GloVis Overview and Guide

GloVis home page

http://glovis.usgs.gov/
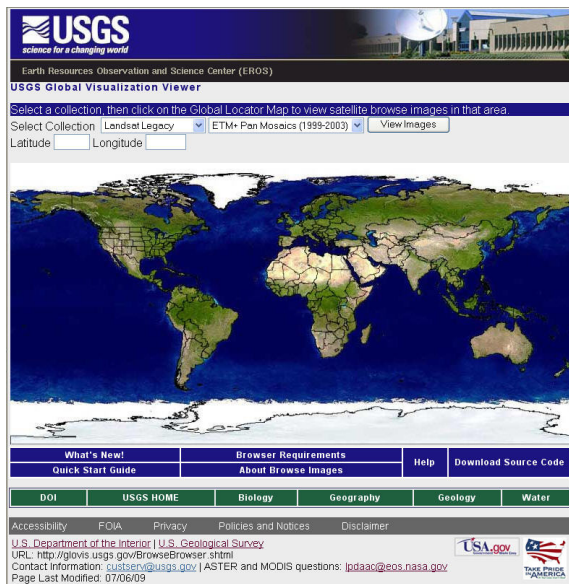
![!] **NOTE** *GloVis requires Java 1.4 or newer. If the version of Java detected is older than that, the page indicating a new version of Java needs to be installed is displayed.*

Introduction

This guide is intended to help USFS users acquire free Landsat data directly from the U.S. Geological Survey Earth Resources Observation and Science (EROS) Center using the Global Visualization Viewer (GloVis). Image data from other satellite and airborne sensors are also available via GloVis, including ASTER, MODIS, and aerial photography, however this tutorial will focus on using GloVis to search for and download Landsat data.

Specific topics of the tutorial will include (1) a description of the basic functionality of the GloVis viewer; (2) directions on how to review the availability and quality of Landsat TM/ETM+ data in the archive; (3) directions on how to select and directly download processed Landsat TM/ETM+ image data; and (4) directions on how to submit Level 1 Product Generation System (LPGS) processing orders for currently unprocessed Landsat TM/ETM+ image acquisitions that can then be subsequently downloaded.

The USGS Global Visualization Viewer (GloVis)

The USGS Global Visualization Viewer (GloVis http://glovis.usgs.gov/BrowseBrowser.shtml) is a quick and easy online search and order tool for selected satellite data. The viewer allows user-friendly access to all available browse images from the multiple EROS data holdings.

Through a graphic map display, the user can select any area of interest and immediately view all available browse images within the USGS inventory for the specified location. From the browse image viewer page, the user may either navigate to view adjacent scene locations or select a new area.

GloVis also offers additional features such as cloud cover limits, date limits, user-specified map layer displays, scene list maintenance, and access to metadata.

A downloading interface is provided for datasets that are available online.   An ordering interface is available for data requiring on-demand processing.
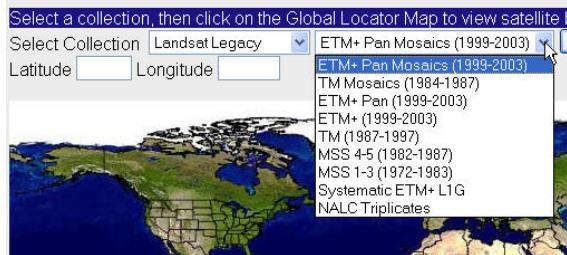
1

Select collection (Landsat Archive)

Select a collection, then click on the Global Locator Map to view satellit
Select Collection | Landsat Archive | Landsat 7 SLC-off (2003->)
Latitude [ ] Longitude [ ]
- Landsat 7 SLC-off (2003->)
- Landsat 7 SLC-on (1999-2003)
- Landsat 4-5 TM
- Landsat 4-5 MSS
- Landsat 1-3 MSS
- Landsat 4-7 Combined

Select collection (Landsat MRLC)

Select a collection, then click on the Global Locator Map to view sate
Select Collection | Landsat MRLC | MRLC/MTBS Radiance
Latitude [ ] Longitude [ ]
- MRLC/MTBS Radiance
- MRLC/MTBS Reflectance

