



Landsat 9: The Newest Satellite to Picture Earth, Deforestation and Climate Change

AmazonTec 2021

October 21, 2021

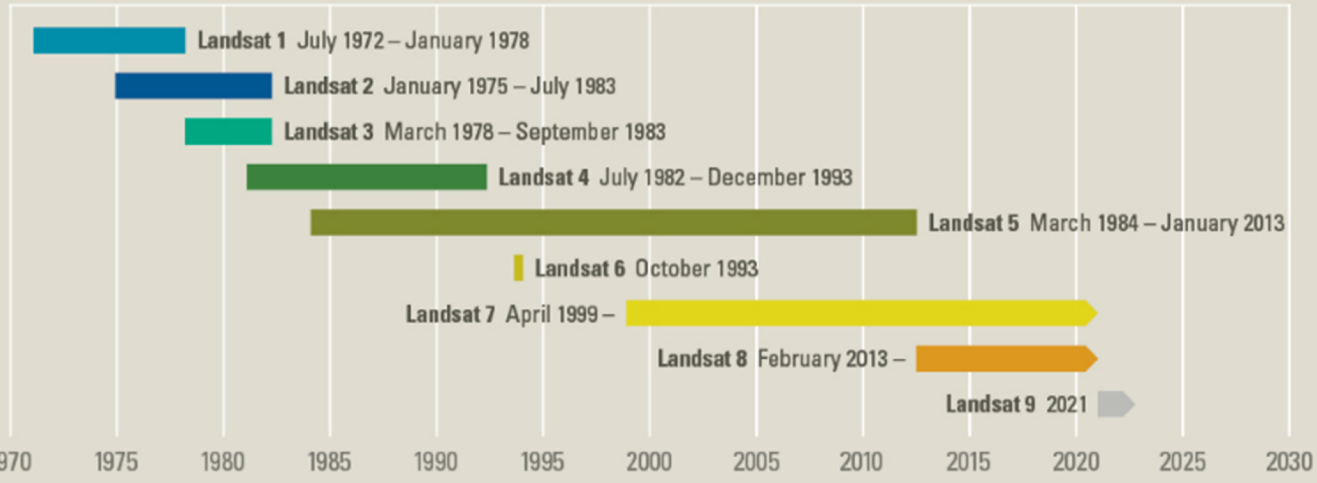
Timothy Stryker

Chief, Outreach and Collaboration
Branch

USGS National Land Imaging Program

U.S. Department of the Interior

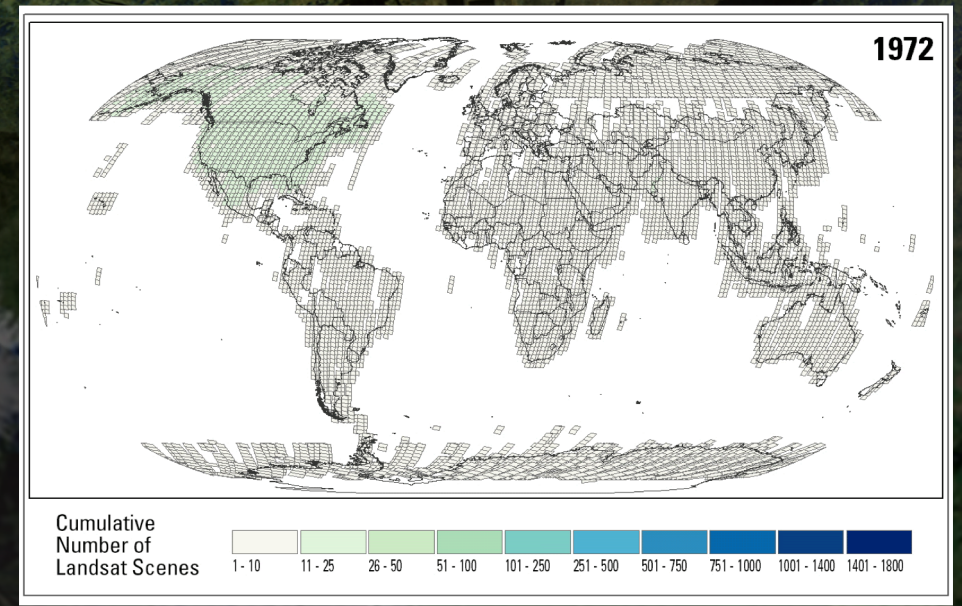
Landsat Missions: Imaging the Earth Since 1972



