DNG File Format

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In this lesson, were going to talk about the DNG file format. The format has been around since 2004 and the information relating to it can often times seem confusing. The lesson will cover what the DNG format is, the advantages, disadvantages, etc. The goal is that you become knowledgeable about it enough to know whether or not it is a good format for you to use with your images.

Basic Info

- DNG = Digital Negative

- The format was introduced by Adobe in 2004.

- It's a fully documented format, submitted to the standards organization.

- Some cameras can save directly into the DNG format.

- You can save a file from raw into DNG without a heavy conversion, so it maintains the special qualities of a raw file.

- What's nice about the format is that you can take a raw file from almost any camera manufacturer and convert it into the DNG format. When you do this, it preserves the information in the file without changing it all that much. That can't be said for other formats. When you convert a raw file to jpg, png, etc., the file goes through a pretty radical transformation, and some or much of the raw information is lost. When you lose information in the file, you can not effectively edit the image and maintain high quality results.

- You can open a DNG file in older software like Photoshop CS6 or Lightroom 6.

Cameras that save into DNG

The following camera brands can save directly into the DNG format within the camera itself:

- Leica

- Hasselblad

- Pentax

- Ricoh

- Samsung

- Casio

It would be nice if all major camera brands saved images in the DNG format. This would prevent us from having to update our Adobe software every time we use a new camera. We need to do this because, with every new camera release, the camera company makes small changes to their individual raw file format and then Adobe needs to update the software in order for it to be compatible.

Advantages of the DNG file format

- It preserves camera data similar to a raw file. (Note: True raw is unaltered)

- New raw formats in DNG can be opened in older software.

- There is no need for XMP files. With raw files, the adjustments made in Lightroom or Camera Raw are saved alongside the image file as a separate "sidecar" file known as an XMP file. With the DNG format, that information can be saved directly into the file.

- With DNG, you get files that are 10-20% smaller. The data that the camera sensor captures into your normal raw files doesn't have any kind of efficient

compression. DNG has some compression, making the file size a bit smaller.

- The lossy version is up to 75% smaller. There is a version of the DNG format where you can choose to use lossy compression. With this version, the quality of the file will go down, but it will also be up to 75% smaller than the original file size and this can be useful for some purposes.

- DNG files have an embedded preview that can be updated. In a normal raw file, the built-in preview is a jpg file that can not be changed. With a DNG file, the preview built into the file changes to reflect any adjustments you make to the image. This means that if I preview the DNG file in other software, it will preview the changes that I made within Lightroom or Camera Raw.

- DNG files have a checksum for validation. This means that the DNG format assigns the file a number and that number would change if any data in the file changed. With this, you can look back at your old files and ask it to validate them based on those numbers. If the checksum number is different than the number it had on record, that means that something happened with file. This means that, with DNG, we can validate that our files have not changed and become corrupt.

Disadvantages of the DNG format

- The conversion is not reversible (unless you embed the full raw file).

- Nikon/Canon/Sony, etc. software can't open DNG files.

- Updating a backup is more data-intensive compared to if you were using XMP files. When you make changes to a raw file, those changes are saved as a separate XMP file, which is a super small text file stored alongside the image file. When you back up these files, the small XMP files are the only ones that need to be saved. With the DNG format, those changes are saved within the image file itself. When backing up these files, it will take much longer because the entire image file needs to be saved, not just the small XMP text file.

- File info date is the conversion date, not the capture date. It's important to be aware that when you convert an image from a raw format into a DNG format, the file date will reflect the date the image was converted to into DNG and not the date you captured the image with your camera.

- It takes time to convert images into the DNG format.

- Some metadata is lost when you convert to DNG. It's very negligible, but there have been some reports of small amounts of metadata being lost when converting (ex: focus points).

- Some photography competitions require raw files, not DNG.