Select collection (Landsat Legacy)

Select a collection, then click on the Global Locator Map to view satellite b
Select Collection | Landsat Legacy | ETM+ Pan Mosaics (1999-2003)
Latitude [ ] Longitude [ ]
- ETM+ Pan Mosaics (1999-2003)
- TM Mosaics (1984-1987)
- ETM+ Pan (1999-2003)
- ETM+ (1999-2003)
- TM (1987-1997)
- MSS 4-5 (1982-1987)
- MSS 1-3 (1972-1983)
- Systematic ETM+ L1G
- NALC Triplicates

> *The default selection, "**Landsat 7 SLC-off (2003 —>)**" restricts scene searches to ETM+ imagery affected by the May 31, 2003 failure of the sensor's scan line corrector. This is not the ideal option for most purposes. Try "**Landsat 4-7 Combined**" for the best selection of available scenes.*

1. Getting Started—Select Collection

Bring up the GloVis home page in a web browser. You will see a world map. The cursor location is displayed as latitude and longitude.

The first step is to select an image collection. The default selection is "Landsat Archive" and "Landsat 7 SLC-off (2003 —>)." This option constrains image search to ETM+ scenes collected after the May 31, 2003 failure of Landsat 7's on-board scan line corrector (please refer to the *Overview of Landsat Program and Image Archive* for an explanation of this and other terms used here). If you are looking for the most complete selection of Landsat scenes, you should choose "**Landsat 4-7 Combined**".

Other Landsat Archive choices available: "Landsat 7 SLC-on (1999-2003)" and two options for browsing Landsat Multispectral Scanner (MSS) scenes.

Landsat MRLC, which offers options for standard radiance or reflectance-corrected imagery, is another collection offered on GloVis. The MRLC archive is made up of selected high-quality Landsat scenes acquired through the Multi-Resolution Land Characteristics Consortium.

The third available Landsat collection is Landsat Legacy, which offers a number of special options including mosaics, 15-meter panchromatic imagery, and MSS imagery including scenes acquired by the North American Landscape Characterization (NALC) project.
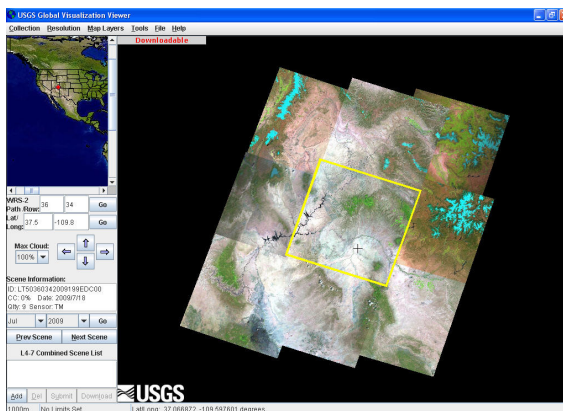
Once the Browse Image Viewer is open (see next page), the ability to change collections is still available on the top menu, or by using the keyboard shortcut **Alt+C**.

Select location

Browse Image Viewer (see appendix 1)

⚠️ **NOTE** *Some browsers block pop-up windows, which could prevent the image, metadata, help, tools, and shopping basket windows from appearing in GloVis.*

2. Start the Browse Image Viewer

There are two ways to start the Browse Image Viewer so that you can start viewing Landsat scenes. The simplest way is to click on a map location. Otherwise, you can enter a location using the latitude and longitude fields and click on the "View Images" button. Remember that longitude west of Greenwich is signified by a negative number.

The Browse Image Viewer (see appendix 1) will open in a small application window, which can be maximized to full screen. The underlying browser window must remain open while the viewer is in use.

At the top of the Image Viewer is a menu bar. The menus (Collection, Resolution, Map Layers, Tools, File and Help) are discussed on the next page.

On the right side of the Image Viewer is the image display area, showing a quick-look image of the selected Landsat scene and the eight adjacent scenes. You can change the resolution to view a close-up of the selected scene (see next page). In the upper left corner of the image display area is a message box that tells you if the selected scene is downloadable.