NASA-USGS Partnership

NASA Satellite Development & Launch

USGS Satellite Operations & Data Distribution



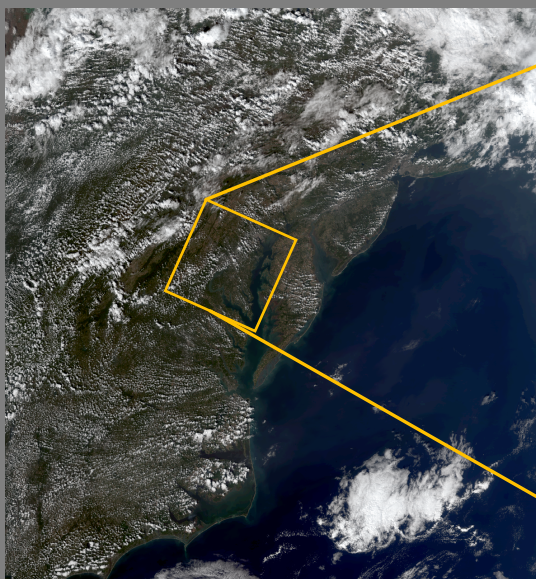
- ~50 years of land cover, land use, and vegetation information
- Large area coverage for global, continental and regional studies
- The most cited land-imaging satellite in peer-reviewed scientific literature, and the citation rate is increasing

- Data Archive contains 300 billion km²
- Adds 40 million km² per day

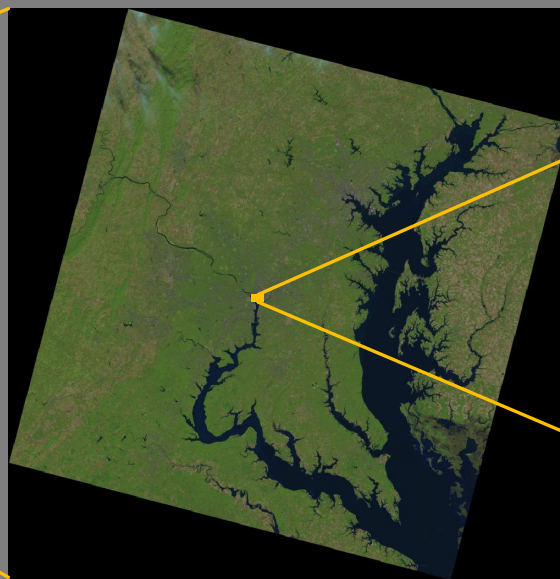


Why is Landsat Unique?

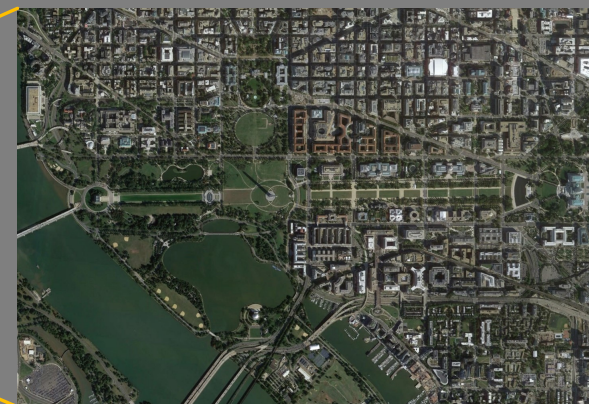
- Quality of imagery and global coverage
- Cross-calibration of sensor data
- Irreplaceable historical record
- Landscape-scale resolution
- Supports government, commercial, non-profit, and education users worldwide



Weather-scale



Landsat



Commercial

Free and Open Data Access: USGS Web Tools



Landsat Data Access

- HOME
- LANDSAT MISSIONS
- SCIENCE
- PRODUCT INFORMATION
- DATA AND TOOLS
- PUBLICATIONS
- DOCUMENTS
- MULTIMEDIA
- NEWS
- EDUCATION
- CONNECT
- PARTNERS
- ABOUT
- GLOSSARY AND ACRONYMS

Landsat Commercial Cloud Data Access

[Landsat Collection 2 Level-1 and Level-2 global scene-based data](#) can be accessed from the Amazon Web Services (AWS) cloud platform. The Landsat products are located in an Amazon Simple Storage Service (S3) `s3://usgs-landsat-commercial-scene-bucket/usgs-c2` region.

PLEASE NOTE: On December 23, 2020 the USGS is releasing [Temperature products using the Satellite \(SAT\) Application](#). The Collection 2 Surface Temperature products Machine to Machine (M2M), and direct access in the issue and will provide an update when these Spatial

Leveraging the storage and processing that cloud ser time. While this new capability does not change exist the growing record of [Landsat Earth Observations](#).

