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Landsat Update

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Landsat Mission News

Landsat 8 Celebrates First Year

February 11, 2014 marked the first anniversary of the launch of the Landsat 8 satellite. The satellite has collected over 160,000 images of the Earth, adding to the expansive 40+ year Landsat data archive.

Click on the image or copy this URL into your browser: https://www.youtube.com/watch?v=P-lbujsVa2M.

The article below describes the first year of Landsat 8. This was published on the Landsat webpage on February 11, 2014.

Landsat 8: Good Things, Getting Better

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February 11, 2014

It's hard to believe a year has passed since the launch of Landsat 8. This first anniversary is going to be an exciting, upbeat celebration because the new satellite is meeting, if not exceeding, all expectations. "Landsat 8 is nearly perfect," said Jim Lacasse, Landsat Operations and Maintenance Project Manager. "We're getting really high quality data."

There is, however, a bit of tweaking going on as Landsat calibration and instrument teams work to correct a few small issues. Landsat 8's Operational Land Imager (OLI), for example, is composed of tens of thousands of very sensitive detectors-so sensitive that tiny discrepancies are evident in Landsat 8 images of dark, uniform areas such as large expanses of water. The calibration team has made an overall improvement to the radiometry (color fidelity) of the OLI sensor's bands to resolve this problem.

The satellite's Thermal Infrared Sensor (TIRS) acquires two infrared bands. Both are being affected, to different degrees, by a stray light problem. "Light from outside the area we are looking at is getting into the telescope-it's being reflected from something in the sensor itself-which is causing 'ghosting' in the images," said Ron Morfitt, Landsat 8 Calibration and Validation Lead. "To fix the problem, the calibration and instrument teams are scanning the moon, which is a very bright object with a very dark background, to try to find out exactly where the stray light is coming from. We'll then build a filter to remove the ghosts from the images," Morfitt added. "It is a very novel solution."

Landsat 8 and Landsat 7 are also being managed in a novel way, with the newer satellite being used to extend the capabilities-and lifespan-of the older one. "Landsat 7 recently went to a continental landmass acquisition strategy," said Lacasse. "Capturing images of islands, for example, was very inefficient due to Landsat 7 scheduling constraints. The responsibility for capturing images of islands has been turned over to Landsat 8, with its much more sensitive sensor. The change helps to conserve the resources of Landsat 7 while still meeting our science goals."

This change has also resulted in more data than anticipated being acquired by both satellites. Freed from routine acquisition of island images-as well as those of water, Antarctica, and night scenes-Landsat 7's output has increased from 375 to 438 scenes per day while at the same time prolonging the life of the ETM+. Landsat 8 is also collecting more than its anticipated 400 scenes per day. "We are currently scheduling 550 images per day," said Gene Fosnight, Landsat Acquisitions Director. "Landsat 8's new bands and increased sensitivity make it particularly useful for dark objects like water and bright objects like snow and ice. We are acquiring those types of images at a higher rate than ever before. Landsat 8 is also cautiously beginning night imaging campaigns of active volcanoes."

More data. Better data. It's definitely something to celebrate.

Landsat 8 Images Moon

Landsat 8 was built to do something none of its predecessors had done before: look at the Moon.

The Moon provides a stable data source because it is a target with practically static surface cover and no atmospheric effects. Data from on-orbit lunar imaging can be used to track the stability of the Operational Land Imager (OLI) instrument and the Thermal Infrared Sensor (TIRS) aboard Landsat 8, resulting in improved calibration of the data, making good data even better.

Landsat 8 typically collects lunar data monthly near full Moon - at the lunar phase angle of about 8 degrees. Any changes to the sensor's radiometry (measurements of light) can be detected and used to improve sensor calibration.

Lunar data are collected only for calibration or other engineering purposes, so it is not normally released to the public, but USGS and NASA have decided to put out a sample dataset for those eager to look more closely at Landsat 8 lunar data.

The image below was acquired June 24, 2013, and displays panchromatic band 8.

Landsat 8 Lunar Calibration data, band 8. Acquired June 24, 2013.