On the left of the Image Viewer, there is a location map and fields indicating the WRS-2 path and row and the latitude/longitude of the scene center. If you want to move to a different scene, you can type in the new location and click on the appropriate "Go" button. Just below the buttons, a set of four navigation arrows makes it easy to jump to adjacent scenes by going up, down, left or right.

There is a "Max Cloud" drop-down menu to the left of the navigation arrows. The default is a maximum of 100% cloud cover. This can be reset all the way down to zero, so that cloudy scenes are not displayed.
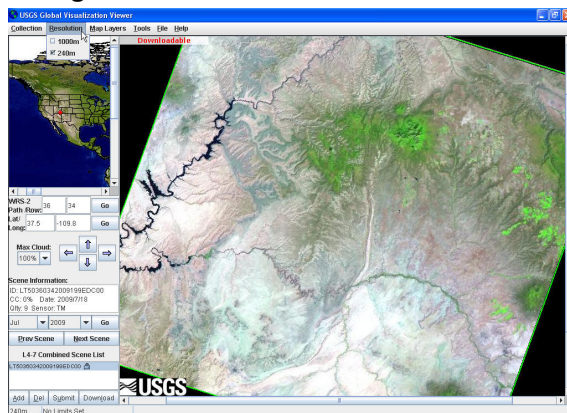
"Scene Information" displays the Landsat scene ID, percent cloud cover (CC), date of acquisition, the 0-9 image quality score (based on the number and distribution of bad scans, with 9 indicating a perfect scene), and the type of sensor (MSS, TM, or ETM+).

Below the scene information is a pair of drop-down menus enabling the user to select a different scene acquisition month and year. Click on "Go" to make the Image Viewer go to the first archived scene for the selected month.
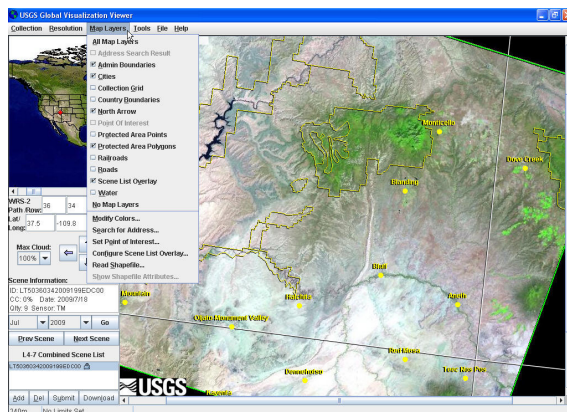
At the bottom is the scene list. This is your "shopping cart." The first two buttons below the list let the user add and delete scenes from the list. The "Submit" button submits scenes for

Image Viewer—240 m resolution

Image Viewer—Map Layers

processing, which is necessary only if you want to obtain scenes not tagged as downloadable. The "Download" button initiates scene downloading (see page 5).

3. Using the Menu Bar

The menu bar at the top of the Image Viewer includes some key functions, labeled Collection, Resolution, and Map Layers. In addition, but not discussed in detail here: Tools (offers users a selection of tools), File (allows the user to manipulate scene lists and metadata) and Help.

The *Collection menu* enables the user to switch to a different archive (see section 1, page 2). A variety of image collections can be accessed in addition to the Landsat collections. The *Resolution menu* offers two choices: the default 1000 m view (which displays nine adjacent Landsat scenes), and the 240 m view that provides a closer look at the selected scene. See appendix 1.

The *Map Layers menu* offers many options to add vector GIS layers to the image display for locational reference. The example in appendix 2 shows Admin Boundaries (state boundaries), Cities, and Protected Area Polygons (here showing Natural Bridges National Monument, the Dark Canyon Wilderness, Grand Gulch Primitive Area, and portions of the Glen Canyon National Recreation Area, the Manti-La Sal National Forest in Utah, and the San Juan National Forest in Colorado).

More information about map layers from the GloVis help page (http://glovis.usgs.gov/ ImgViewerHelp.html#apLayersMenu).