- [USGS Press Release \(March 2020\)](#)

Documentation and Addition

Visit the links below to learn how to apply your work!

- Documentation**
- [Landsat Commercial Cloud Data Access User](#)

Tutorials

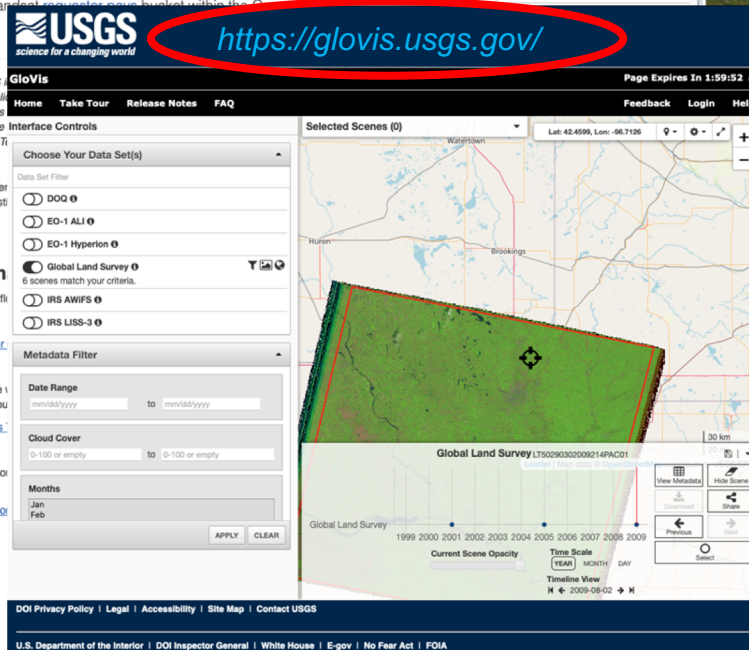
The following files are available to guide users while in the Jupyter Notebook (.ipynb) file, along with .html ou

- [Landsat Cloud Direct Access Requester Pays](#)

Videos

These videos explain how using data in the cloud wo

- [Landsat Data is Moving to the Cloud](#)
- [Landsat in the Cloud – Supporting Current Wo](#)
- [Cloud Processing - coming soon](#)



USGS
<https://glovis.usgs.gov/>

Page Expires In 1:59:52

Home Take Tour Release Notes FAQ Feedback Login Help

Interface Controls

Choose Your Data Set(s)

Data Set Filter

- DOQ
- EO-1 ALI
- EO-1 Hyperion
- Global Land Survey
- IRS AWFS
- IRS LIS-3

Metadata Filter

Date Range

mm/dd/yyyy to mm/dd/yyyy

Cloud Cover

0-100 or empty to 0-100 or empty

Months

Jan Feb

APPLY CLEAR

Selected Scenes (0)

Waterdown

Lat: 42.4589, Lon: -96.7126

Global Land Survey LT50290302009214PAC01

Global Land Survey

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

Current Scene Opacity

Time Scale

YEAR MONTH DAY

Timeline View

H ← 2009-08-02 → H

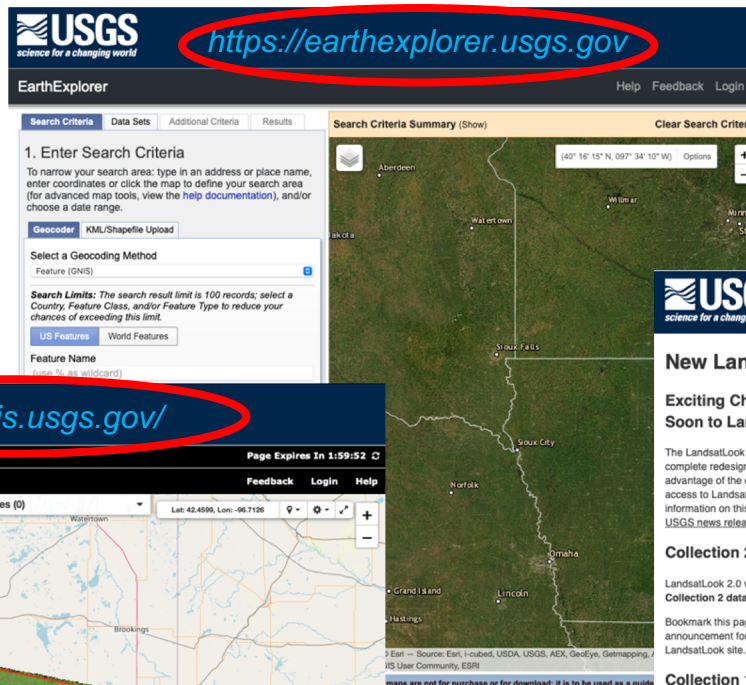
View Metadata Hide Scene

Download Share

Previous Select

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USGS
 science for a changing world

<https://earthexplorer.usgs.gov>

EarthExplorer Help Feedback Login

Search Criteria Data Sets Additional Criteria Results

Search Criteria Summary (Show) Clear Search Criteria

1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.