Recent Landsat 7 Maneuvers Affect WRS Footprints

On January 9, 2014, the USGS executed a delta-velocity (delta-v) maneuver to pre-position Landsat 7 for a larger delta-inclination (delta-i) maneuver used to maintain the satellite's mean local crossing time. NOAA’s space weather forecast predicted high solar activity during this time that would increase the atmospheric drag on the spacecraft, and therefore, the maneuver's "burn time" was extended. The geomagnetic storm that was forecast never occurred and caused the delta-v maneuver to perform a slight over-correction and therefore a larger than expected shift in the ground track of the orbit.

A delta-i was successfully executed on February 4, 2014 to help move the satellite back, and on February 12, the satellite reached the correct position. There are no impacts to Level-1 data processing and product quality is not affected although users may notice a slight difference in the nominal WRS footprint that is more noticeable toward the equator.

Product News

Landsat 8 Reprocessing Effort Update

In February of 2014, all Landsat 8 data were removed from the online cache to reprocess to employ calibration updates for both sensors onboard the satellite. (See http://landsat.usgs.gov/calibration_notices.php.)

As of March 21, 2014, over 135,000 scenes have been reprocessed and repopulated to the online cache, and are available for download by all users once again.

Search Interfaces to discontinue support of older Internet Explorer browsers

As of May 1, 2014, Internet Explorer (IE) browsers prior to version 9.0 will no longer be supported on the EarthExplorer (http://earthexplorer.usgs.gov) and GloVis (http://glovis.usgs.gov) searching interfaces. Older versions of IE may cause display and functionality issues, and will prevent the sites from operating properly.

Please work with the Information Technology Department in your organization to upgrade IE on your system, or to acquire an alternate web browser, such as Mozilla Firefox or Google Chrome, and contact lta@usgs.gov with any questions.

Upcoming Changes to Landsat Surface Reflectance Climate Data Records

In the near future, a number of changes will be made to the processing and output options for Landsat Surface Reflectance Climate Data Records (CDR), which are requested through the Earth Resources Observation and Science Center (EROS) Science Processing Architecture (ESPA) on-demand interface (https://espa.cr.usgs.gov) and EarthExplorer (http://earthexplorer.usgs.gov).

Currently, HDF-EOS is the standard output format for Surface Reflectance CDR data products. The upcoming code changes will allow users to select from three output formats: HDF, GeoTIFF, or Binary. Surface Reflectance data products requested from EarthExplorer will be delivered as GeoTIFF, and the metadata will be delivered in an .xml file. The brightness temperature will be labeled in Kelvin instead of currently-noted Celsius.

On March 28, 2014, samples of the new data products will be available to download from http://landsat.usgs.gov/CDR_ECV.php. If you have placed orders for SR data in the past, you will also be receiving an email from us when the samples are ready.

