



Conserve O Gram

August 2008

Number 22/2

Understanding Digital Image Formats

There are dozens of file formats available to represent digital images. The type of format used depends upon its intended use. This *Conserve O Gram* compares the differences between the three formats: Camera RAW (or other proprietary capture formats), TIFF (Tagged Image File Format) and JPEG (Joint Photographic Experts Group). Each of these three formats offers specific advantages for different applications.

Camera RAW or other Proprietary Formats

The file format containing the “raw” data is captured directly from the camera’s digital imaging sensor. It is a digital “negative.” A RAW file receives almost no processing by the camera and like a film negative, RAW files hold the most data possible of an exposure.

RAW files must be converted to another file format, like TIFF or JPEG, usually as a RGB (Red, Green, and Blue) file, to obtain editable images. A RGB file contains separated color information in red, green, and blue channels and is most often used to produce prints and web images

RAW files can be manipulated in many different ways prior to conversion to an RGB image, including color balance, density and contrast. Working with RAW file format provides complete command over the maximum amount of data without loss due to file manipulation.

Camera RAW files offer the best possible starting point for quality reproductions and archiving.

Most camera manufacturers have their own version of RAW file formats, for example, Nikon’s proprietary format is NEF. Although all camera RAW formats have the same capabilities, the different versions help keep RAW from being universally used outside of the photographic and printing professions. Using RAW increases the amount of hard drive space needed to store the large data files compared with JPG files.

TIFF (.tif) or Tagged Image File Format

TIFF stands for Tagged Image File Format. TIFF is a flexible output file format used to store bit-mapped, grayscale and color images. Although not a “negative” version of an image, a TIFF file is almost as big as a RAW file and includes most of the data originally found in a RAW file. Large TIFF files have the advantage of allowing compression using a relatively lossless compression process. Although smaller than a RAW, a compressed TIFF file is still too large for easy delivery over the internet.

The TIFF file format is ideal for producing and storing high-quality images that are used to produce professional photographic prints, exhibit backgrounds, posters, magazines, etc. Large TIFF files allow for examining and

enlarging details within the image.

JPEG (.jpg) or (Joint Photographic Experts Group)

JPEG stands for Joint Photographic Experts Group, named after the group that designed the original file format. JPEG file format is the industry standard for digital image delivery over the internet and for amateur photography. JPEG is favored because its compression produces a reasonable image with a small file size.

JPEG's compression reduces image files to about 5% their normal size with loss due to destructive or "lossy" compression. "Lossy" means that image information is lost each time the files are manipulated and saved. This loss is the result of the decompression and recompression from subsequent saving of the image. JPEG achieves acceptable quality results for the internet and amateur photography by successfully taking advantage of human eye limitations. JPEG's generational loss of data means that it is not favored for professional quality printing or archival storage. JPEG's best application is for digital image delivery over the internet.

Note: JPEG files can be readily made from TIFF files. Therefore, it is recommended that you capture the largest size TIFF file possible; and then create a JPEG file from the TIFF file for printing smaller images, displaying images in park web exhibits and in the *Web Catalog* at www.nps.gov/history/museum.

References

Fraser, Bruce *Real World Camera Raw with Adobe Photoshop CS2*. Peachpit Press, Berkeley, CA, pp.17-19, 2005.

Muse, Mark *Digital Image Guide*, Harpers Ferry Center, National Park Service, 2006. <http://www.nps.gov/hfc/products/pubs/#>

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