Geocoder KML/Shapefile Upload

Select a Geocoding Method

Feature (GNIS)

Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

US Features World Features

Feature Name

(from 33 results)

Aberdeen

40° 16' 15" N, 097° 34' 10" W Options

Wallerstown

Wilmer

Mirning

St. Paul

Stark Falls

Souix City

Norfolk

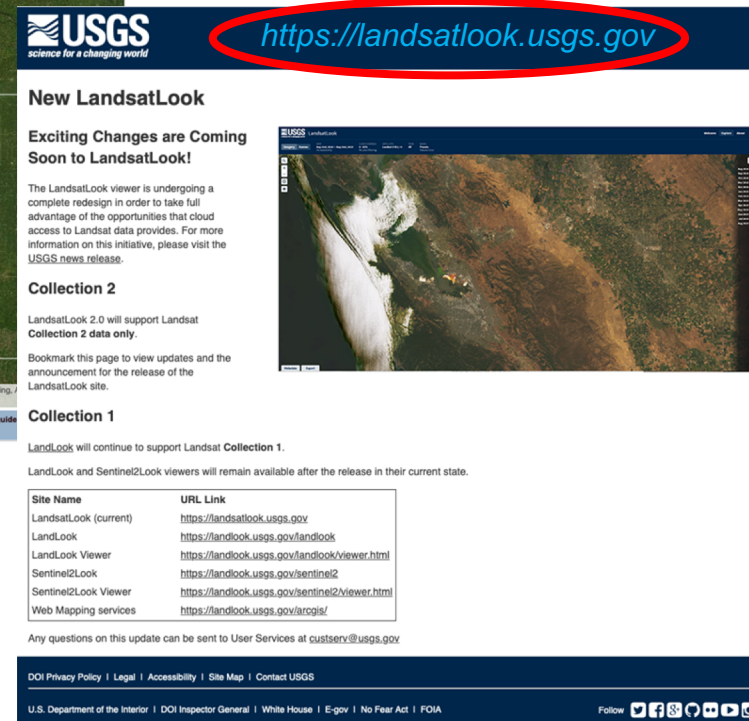
Grand Island

Lincoln

Hastings

East — Source: Earth-cubed, USDA, USGS, AEX, GeoEye, Getmapping, IGN User Community, ESRI

maps are not for purchase or for download; it is to be used as a guide



USGS
 science for a changing world

<https://landsatlook.usgs.gov>

New LandsatLook

Exciting Changes are Coming Soon to LandsatLook!

The LandsatLook viewer is undergoing a complete redesign in order to take full advantage of the opportunities that cloud access to Landsat data provides. For more information on this initiative, please visit the [USGS news release](#).

Collection 2

LandsatLook 2.0 will support Landsat Collection 2 data only.

Bookmark this page to view updates and the announcement for the release of the LandsatLook site.

Collection 1

LandsatLook will continue to support Landsat Collection 1.


LandsatLook and Sentinel2Look viewers will remain available after the release in their current state.

Site Name	URL Link
LandsatLook (current)	https://landsatlook.usgs.gov
LandsatLook	https://landsatlook.usgs.gov/landlook
LandsatLook Viewer	https://landsatlook.usgs.gov/landlook/viewer.html
Sentinel2Look	https://landsatlook.usgs.gov/sentinel2
Sentinel2Look Viewer	https://landsatlook.usgs.gov/sentinel2/viewer.html
Web Mapping services	https://landsatlook.usgs.gov/arcgis/