When to use DNG

- **HDR & Panos from ACR/LR** Whenever you use Camera Raw or Lightroom to combine multiple images into a panorama or an HDR composite, the default file format of the resulting file is DNG and that's because it can maintain many of the special qualities of a raw file (ability to bring back shadow/highlight detail, etc.).

- **Old software, new camera (Photoshop CS6, Lightroom 6)** If you are using older software, that software may not be able to support the file formats saved by newer cameras. If this is the case, you can convert the files to DNG so that older software can support them.

- **Deliver "Raw" file to client** If a client asks for a raw file, it isn't always ideal to send them the image file PLUS the sidecar XMP file that contains all of the adjustments. Additionally, the client may not need the huge file size of the raw file. With DNG, there is no XMP file and the file size can be scaled down while still retaining the qualities of the raw file.

- **Teaching with smaller files** DNG files can be convenient for teaching purposes. In fact, Masters Academy uses DNG files as "raw" files."

- **Lossy DNG for outtakes** If you would like to save space on your hard drive and have a folder designated as your outtakes folder, you can use the DNG format for these images, as they're 1/4 the size of raw format originals.

- **Can use lossy DNG as an alternative to jPEG** This will allow you to dramatically reduce the file size while retaining more information in the file. Note that this is fine as long as you're not going to give the file to someone else. When you give a file to someone else, it should be in a universal file format that just about any software can open.

Notes about DNG

- DNG support in other software does NOT mean that software will reflect the ACR/LR edits. That's because the adjustments made in ACR and/or Lightroom are stored in the metadata, not the image itself. When software says it supports DNG, it means that it can open a file that has been saved in the DNG format.

- Converting from jpg to DNG can be validated, but the file size will still increase and quality can decrease. Converting from jpg to DNG also means that the format is no longer universal, as DNG is not compatible with as much software as the jpg format.

- DNG is better than jpg for raw captures that don't need to be high resolution or in a universal file format.

How to convert to DNG

Now let's talk about how we can convert images into the DNG format. We already mentioned that some cameras are capable of saving images in DNG and in those cases, we wouldn't need to convert at all. We'd just need to tell our camera to save that format. If that's not the case, there are five options to choose from.

Camera Raw via the Save button In Adobe Camera Raw, there is a Save button in the lower left corner of the interface. When you click it, you can choose from various file formats, one of which is DNG. I would use this option if I was using ACR and not using Lightroom at all.

