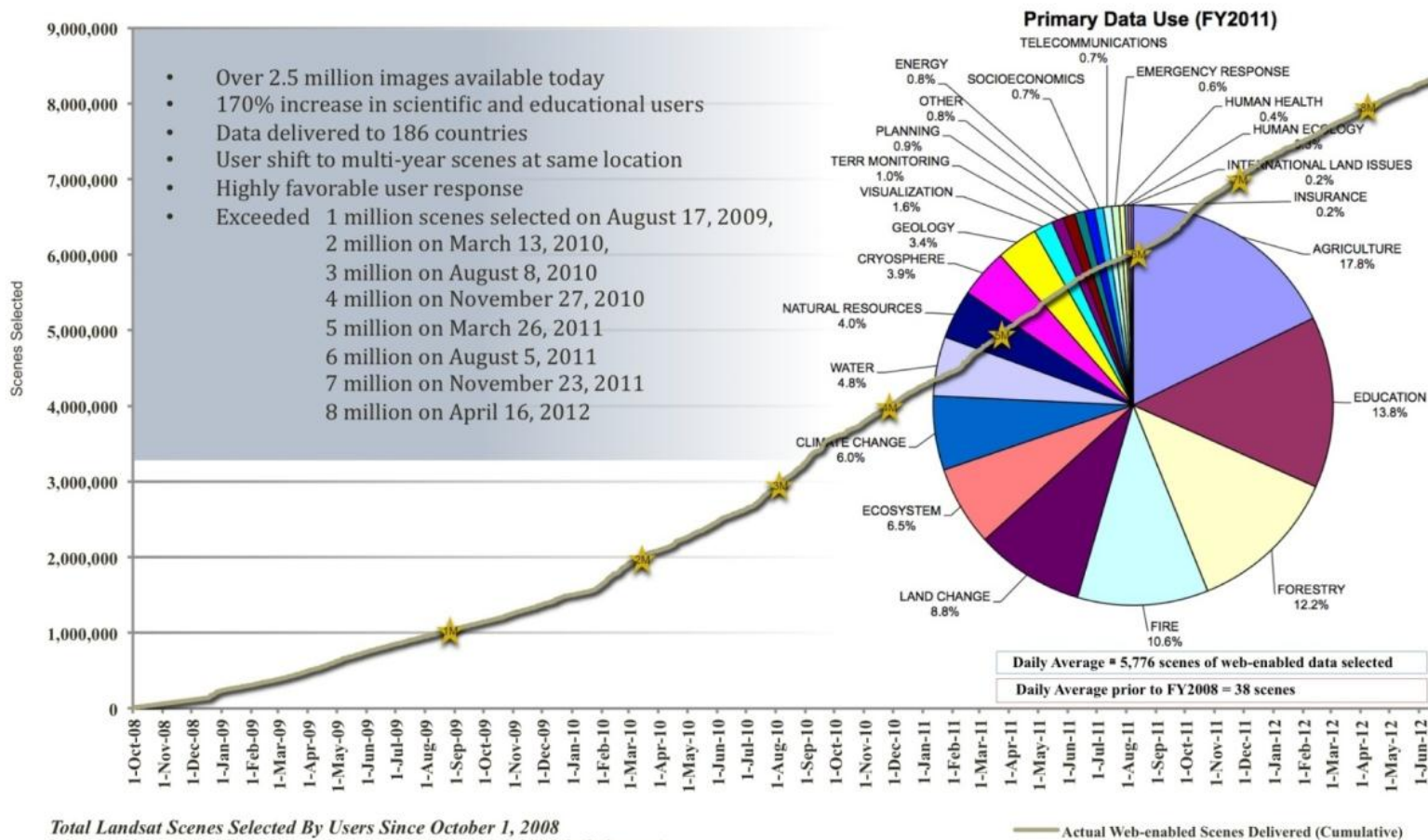


Presented by
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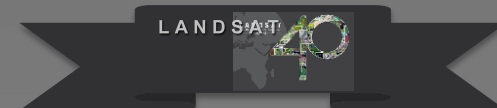


Free, Web-Enabled Satellite Data

The Landsat Experience



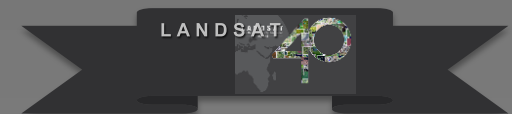
**A New Era in Utilization
of Land Satellite Imagery**