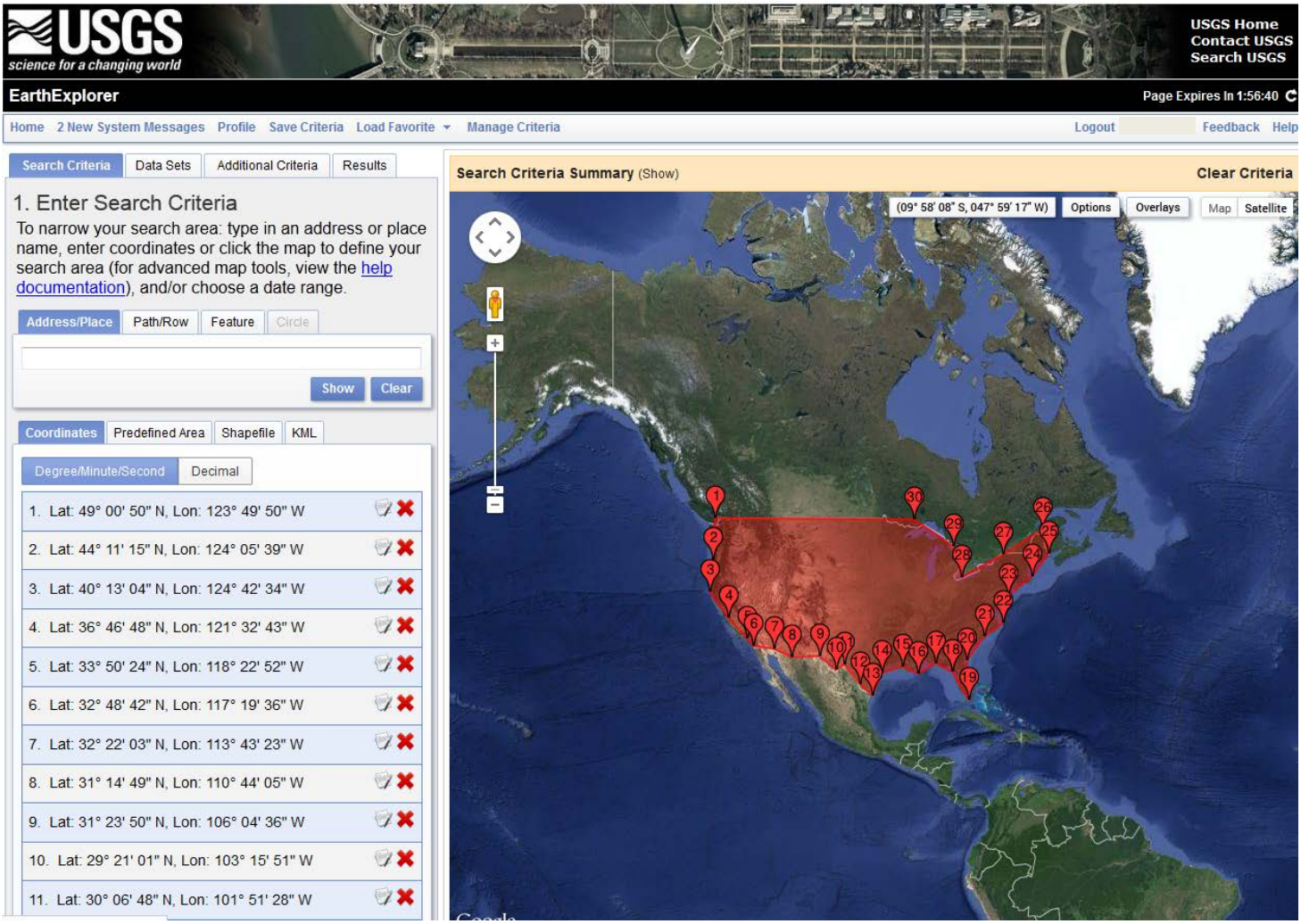
A future notice will provide an exact date for the implementation of these changes.

Tips and Tricks

Save your Area of Interest Easily on EarthExplorer

EarthExplorer (EE) - http://earthexplorer.usgs.gov is the primary search portal for access to the USGS archives, including Landsat data. Did you know you can save your area of interest (AOI) to make future searches easier?