Lightroom during import When importing images into Lightroom, there is a setting that allows us to convert to DNG. Note that you can't convert newer raw formats with an older version of Lightroom. (You would have to use a DNG converter instead.)
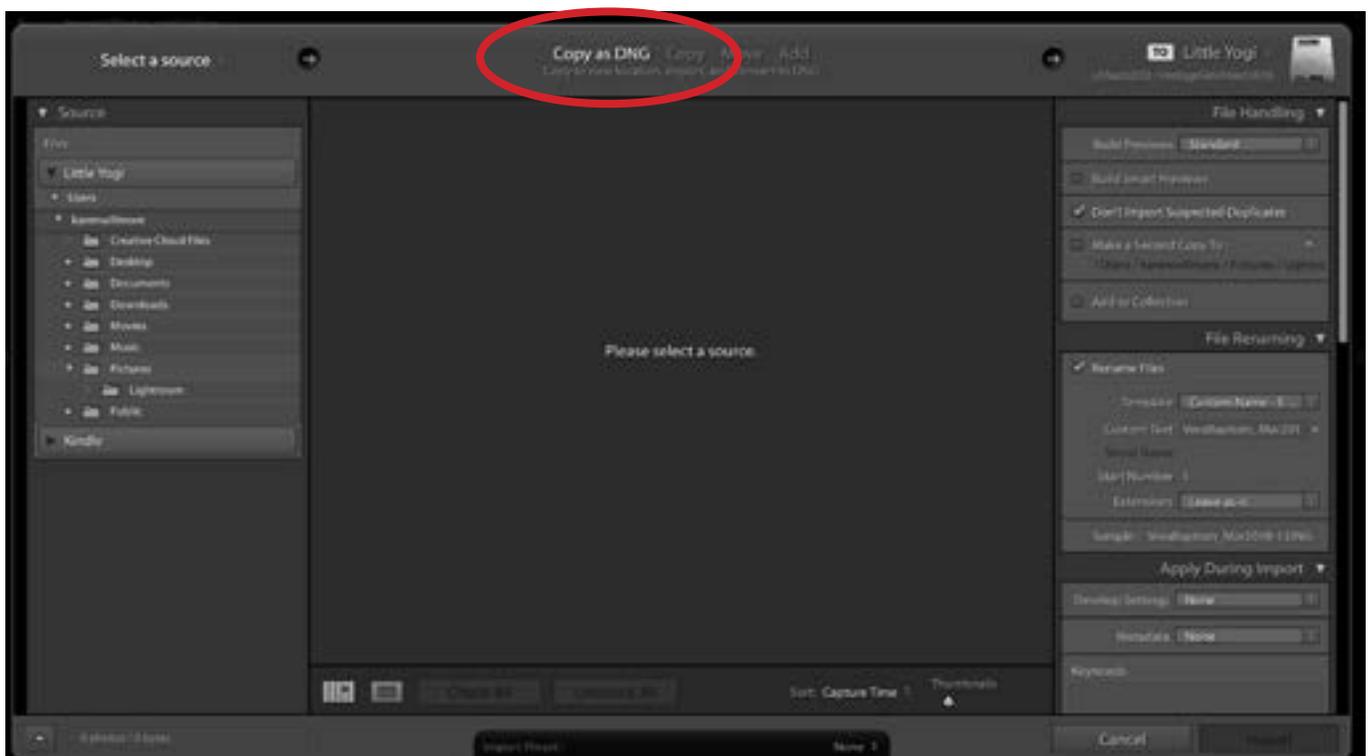

In Lightroom's Import dialog, clicking the Copy as DNG option will cause Lightroom to copy the files from their current location and convert them into DNG files in a new location that you specify.