Any questions on this update can be sent to User Services at custserv@usgs.gov

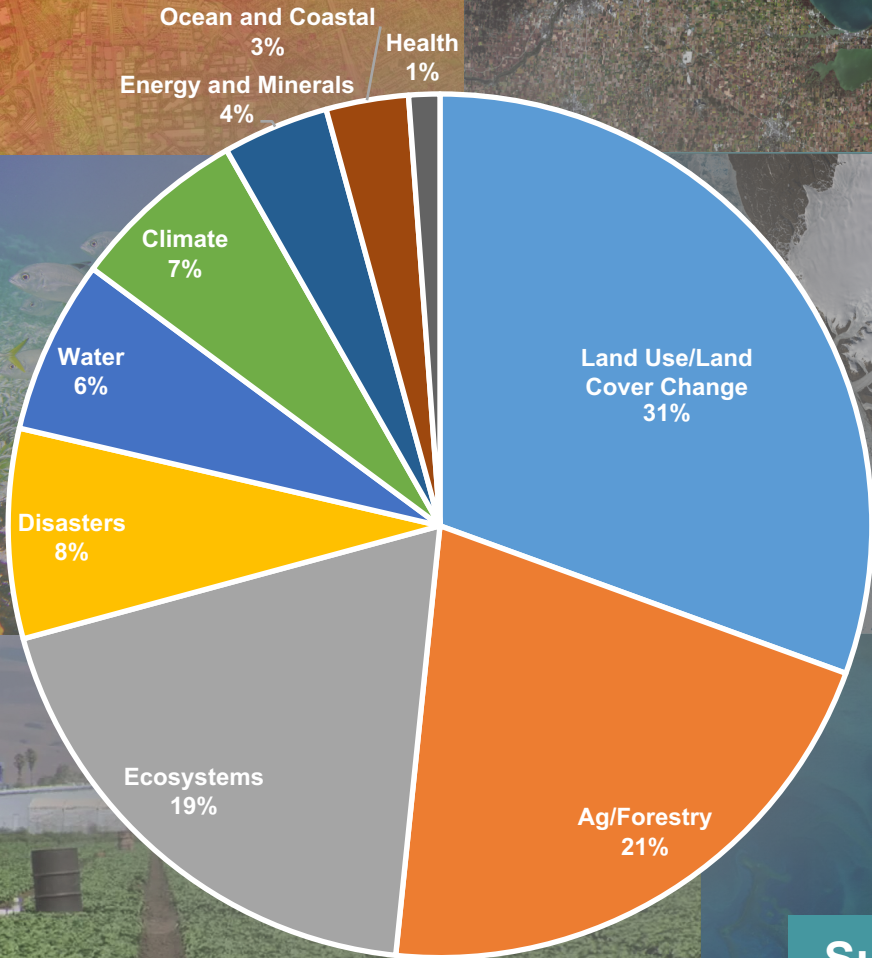
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Follow 

Landsat Applications

- The U.S. Government's most-used land imaging data set
- The second-highest system in societal benefit impact among 1300 Earth-observing systems (second only to GPS)



Supports numerous government, indigenous, academic, commercial, non-profit, and international uses

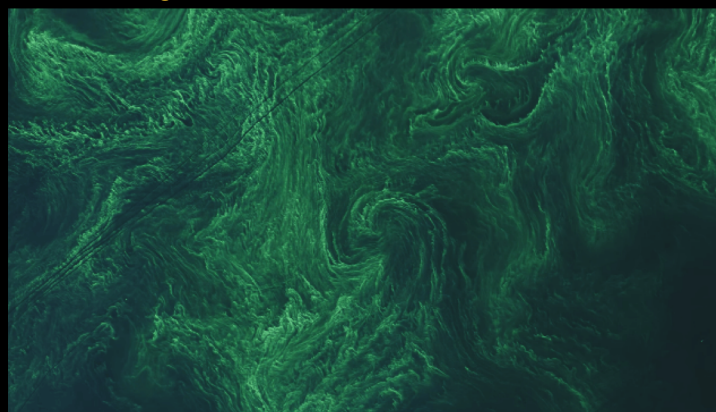


Landsat is Essential to Understanding Landscape Change

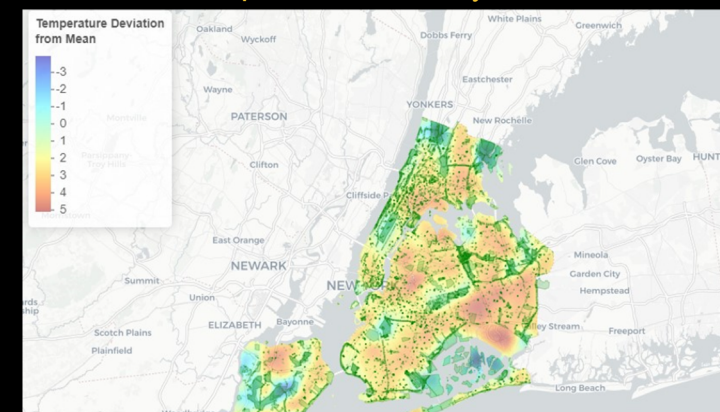
Applications include:

