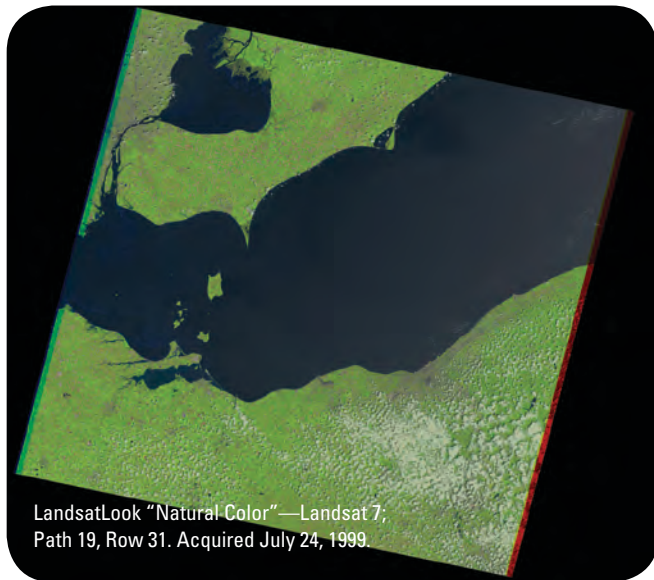


# LandsatLook: Images and Viewer

*LandsatLook images are full resolution JPEG files derived from Landsat Level 1 data products. The images are compressed and stretched to create an image optimized for image selection and visual interpretation; it is not recommended that they be used in digital analysis.*

## Natural Color, Thermal, and Quality Images Available

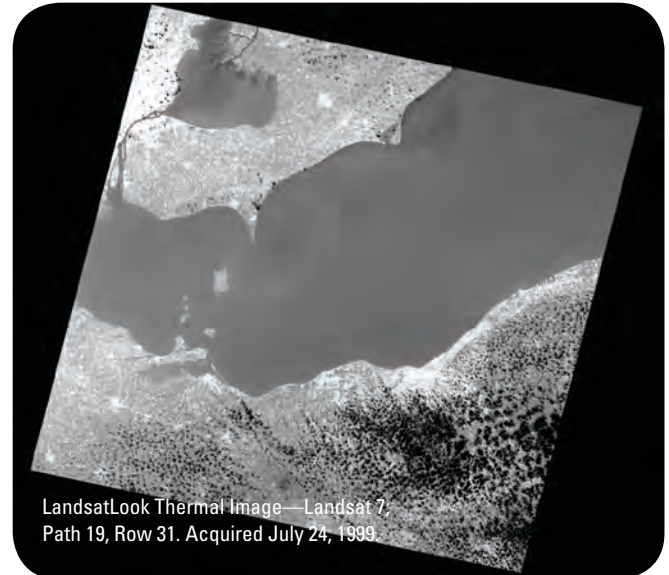
*The LandsatLook “Natural Color” Image is a composite of three bands designed to show a natural color image.* Bands 6, 5, and 4 are used for Landsat 8 Operational Land Imager (OLI) images. Bands 5, 4, and 3 are used for Landsat Enhanced Thematic Mapper Plus (ETM+) and Thematic Mapper (TM) images. Bands 2, 4, and 1 are used for Landsat Multispectral Scanner (MSS) images. Top of atmosphere reflectance is calculated after the pixel digital number (DN) values are converted to calibrated radiances. Values were scaled to a 1–255 range using a gamma stretch, with a gamma=2.0. This stretch was designed to emphasize vegetation without clipping the extreme values.



*The LandsatLook Thermal Image is a single-band grayscale image designed to display thermal properties.* Band 10 (Landsat 8 Thermal Infrared Sensor-TIRS), Band 6 (TM) and Band 61-high gain (ETM+) are used; this image is not available for MSS scenes. Image brightness temperature values are calculated after the pixel digital number (DN) values are converted to calibrated radiances. An image specific 2 percent clip and a linear stretch to 1–255 were applied to the brightness temperature values to emphasize image-specific thermal variability.

*The LandsatLook Images with Geographic Reference bundle includes the “Natural Color” and Thermal Image files, along with .xml and .wld files, and is designed for use in geographic information system or image processing software packages.* The bundle uses the Geospatial Data Abstraction Library Extensible Markup Language files (GDAL XML) and Environmental Systems Research Institute (ESRI™) world files. ESRI™ world files are simple and

widely supported, but do not include projection information. GDAL XML files are less well supported, but contain important projection information. (In some software packages, it will be necessary to import the .wld and .xml files separately to successfully create a georeferenced image.)



*The LandsatLook Quality Image (Landsat 8 only) is provided to provide information regarding conditions that may affect the accuracy of the pixels in each scene.* Quality Assessment (QA) bits inform users of conditions that can affect the calculation of a physical value. Used effectively, QA bits improve the integrity of science investigations by indicating which pixels might be affected by instrument artifacts or subject to cloud contamination.

## Viewing, Downloading, and Using LandsatLook Images

The LandsatLook Viewer ([landsatlook.usgs.gov](http://landsatlook.usgs.gov)) allows quick rendering of images at full resolution. In addition to other features, the LandsatLook Viewer mosaics images on-the-fly and allows screen captures of the viewing window. The search features use the USGS metadata base that includes information such as cloud cover, acquisition date, and so forth. Although the Viewer is not directly suitable for rigorous scientific analysis, the potential effect on science in the classroom, decision making, and science in the field is enormous. The data are accessible in four ways to serve the widest array of users:

1. Save the image off the screen as a jpeg or a GeoTIFF.
2. Immediately download single full LandsatLook images.
3. Select and download many full LandsatLook scenes using the USGS shopping basket.
4. Select and download full multiband Landsat data through the shopping basket.

LandsatLook Images are also included as options when downloading Landsat scenes from GloVis (<http://glovis.usgs.gov>) or EarthExplorer (<http://earthexplorer.usgs.gov>), and can be viewed in most software, including image processing systems, Geographic Information Systems, graphic packages, and web browsers.

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