If you use this method for importing DNG files, there is a group of settings you should be aware of. Go to the Lightroom menu and choose Preferences (In Windows, this would be found under the Edit menu.) and then click on the File Handling tab within the Preferences dialog. Here, you'll find a section called Import DNG Creation. This will give you options regarding the file extension, compatibility versions and JPEG previews.
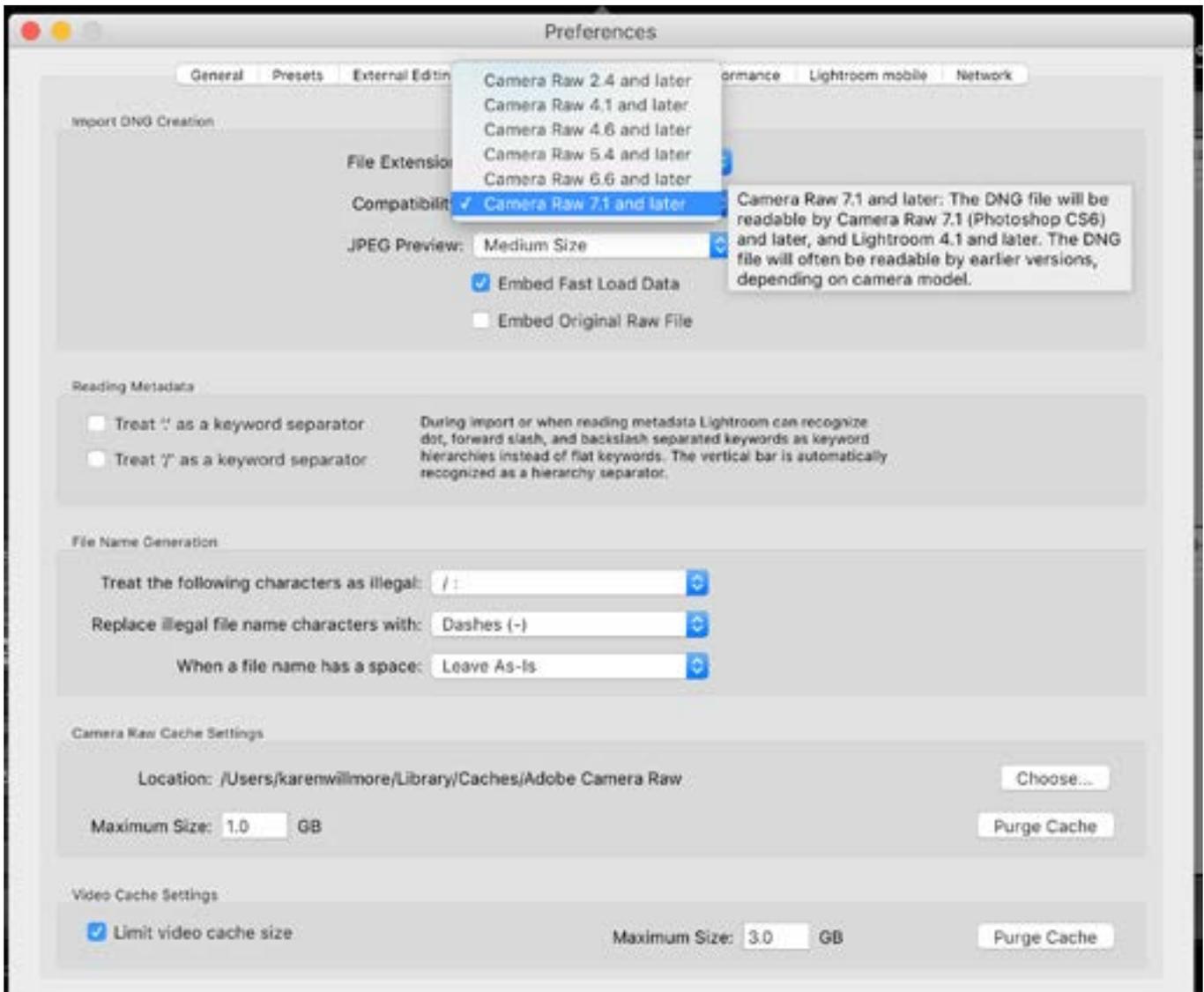
In the Lightroom Preferences, you can specify the software compatibility for DNG files. If you hover your cursor over an option in the menu, a box will pop up, listing all of the compatible software.