- Impacts of Climate Change
- Quantifying Global Forest Change
- Managing Water Consumption, Management & Human Health
- Supporting Disaster Mitigation & Recovery Efforts

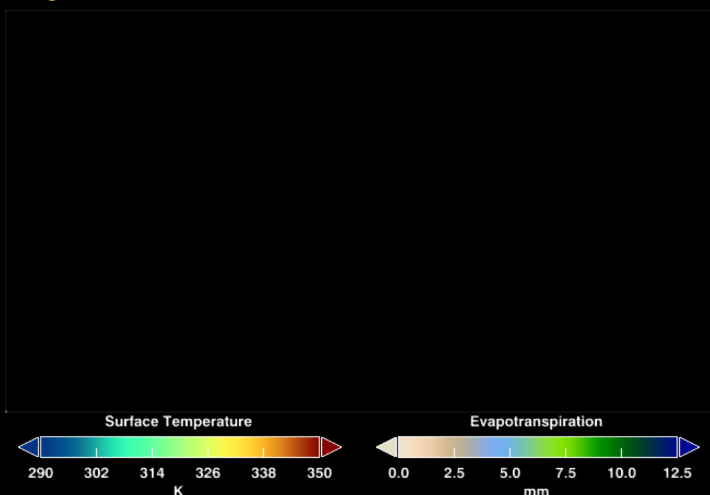
Harmful Algal Bloom - Lake Erie



Urban Heat Map - New York City



Irrigated Farm Lands - New Mexico



Tropical Forest Loss - South America

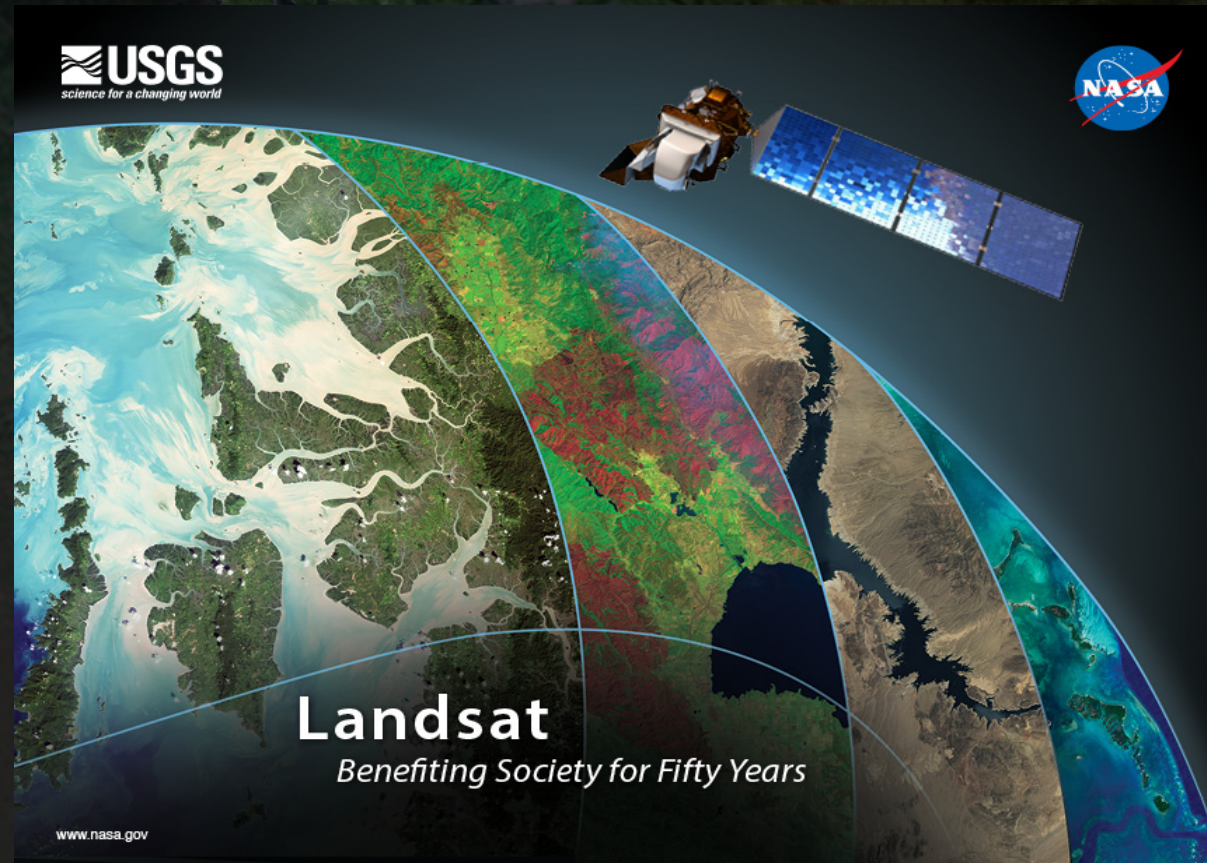


Disaster Recovery

Full, Free, and Open Data for Everyone

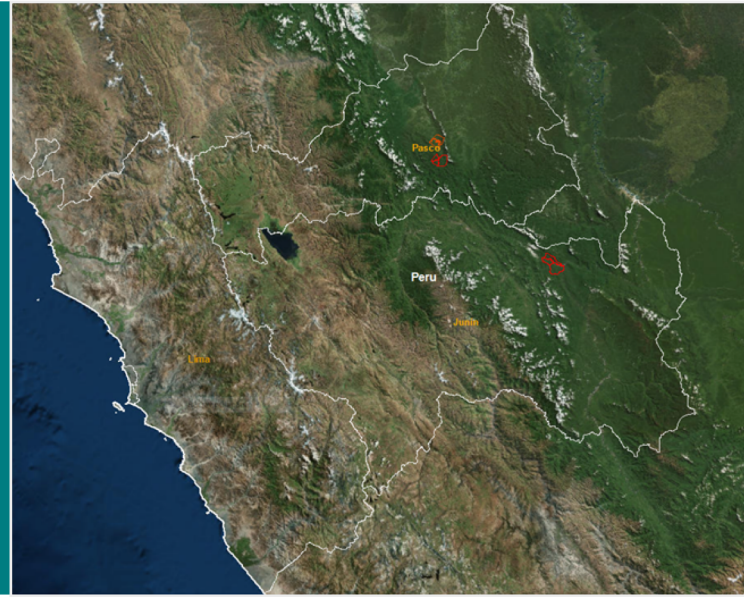