4. Displaying a Shapefile

To display an ArcGIS shapefile from your local machine, select "Read Shapefile" on the Map Layers menu. Any shapefile added must be in a Geographic (lat/lon) projection.

Select file (only the associated .dbf files appear on the list). Choose color (the default is red) and click OK. Your shapefile is then displayed in the Image Viewer and is listed at the bottom of the Map Layers menu. See appendix 3.

In the Image Viewer, click on any element (point, line, or polygon as appropriate) in the displayed shapefile, then go to Map Layers —> Show Shapefile Attributes. The associated attributes are listed. Switch to the "settings" tab on the right (labeled with the shapefile name). Here you can change the color, and filter the display according any single shapefile attribute.

Tools —NDVI Graph
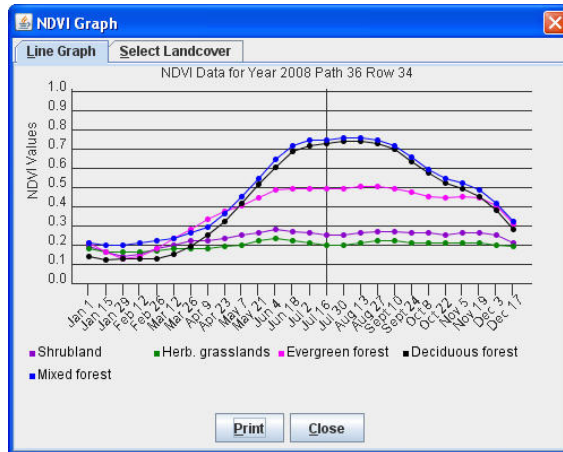
5. The NDVI Graph

The *NDVI Graph dialog box* is a Java applet that displays an annual graph of Normalized difference Vegetation Index (NDVI) measurements for the selected WRS-2 path and row in the image display. It can be found under Tools—> NDVI Graph. This graph depicts the approximate relative greenness for various vegetation types, which is an aid to phenological matching for change detection. Clicking in the graph area will select the scene closest to the date clicked on. *Note: the NDVI graphs are an average calculated from 1 km AVHRR satellite data. NDVI graphs are available only for the United States, and are updated yearly for the previous year.*

6. Downloading Imagery

When the "Downloadable" message is shown in the image display area, the full resolution data may be downloaded at no charge. To download the imagery, first select (click on) the scene you would like to download. Then on the bottom portion of the left panel under "Scene List," click "Add" and the scene will be added to the list. The scene will be highlighted in the Scene list box, and the Download button will become available.

Click the Download button. A pop-up box will appear with the scene ID, the file size and format (uncompressed), the amount of time the download is expected to take and asking if you would like to continue. To download, click "Yes."

If you are not a registered GloVis user, the site will ask you to register. Also, there is a questionnaire to fill out. Then you get to the download button, and it will open a dialog that enables you to save a **.tar.gz** (Tape ARchiver / GZip) file to your local disk. On a fast Internet connection, this can take less than ten minutes.

A utility such as WinZip must be used to unpack and extract the GeoTIFF (Geographic Tagged Image-File Format) files, one for each Landsat band. A README file and a "GCP Residual Report" for georeferencing ground control points are also included.

7. On-demand Processing

If a scene is not available for immediate download, it may be submitted for on-demand processing. Submitted scenes will be placed in the USGS Shopping Basket.

Menu bar

Location map

Navigation arrows

Location

Cloud cover filter

Scene info

Date acquired

Prev/Next

Scene list

Add scene to scene list

Download scene

USGS Global Visualization Viewer

Collection   Resolution   Map Layers   Tools   File   Help

Downloadable

WRS-2 Path/Row: 36   34   Go
Lat/Long: 37.5   -109.8   Go

Max Cloud: 100%

Scene Information:
ID: LT50360342009199EDC00
CC: 0%   Date: 2009/7/18
Qlty: 9 Sensor: TM