Lightroom during export When exporting an image (or images) from Lightroom, the file format options within the Export dialog include DNG. This method can be convenient when you need to hand off an image to someone who wants the raw file. Within the Lightroom Export dialog, click on the File Settings tab to access the File Format menu. If you choose the DNG format, a series of settings related to it will become available. Included here is a "Use Lossy Compression" check box. If you turn this on, your file size will be smaller. If you don't turn this check box on, then the Image Sizing settings will be grayed out/unavailable. That's because it will use the full size image when exporting as DNG. If you do turn the check box on, you can specify the size based on the long edge of the image or in megapixels.
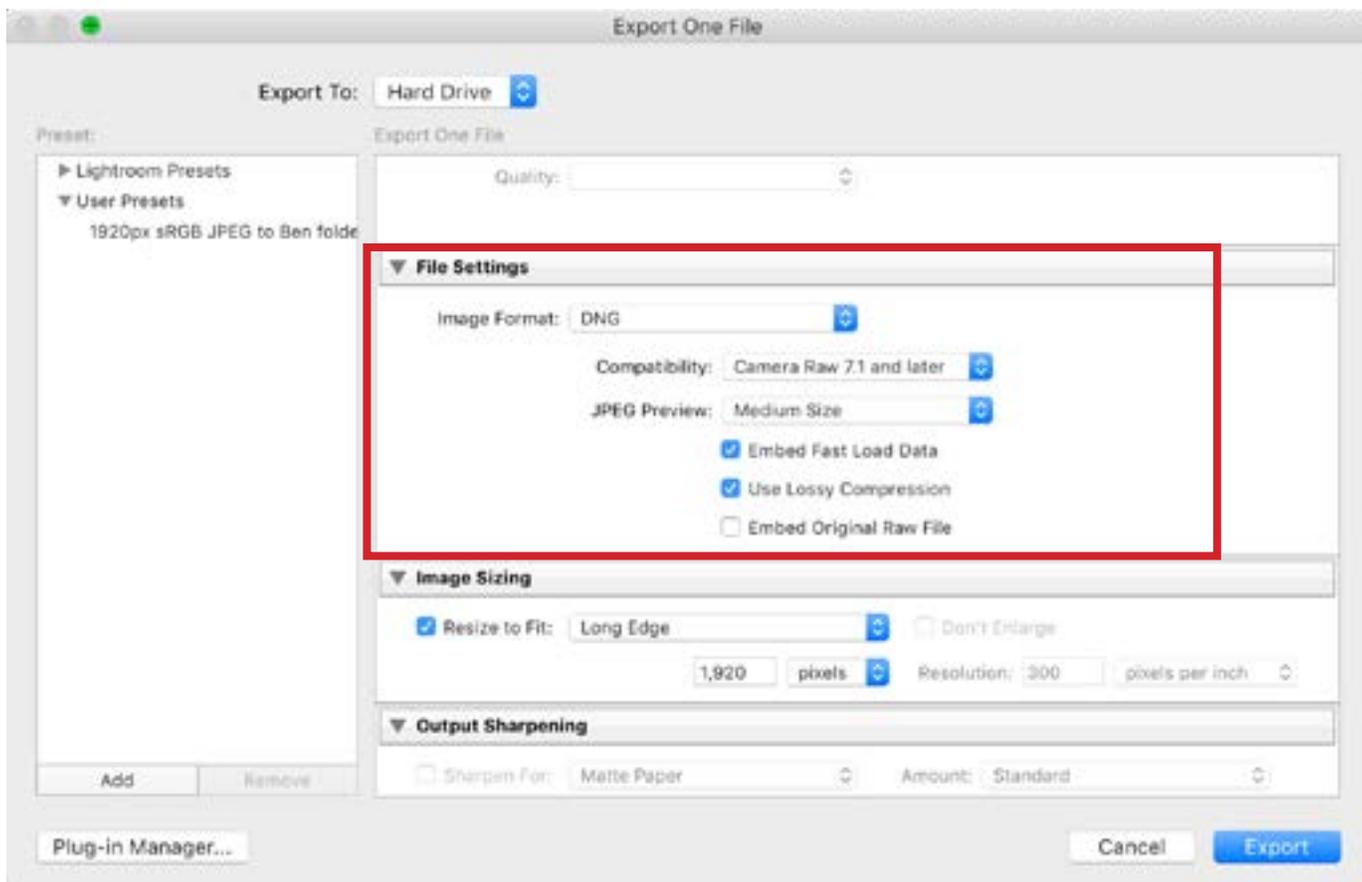
Within the Lightroom Export dialog, click on the File Settings tab to access the File Format menu. If you choose the DNG format, a series of settings related to it will become available.

Lightroom Library Module In Lightroom's Library Module, you can select an image (or images), go to the Library menu at the top of the screen and choose Convert Photo to DNG.

Adobe DNG Converter This is a special program that you can download for free from the internet. This is what you would use if you have older software that does't support the camera's newer raw format.

DNG Versions

When exporting to DNG, you may be given the option of different DNG versions to choose from. These options are based on what version of Camera Raw would be able to open the file.