National Geospatial Advisory Committee – Landsat Advisory Group

Statement on Landsat Data Use and Charges

- The value of Landsat data is internationally recognized as indispensable to science, natural resource management, commerce, security, foreign policy, agriculture, and education
- Since 1972, Landsat data have become a critical part of U.S. infrastructure. Like GPS, the National Weather Service, and the National Oceanic and Atmospheric Administration's (NOAA) operational weather satellites, Landsat provides a huge return on the taxpayers' investment.
- Landsat enables more efficient science and natural resources management. Its ability to monitor worldwide land surface changes is a proven public good



Landsat Data: Estimated Annual Productivity Savings

Source: U.S. National Geospatial Advisory Committee, 18/09/12

Application	Annual Savings
Monitoring Consumptive Water Usage	\$20-73 million
U.S. Government Mapping	Over \$100 million
Forest Health Monitoring	\$12 million
National Agricultural Commodities Mapping	Over \$4 million
Flood Mitigation Mapping	Over \$4.5 million
Forest Fragmentation Detection	Over \$5 million
Forest Change Detection	Over \$5 million
World Agricultural Supply and Demand Estimates	Over \$3-5 million
Fire Management Support	\$28-30 million
Coastal Change Analysis	\$1.5 million

***Annual Economic Value of Landsat Far Exceeds
the Cost of its Development and Operations***



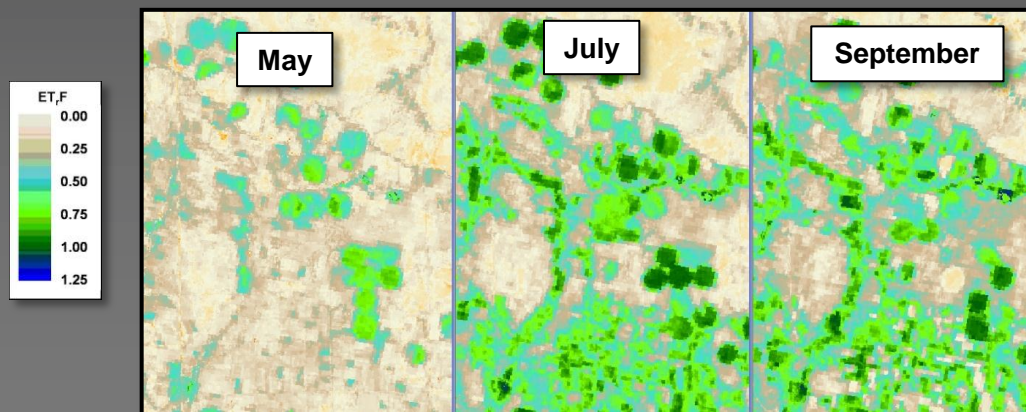
Economic Advantages of Open Availability

Economic cost savings for environmental management

- A 2006 study estimated the value attributable to the loss of Landsat imagery in the event of a data gap at \$935M per year (American Society for Photogrammetry and Remote Sensing).
- Water managers will save an estimated \$1 billion over the next decade using remotely sensed concise measurement estimates of consumptive water use (Western States Water Council).

Commercial data use has increased under free distribution policy

- Google Earth Engine provides cloud computing technology to analyze large amounts of Landsat data for environmental analysis.
- ESRI "Change Matters" product is based entirely on Landsat imagery.



