



JPEG2000

A Closer Look at Compression Artifacts

100:1 compression

1.6 Mb lossy JP2

This 4X zoom on the 100:1 JP2 image shows the loss of significant detail. The large dark vegetation feature is generally intact, but other features do not retain detail. Some highway features remain, but they are discontinuous and easily confused with elements that actually appear to be bare soil in the lossless original image. The oil field road grid is gone.



50:1 compression

3 Mb lossy JP2

The same 4X zoom on the 50:1 JP2 image shows some of the oil field access road grid, although in many places it is obscured. Likewise detail has been lost in the drainage and dark vegetation features in the top half of the image. The highway features do retain their integrity, and detail survives in the upland drainage east of the dark vegetation. Nevertheless, blurring is evident throughout.



2.2:1 compression

75 Mb lossless JP2

This 4X zoom on the uncompressed original image shows clear pixelization at the limit of the image resolution. The drainage feature and dark vegetation in the top half of the enlargement have well-defined jagged edges (typical of lossless images) that show the resolution limit of the image acquisition device. The oil field access road grid in the bottom half of the image (faintly visible at 1x) proves to be a single pixel wide in most places.

At higher zoom levels, the effects of JPEG2000 compression become more evident. For many applications, the loss of detail at higher zoom levels will be unimportant. For example, if you are delivering atlas images over the internet, you may not need high-resolution zoomable detail, while you greatly value the ability to deliver a 2 Mb image 100 times as fast as a 200 Mb image. Many applications that use imagery for direct visualization, display, and printing can use JPEG2000 lossy compression of an appropriate level without harm. But understand that you can still use JPEG2000 lossless compression when you need to retain full precision for image analysis and processing.