- Camera Raw 2.4, Photoshop CS & Lightroom 1.0 (or newer)

- Camera Raw 4.1, Photoshop CS3 & Lightroom 1.1 (or newer)

- Camera Raw 4.6, Photoshop CS3 & Lightroom 2.1 (or newer)

- Camera Raw 5.4, Photoshop CS4 & Lightroom 2.4 (or newer)

- Camera Raw 6.6, Photoshop CS5 & Lightroom 3.6 (or newer)

- Camera Raw 7.1, Photoshop CS6 & Lightroom 4.1 (or newer)

Validating DNG files

Earlier in the lesson, we talked about the checksum concept, which is the ability to check for changes in a file to see if it has somehow become corrupt. You can run this "check" by selecting one or more DNG files in Lightroom, going to the Library menu at the top of the screen and choosing Validate DNG Files. You will see a progress bar at the top of the screen, indicating that Lightroom is checking the files to make sure that they haven't become corrupt.

The DNG Converter

As was mentioned above, the DNG converter is a piece of free software and you can find it by doing a Google search for "Adobe DNG Converter download." Once open, you'll find a list of options, the first of which is where you select the folder of images you'd like to convert. If the folder you selected has subfolders containing images that need to be converted as well, turn on the "Images contained within subfolders" check box. There is another check box where you can tell it to "Skip source image if destination image already exists" and this will ensure that you don't convert an image twice and therefore have two copies of it in the destination folder. I usually keep this setting turned on. The next menu will allow you to determine whether the new files should be saved into the same location or into a new location. If you choose to save into a new location, you'll be prompted to choose that destination folder on your hard drive. Next, you can decide whether you'd like the file names to stay the same or if you'd like to designate new names. Lastly, there is a list of all the DNG file preferences. If you want to change them, click on the Change Preferences button and you'll be presented with the same options that we saw in
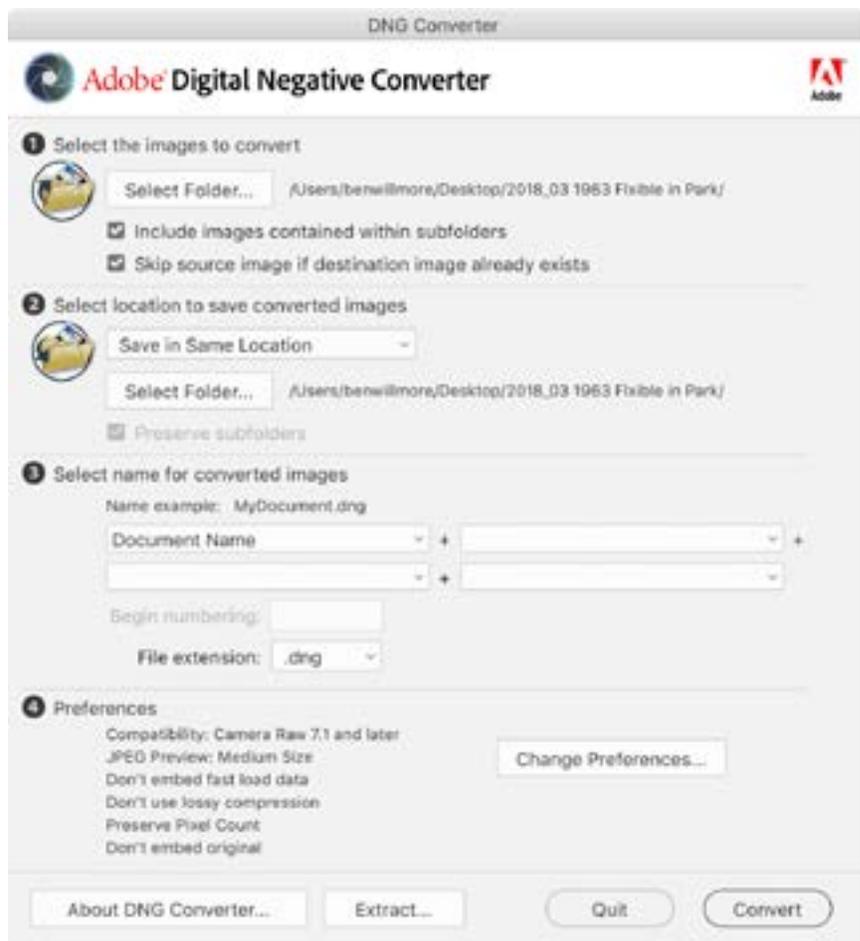