Jul   2009   Go

Prev Scene   Next Scene

L4-7 Combined Scene List

LT50360342009199EDC00

Add   Del   Submit   Download

USGS

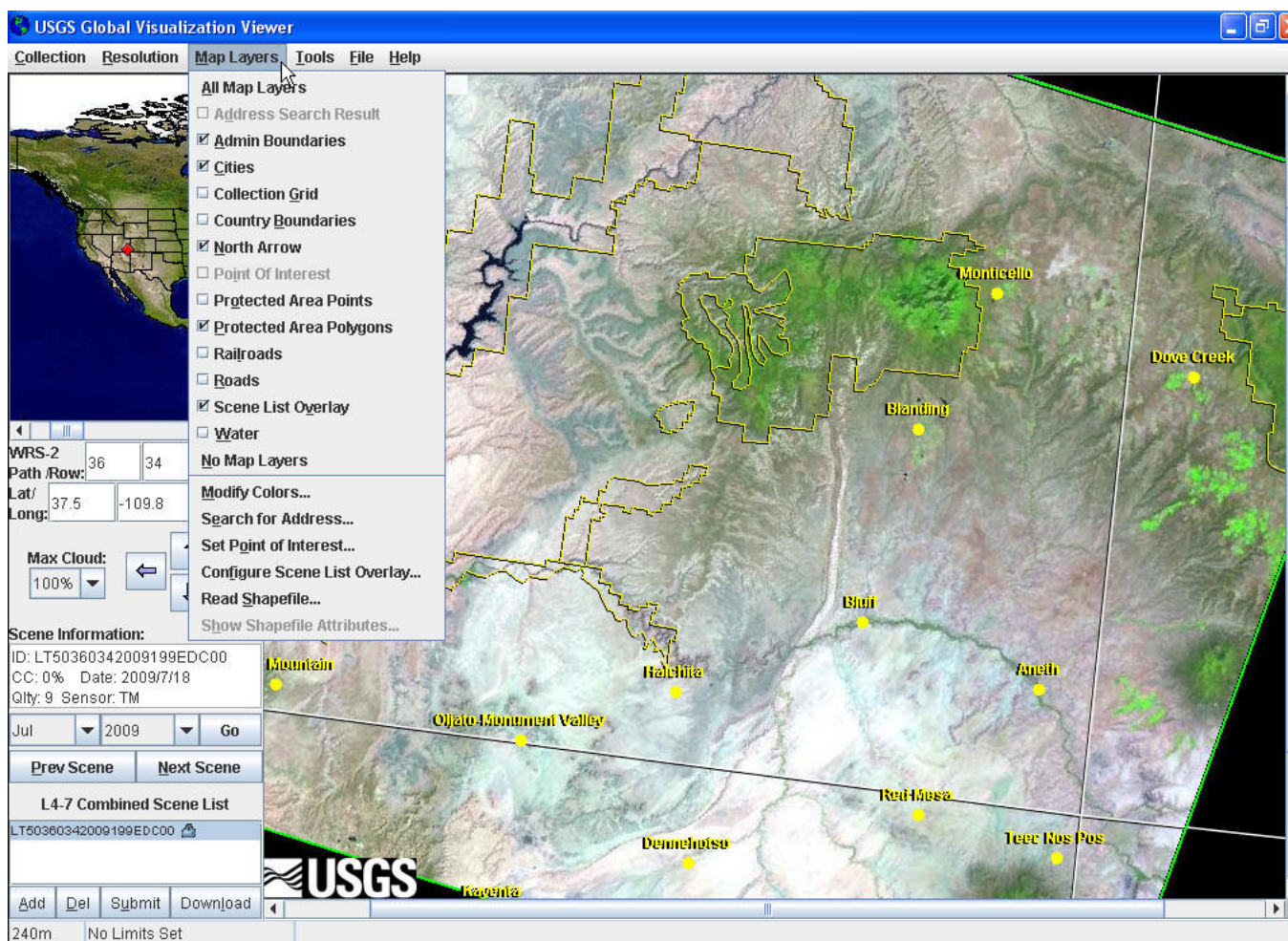1000m   No Limits Set   Lat/Long: 37.955664, -109.527276 