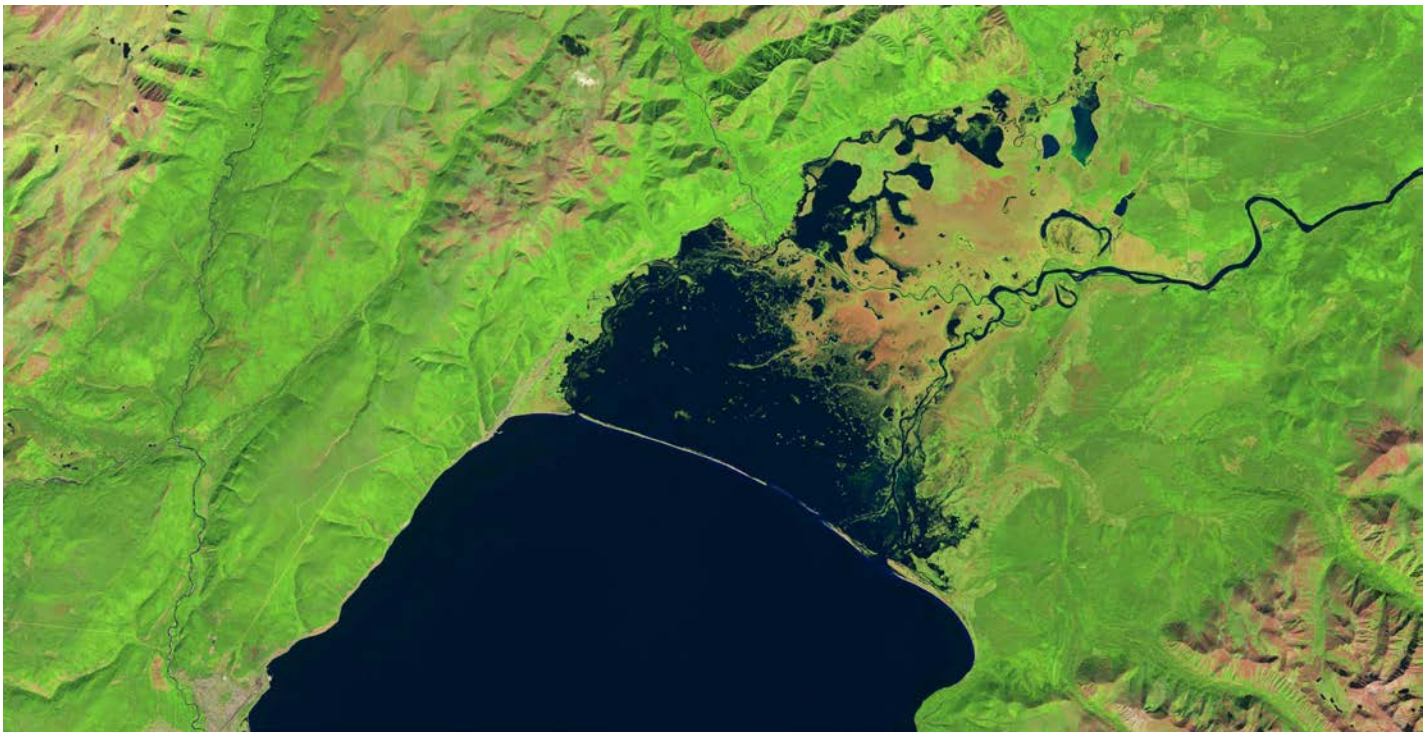
After you login to EE, select your AOI. You can use up to 30 points to create your polygon, or you can also use the Circle option on the map interface. You can save the AOI only, as in the example below, or add any other search criteria – Date Range, Data Sets, and Additional Criteria. In this example, only the AOI is going to be saved for easy future use.



After all criteria are set, click **Save Criteria** in the menu bar above the map. The area of interest and any associated criteria are saved for future reference. The **Manage Criteria** menu items lists all saved criteria, which can be removed, viewed and modified, or added as **Favorites** for easy loading.

Landsat Image of Interest

Yarki Island and Lake Baikal, Russia



Sensor: Landsat 8 Operational Land Imager (OLI)
Acquisition Date: August 31, 2013
Path/Row: 132/21

Located in southern Siberia in Russia, Lake Baikal is the deepest lake in the world (1,700 m) and contains 20 percent of the fresh surface water on the planet. Because of its geologic age and geographic isolation, more than two-thirds of the lake's freshwater species are found nowhere else in the world.

A narrow sand spit stretches across the lake's north end to form Yarki Island, which separates the northernmost shoreline from the open water. This long, discontinuous land surface is the result of accumulated sediments from several rivers flowing in from the north, combined with the interaction of these sediments with incoming waves, wind, and storms from the main lake to the south. The shallow lagoon that is created behind Yarki Island is filled with relatively warm waters and peat deposits, and forms an important bird sanctuary.

This Landsat image shows the area around Yarki Island and northernmost Lake Baikal. The green tones in the lagoon area depict vegetative sediments. The mouth of the Verkhnaya Angara River can be seen on the right side of the image.

The vast archive of Landsat images helps researchers and scientists monitor the Earth's ecosystems, and provides unbiased evidence of how changes can affect these ecosystems worldwide.

This and other Landsat Images of Interest can be found in the Landsat Image Gallery: http://landsat.usgs.gov/gallery.php.