The Adobe DNG Converter can be downloaded for free.

the Preferences dialog. When you're done working through the settings, click the Convert button in the bottom right. A Conversion Status dialog will appear, showing you the progress and listing any problems that occur. A problem may occur if you include an image that is not a raw file.

Converting to DNG in Camera Raw

You can save a DNG file from ACR as well. With an image open in ACR, click the Save Image button in the lower left corner. The Save Options dialog will appear and you'll set the Format menu to Digital Negative. The DNG settings will appear below that menu so you can work through those and then click Save.
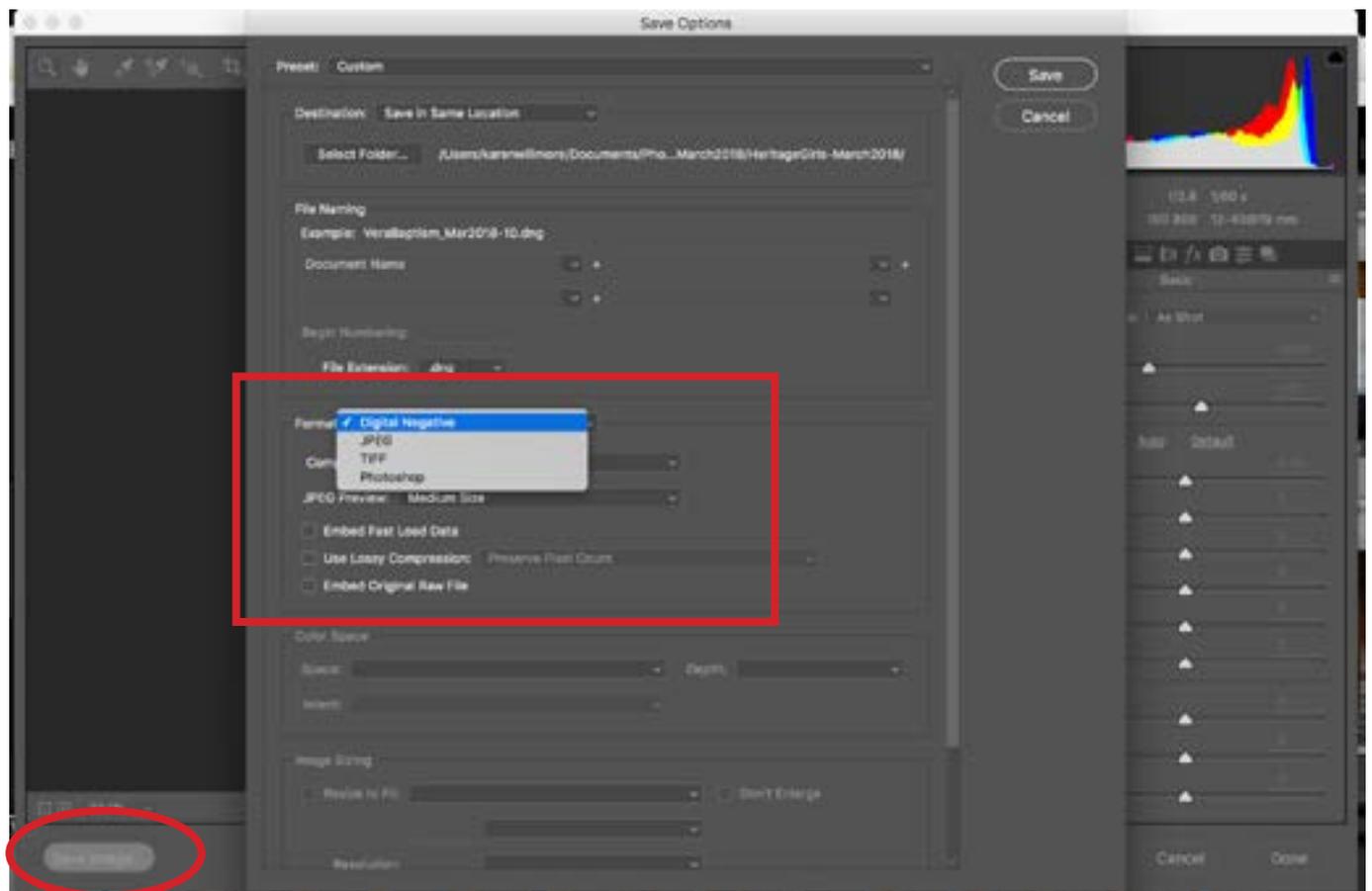