Change Matters ESRI Viewer

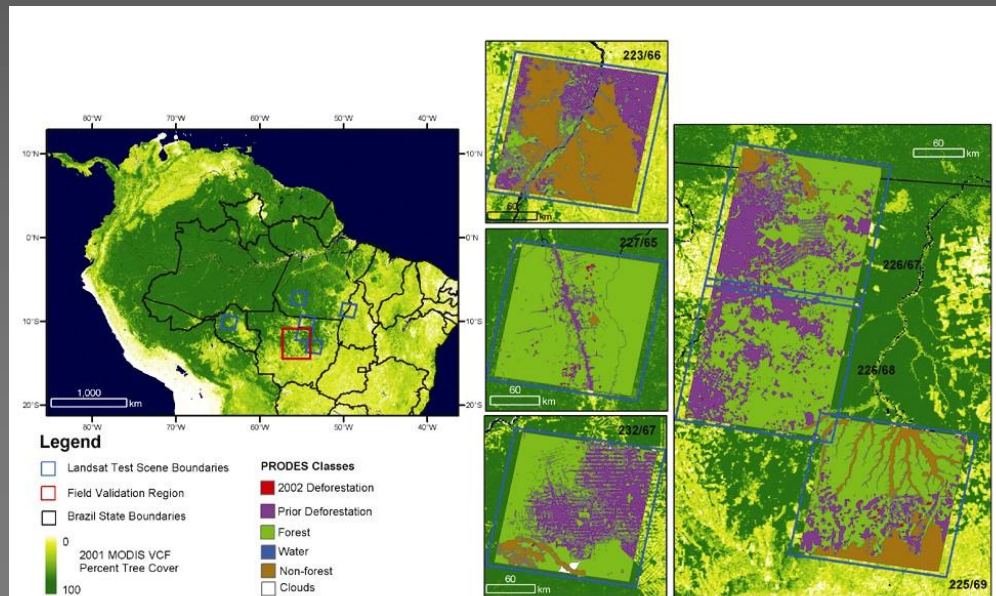
Online application to compute normalized difference vegetation index changes
Using Landsat imagery worldwide from 1975 to 2005.

Great educational tool. Encourages research to study why change happens

The screenshot displays the ChangeMatters ESRI Viewer interface. At the top, the title "ChangeMatters Infrared" is shown. Below the title, there is a search bar with "Bangalore, India" entered, a "Select Image Map" dropdown set to "Infrared", and a "Select Years" dropdown set to "1990 - 2010". Social media icons for Facebook, Twitter, and LinkedIn are visible in the top right corner. The main content area is divided into three panels, each with a "Full Screen" button and a "1 km / 1 mi" scale bar. The first panel is labeled "1990" and shows a false-color satellite image of Bangalore. The second panel is labeled "2010" and shows a similar false-color satellite image. The third panel is labeled "NDVI Change 1990 - 2010" and shows a map where green indicates vegetation increase and purple indicates vegetation decrease. A legend at the bottom identifies various land cover types: Snow/Ice, Urban, Water, Clouds, Wetlands, Agriculture, Conifer Forest, Desert, Broadleaf, Veg Increase, and Veg Decrease. The text "POWERED BY esri" is visible in the bottom right of each panel.

Landsat Open Data Policy Enhances Climate Change Research

- **Operational Global Climate and Resource Monitoring Initiatives**
 - GEO Initiative: Global land cover to be based on 30m resolution Landsat data
 - Terrestrial based essential climate variable products and climate data records:
 - Derived from Landsat sensors and/or cross calibrated to Landsat archives
 - Includes leaf area index, albedo, surface water, snow/ice, fire disturbance
 - FAO Forest Resource Assessment
 - Major space imagery contributor for GEO Global Forest Observation Initiative



INPE's rapid analysis of Amazon Forest Cover using Landsat Data



Innovative Benefits of Open Availability

Studies are being produced on the value of free geospatial data

- *“The Users, Uses, and Value of Landsat and other Moderate-Resolution Satellite Imagery in the United States”* - Results from this study indicate societal value far exceeds the cost of acquiring and distributing data.

Research Applications lead to Innovative Commercial Endeavors

- The Department of the Interior’s policy of releasing the **full Landsat archive at no cost** allows researchers in the private sector and at smaller universities **to generate even more data applications** — applications **that serve commercial endeavors** in agriculture and forestry, that enable land managers in and out of government to work more efficiently, that define and **tackle critical environmental issues**.

Adam Gerrand, Food and Agriculture Organization of the United Nations:

- "The opening of the Landsat archive to free, web-based access is like giving a library card for the world's best library of Earth conditions to everyone in the world."

Successes of Open Availability of Landsat

- **It is good policy:**
 - Consistent with U.S. National Space Policy**
 - Supports GEO Data Sharing Action Plan**
- **It is good value:**
 - Societal value exceeds the cost of the satellite**
 - Commercial enterprises thrive on availability of free images**
 - Provides \$100Ms in value to the U.S. economy**
- **It helps citizens know and protect their planet:**
 - Earth observations are part of society's infrastructure**
 - Access to information empowers all equally**

Thank you



Dasara blessings for a successful
LDCM launch February 11, 2013