"The opening of the Landsat archive to free, web-based access is like giving a library card for the world's best library of Earth conditions to everyone in the world."

- Adam Gerrand, United Nations Food and Agriculture Organization



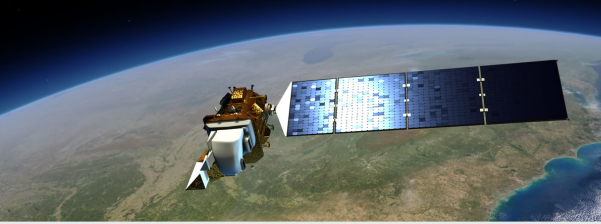
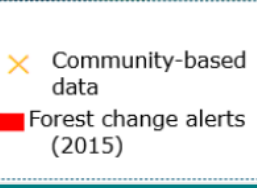
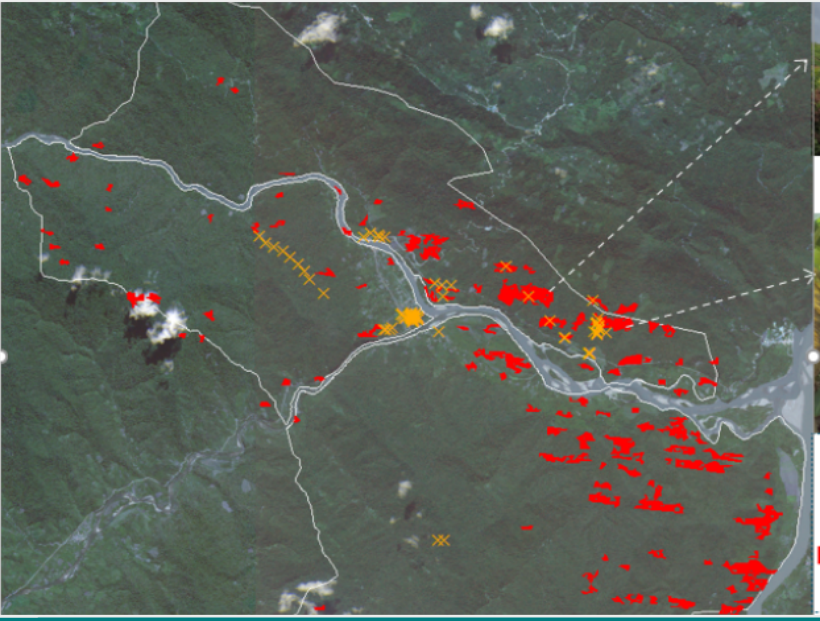
Building National Forest Monitoring Systems

- Accounting of Carbon Emissions from *Deforestation and Forest Degradation*
- Setting *historical baselines* that inform policy
- Accessing Carbon Markets for *implementing sustainable forestry activities*



