

JPEG Directly to JPEG2000

Color orthoimages with 1-meter resolution covering the state of Nebraska are distributed by the Nebraska Department of Natural Resources in JPEG format. As part of the development of a model Nebraska atlas for land use managers (see the color plate entitled *TNAtlas: Nebraska Land Viewer Atlas*), MicroImages created a statewide mosaic incorporating 5867 of these images. If uncompressed, these files would total nearly 1 TB in size. The mosaic (351,947 lines by 736,450 columns) was processed directly from the compressed JPEG files, without import or prior decompression, and output with JPEG2000 compression. In order to create an atlas that would fit on a

single DVD while preserving the 1-meter resolution of the orthoimages, a compression ratio of 200:1 (relative to this uncompressed size) was used. JPEG2000 provides high compression without sacrificing significant image content. The illustrations below compare a small area of one of the source JPEG images (which have a compression ratio of approximately 20:1) with its counterpart in the mosaic with varying JPEG2000 compression ratios. They show that even at 200:1 compression, the resulting blurring of detail is insignificant when the mosaic is viewed at zoom scales as close as 1X; all major features remain easily recognizable.



Source JPEG image, 20:1 compression.



JPEG2000, 40:1 compression.



JPEG2000, 200:1 compression.



JPEG2000, 100:1 compression.

Comparison of image detail in mosaic of 1-m color orthoimages at different levels of JPEG2000 compression. Top left, original JPEG image with 20:1 compression captured at 1X display (1 screen pixel = 1 image cell). No significant compression artifacts are visible at this zoom level. Clockwise beginning at top right, corresponding portion of mosaic with increasing JPEG2000 compression ratio (relative to the

uncompressed size) as labeled. Although there is minor loss of detail with increasing compression ratio, major features such as field boundaries, roads, structures, and trees are still clear and easily recognizable even at 200:1 compression. Modest blurring and other compression artifacts are most evident in the stubble rows in the light-colored field in the left portion of the images.