degrees - LT50360342009199EDC00
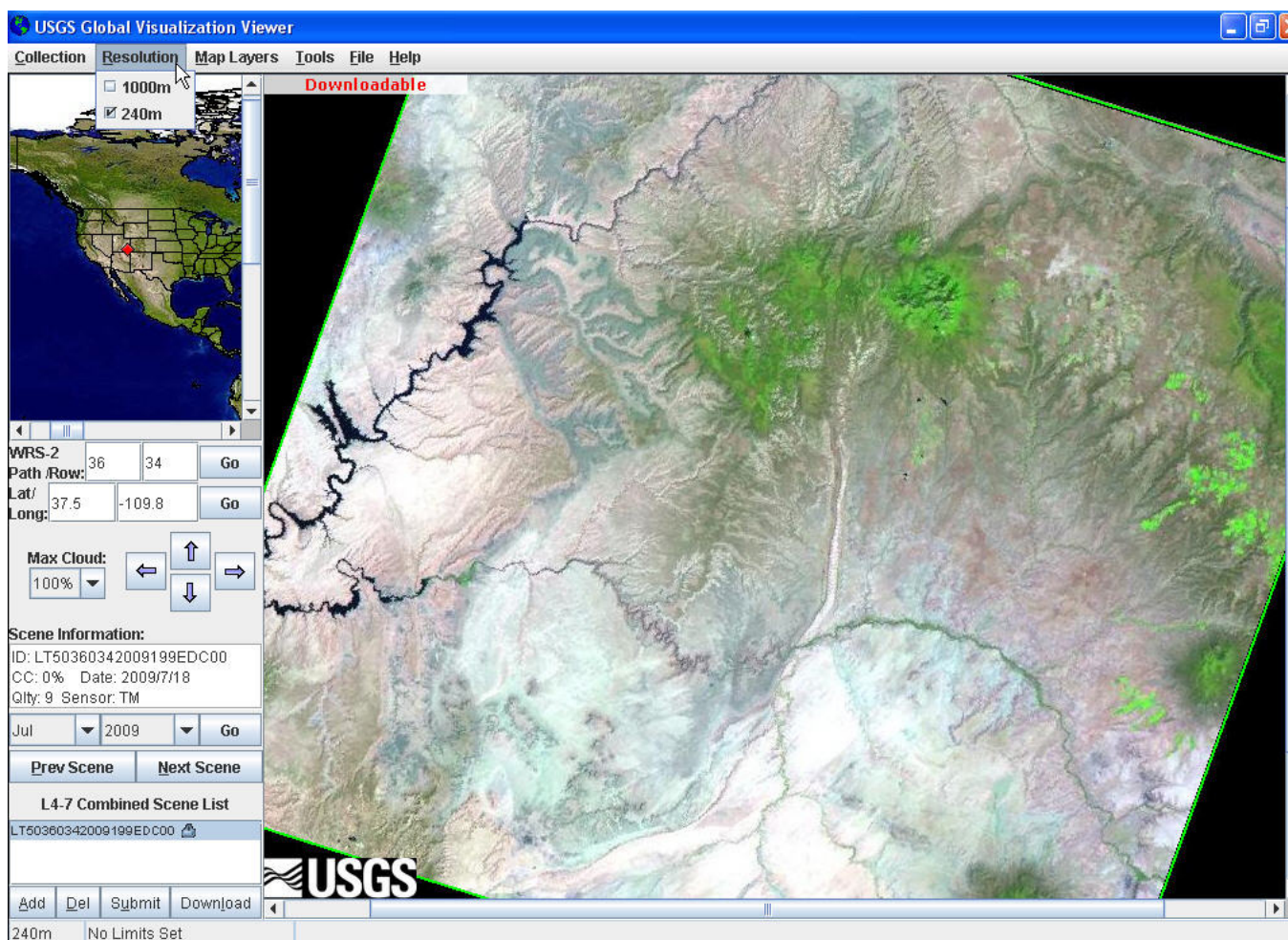
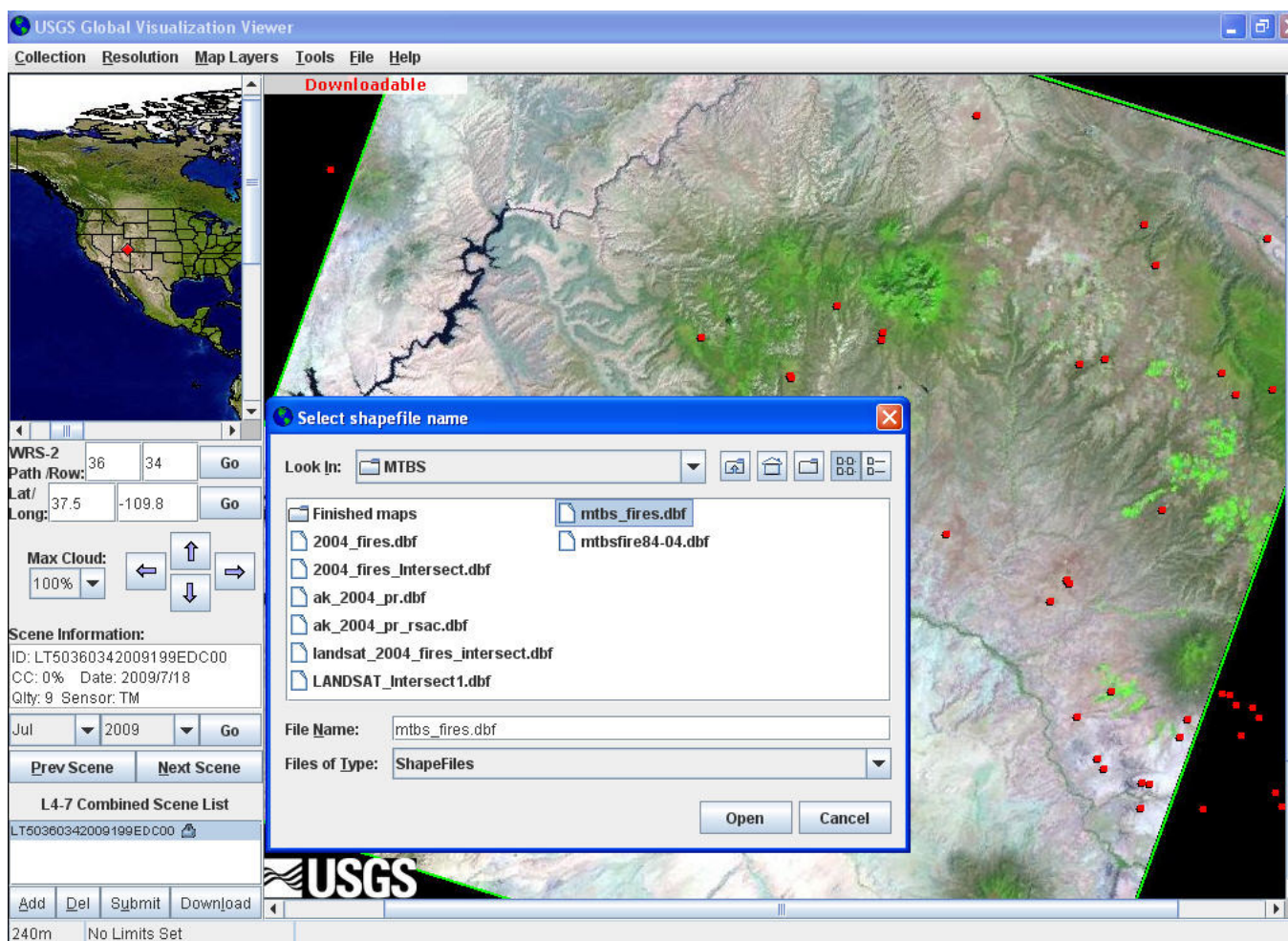**GloVis offers two preview images: a 240 m pixel size (shown) and a 1000 m pixel size (the default).**

Map layers example: Admin Boundaries (state boundaries), Cities, and Protected Area Polygons

Shapefile example: Adding a shapefile of wildfire point locations. Note: selection dialog lists only .dbf