Early Warning Systems of Deforestation and Forest Disturbance

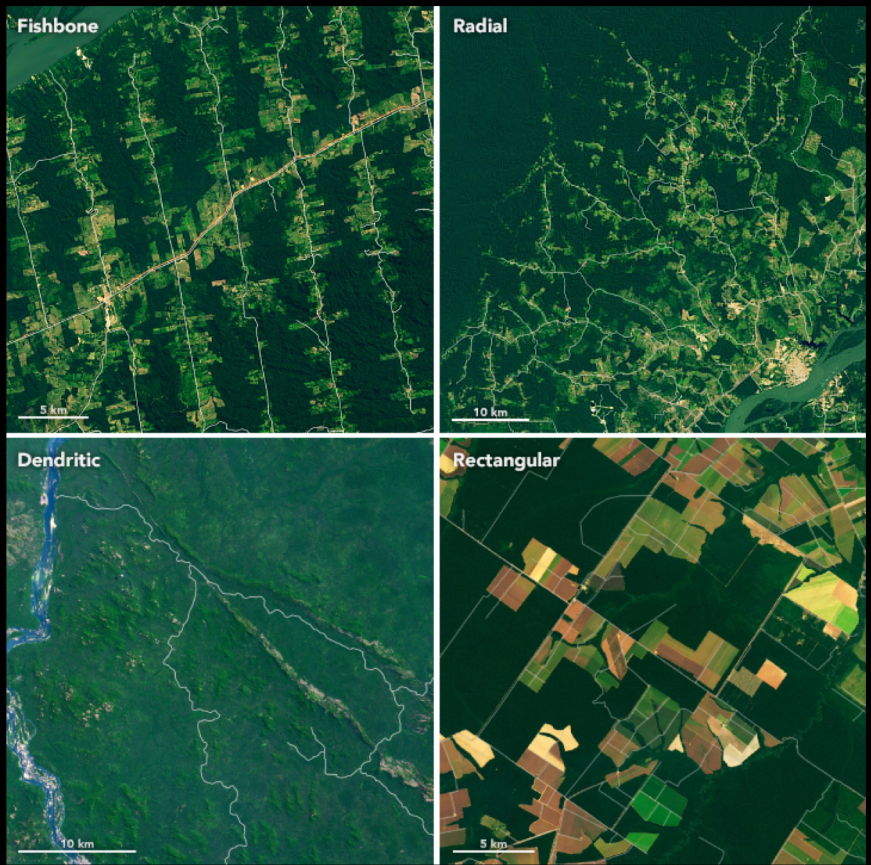
- Near real-time monitoring is necessary for better forest management
- Increase awareness and support law enforcement
- Empower local communities in monitoring and managing forest change



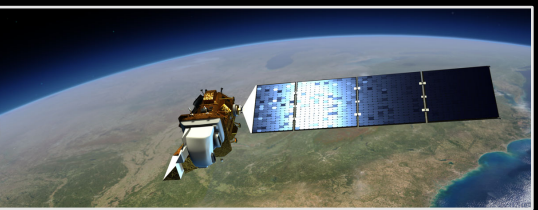
Supporting Global Forest Monitoring

- Landsat is the base satellite data for Global Monitoring Systems
- Global datasets support climate change mitigation actions

Understanding Amazon Deforestation Patterns



Landsat Gallery
<https://landsat.visibleearth.nasa.gov/>



State of Para, Brazil
 acquired June 4, 2000 - June 19, 2019
[Landsat.visibleearth.nasa.gov](https://landsat.visibleearth.nasa.gov)





Landsat Operations and Development Status

Active
In Development
Planned

Landsat 8 Flight Operations (2013-)

Collecting up to 740 new scenes per day; frequent night and off-nadir imaging of volcano and fire imaging.

Landsat 7 Flight Operations (1999-)

Collecting about 470 new scenes per day; latest fuel estimate projects operations through 2021.

Landsat 9 (Launched Sept 27, 2021)

Copy of Landsat 8, but with important improvements for accuracy and resiliency (upgrade to fully Risk Class B); 14-bit data.

Landsat Archive Operations

Over 9 million unique Landsat scenes available in the 50-year archive, with over 100 million downloads since Landsat data become freely available in 2008.

New "Collection 2" now available on the Amazon Cloud.

Landsat Next (~ late 2020s launch)

Technology and user needs analyses led to an architecture study, which delivered post-Landsat 9 recommendations to NASA and USGS in 2020.

NASA and DOI/USGS working together to define a multi-component architecture; details to be announced with FY22 Budget.