In Adobe Camera Raw, click the Save Image button to bring up the Save Options and choose DNG from the Format menu.

Updating DNG files

We mentioned earlier that DNG files have previews built into them. In ACR or Lightroom, that preview may not be automatically updated. If you plan on viewing the previews outside of Adobe software, you will have to manually tell it to update the preview.

Updating Embedded Preview:

- **Camera Raw:** Click on Hamburger menu and choose to Update DNG Previews

- **Lightroom:** Go to the Metadata menu and choose Update DNG Preview & Metadata
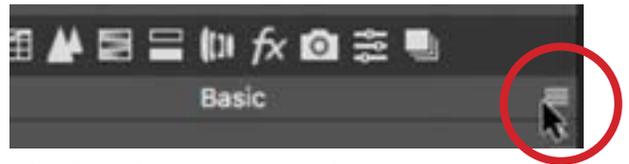
The hamburger menu in Camera Raw

Updating Lightroom Develop settings, keywords, labels, etc. (Catalog —> DNG):

- **Update Preview & Metadata:** Click on the Metadata menu and choose to Update DNG Preview & Metadata

- **Update Metadata only:** Click on the Metadata menu and choose Save Metadata to file (or Command+S)

Tips & Tricks on working with DNG files

- If you ever use smart previews in Lightroom, know that those are actually lossy DNG files that are 2,560 pixels wide. When I'm traveling and don't have the large hard drive that contains all of my images, I make sure that the images I know I'll be using have smart previews and can therefore be exported as DNG files. Just know that the quality of this export will not be as high as if you had the hard drive containing the images actually attached.

- If you are converting your images to DNG as you import them into Lightroom,

I'd recommend validating those files immediately afterward to ensure that everything converted properly and that nothing became corrupt in the process. To do this, select the images, go to the Library menu and choose Validate DNG Files.

- Validate the backup of your images. The following technique will teach you how to validate the backup of your images to ensure that no files have become corrupt. Make sure that your backup drive is connected to your computer instead of your main image drive. In Lightroom, go to your folder list on the left side of the interface. You want to locate the name of the hard drive containing your images. In the video example, that drive was not immediately visible so we right-clicked on one of the folders and chose "Show Parent Folder" from the menu that popped up. I kept doing this until the name of the hard drive appeared. Right-click on the name of the hard drive, choose "Find Missing Folder" from the menu that pops up and then direct it to your backup drive. You can then select all of the images, go to the Library menu and choose Validate DNG Files.

- If you ever find that you're working with older software that is supposed to support DNG, but for some reason it doesn't, here's something you can try. When initially converting your images into DNG, use the linear option, which can be done as follows. Open the DNG converter and click on the Change Preferences button in the lower right. When the preferences dialog appears, click on the Compatibility menu and choose Custom. A box will pop up, inside of which you will turn on the Linear checkbox and click OK.