

This document provides technical information about digital photographs, and it contains two sections:

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 - b. Pixel Dimensions and Resolution
 - c. Minimum Standard for Pixel Dimensions
 - d. File Format
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I. Digital Photography Basics

What is a Digital Photograph? A digital photograph is made up of thousands or millions of pixels (from "picture elements"), which are tiny squares of solid color or shades of gray that are the basic building blocks of a photograph. A 6-megapixel camera creates an image that is about 3000 pixels x 2000 pixels, or 6 million pixels (6 megapixels) total. A 3-megapixel camera with the same height-to-width ratio (that can vary a little) creates an image of about 2100 pixels by 1400 pixels, and so forth. Generally, the more pixels, the greater the detail, but more pixels occupy more memory space.



An enlargement of a portion of an image showing the individual pixels as solid squares of shades of gray and white.

Pixel Dimensions and Resolution: A digital photograph does not have a fixed print size. Any digital image may be printed at any size, though the larger the print, the lower the resolution. For example, the image created by a 6-megapixel camera (3000 pixels x 2000 pixels) may be printed in the following ways:

7" x 4.6" at a resolution of 430 ppi (pixels per inch)
10" x 6.6" at 300 ppi
42" x 28" at 72 ppi.

In each case, if you multiply inches by pixels, you get roughly 3000 x 2000, or 6 megapixels. The image file on your computer is the same -- the difference is only in the way it is interpreted on paper.

Specifying a digital photo's resolution is meaningless until the print size is also specified.

Minimum Standard for Pixel Dimensions: *The HPO minimum standard for images for survey photographs is a pixel dimension of 1350 x 1950.* This creates a print of 6.5" x 4.5" at a resolution of 300 ppi (a 7 x 5 print with margins). A 3-megapixel camera should create an image of about 2100 x 1400 pixels.

The National Park Service minimum standard for pixel dimensions for National Register photographs is 1200 x 1600 pixels, but National Register photos are a subset of survey photographs. Therefore, any survey photo that meets HPO standards will automatically exceed National Register requirements.

File Formats: Most digital cameras create images in a format called *jpeg* (identified by the extension .jpg at the end of the filename), and this is the standard for day-to-day digital photography. There are many other image formats. Image editing software like Photoshop Elements can convert a jpeg file to other formats, and vice-versa.

The National Register requires that nomination photographs be submitted in the TIF format, a more stable format for archival purposes. Because TIFs require substantially more memory space than jpeg files, most photographers will want to photograph using jpeg and convert the images to TIF files later. If you are comfortable with image editing software, you may convert your nomination images from jpeg to TIF yourself before you submit them. Otherwise, the HPO will convert your images to TIFs for you and burn them to an NPS-approved CD for a fee.

Some cameras have the option of taking the photograph as a TIF. The disadvantage of this option is that you will not get nearly as many pictures on the memory card in your camera before it fills up.

File Size: The amount of space an image file takes up on a disk is expressed in kilobytes (Kb) or megabytes (Mb). Several factors determine the size of the file, including the image format, the number of pixels, and (for jpeg images) the compression ratio or quality level at which the file is saved.

Most digital cameras have three quality levels: high (or "fine"), medium (or "normal"), and low. A 6-megapixel Nikon D100 camera at the highest setting creates a jpeg photograph of 3008 x 2000 pixels with an average file size of about 2.5 Mb. The same file converted to the TIF format would be around 18 Mb. File size increases exponentially as the pixel dimensions increase. All other things being equal, a 3000 x 2000-pixel jpeg image is four times the size of the same image

at 1500 x 1000 pixels. See **Using Digital Images in Presentations** below for information about reducing image size for PowerPoint and email.

Image Editing and Management Software: A basic image editor/manager is needed to:

1. Rotate, straighten, and crop images for the best composition.
2. Adjust brightness and contrast to maximize the quality of an image.
3. Create a version of the image with a smaller file size to use in PowerPoint presentations or to attach to email to share for informational purposes.
4. Enable batch renaming and/or resizing of many photos simultaneously as a time saver.

The HPO uses IrfanView software for photo management. IrfanView is a free downloadable image editor with a program called Thumbnails that allows for renaming large numbers of files and creating proof sheets. Tutorials for Thumbnails are available online.

Other popular image editor software options include Photoshop Elements and ACDSee.

Backing Up Image Files!

Periodically back up your pictures onto cloud storage, a thumb drive, or an external hard drive.

II. Digital Images in Presentations

Printing Versus Screen Presentation: Images to be physically printed need a larger pixel dimension for higher quality. That size image, however, will make digital presentations (PowerPoint) slow and may be too large to email.

It is useful to save copies of your images in a reduced pixel dimension for easy emailing and use in PowerPoint presentations. The smaller images look the same on computer screens and in presentations. In fact, images in PowerPoint presentations do not need to be larger than 1000 x 700 pixels.

It is possible to reduce the size of photographs from within PowerPoint after all of the photographs have been loaded. This is done with the program's Compress Pictures function. This can greatly reduce the overall size of the presentation without reducing the quality. The changes will not affect your original photographs. This method gives you limited control and will not provide you with reduced versions of the photos to use for other purposes unless you copy the images back out of PowerPoint one at a time and name them as you save them.

As of 2022, the compress tool is located under the Picture Format tab.

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