# Digital Zone System part-2

The previous lesson addressed he conceptual foundation of a digital Zone System and examined a basic testing procedure to identify the dynamic range of a specific camera. You should conduct an exposure test for each lighting condition you are likely to use but especially, daylight sun, daylight shade and tungsten – the shade and tungsten tests become very valuable later on when you calibrate for color but it is still useful to know how your camera performs under the different conditions you encounter on a day to day basis. Once you establish where your Zone I and Zone IX exposures are relative to the base exposure for middle gray, you can determine the useable dynamic range of the camera. The following chart (from my upcoming book "Mastering Exposure") shows the values for my Canon 5D mark II w/24-70mm zoom lens. You will notice that the camera sensitivity is not identical in all lighting comditions - the cooler color temperature light of the oen shade lighting requires no exposure compensation (a change from the meter reading) and as the color temperature warms up it requires more exposure until we reach the warmest tungsten lighting where I need to open up 1 full stop the reach the ideal exposure!

## Canon 5D Mark II w/24-70 Zoom

| Lighting | Camera ISO | Exposure Compensation | Zone I | Zone IX | Dynamic Range |
|----------|-----------|----------------------|--------|---------|---------------|
| Shade | 100 | none | — 4 | +2.33 | 6.33 |
| Sun | 100 | +2/3 | – 4 | +2.33 | 6.33 |
| Tungsten | 500 | +1 | – 4 | +2.66 | 6.66 |
| Flash | 100 | +1/3 | – 4 | +2.33 | 6.33 |

The Zone values in the chart represent the change in f-stops from the compensated exposure – adding the values together gives you the dynamic range. I must stress here that this is useable dynamic range based on actual tests for measured value changes in the test target as we saw in the previous lesson. With this knowledge you can make more informed exposure judgements because you will know what the real clipping limits are for your camera. We are basically unconcerned with placing values in the middle range because you have a great deal of control in Photoshop/ACR/Lightroom for shaping contrast and value structure in the image. The real concerns are the end points - how much additional exposure can you give a highlight value before it becomes unretrievably clipped? How much exposure can you subtract for a shadow value and still have useable information beyond the noise floor?

After you calibrate your capture system for exposure, color calibration is a much more automated process. We will look at two methods - one from Adobe and another from X-Rite. First there is Adobe's DNG Profile Editor -

you can still download this public beta for free here: http://labs.adobe.com/dngprofileeditor. the DNG Profile Editor can only work with DNG files so, in order to create a custom camera calibration "profile" you must convert the RAW files from your test into DNGs. You also must have a good exposure of the Colorchecker target (now called the X-Rite 24 Pastch ColorChecker). After converting your test files for shade and tungsten into DNGs, launch the DNG Profile Editor and open the two DNG files...

## The DNG Profile Editor
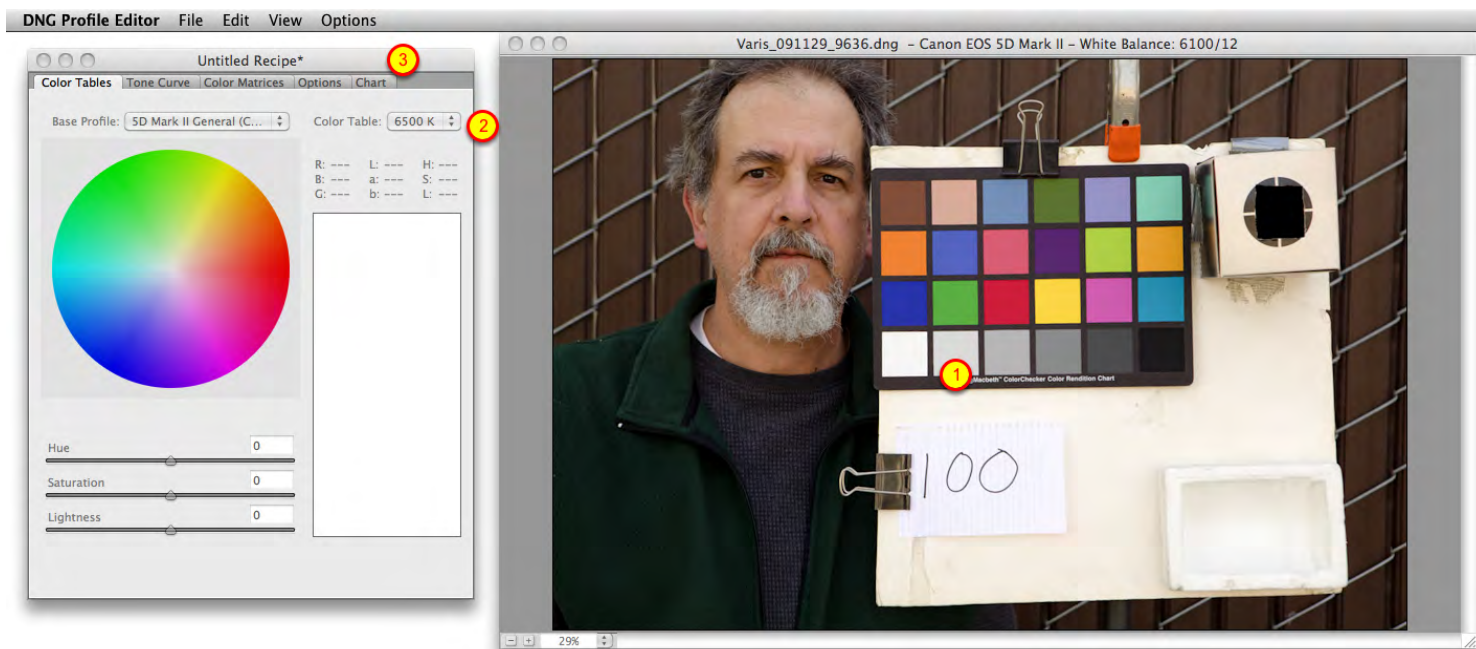


The Editor opens with an "Untitled Recipe" - open both the shade and tungsten DNG files from the file menu. If you have done the white balance in ACR or LIghtroom the image will appear color correct, if it looks off you can manually white balance by clicking on **(1)** one of the gray patches in the image - Adobe recommends using the light gray patch. Start with the shade image and select **(2)** "6500 K" from the pop up menu at the upper right corner of the "Color Tables" tab. Now (3) click on the "Chart" tab...

## The Chart Tab
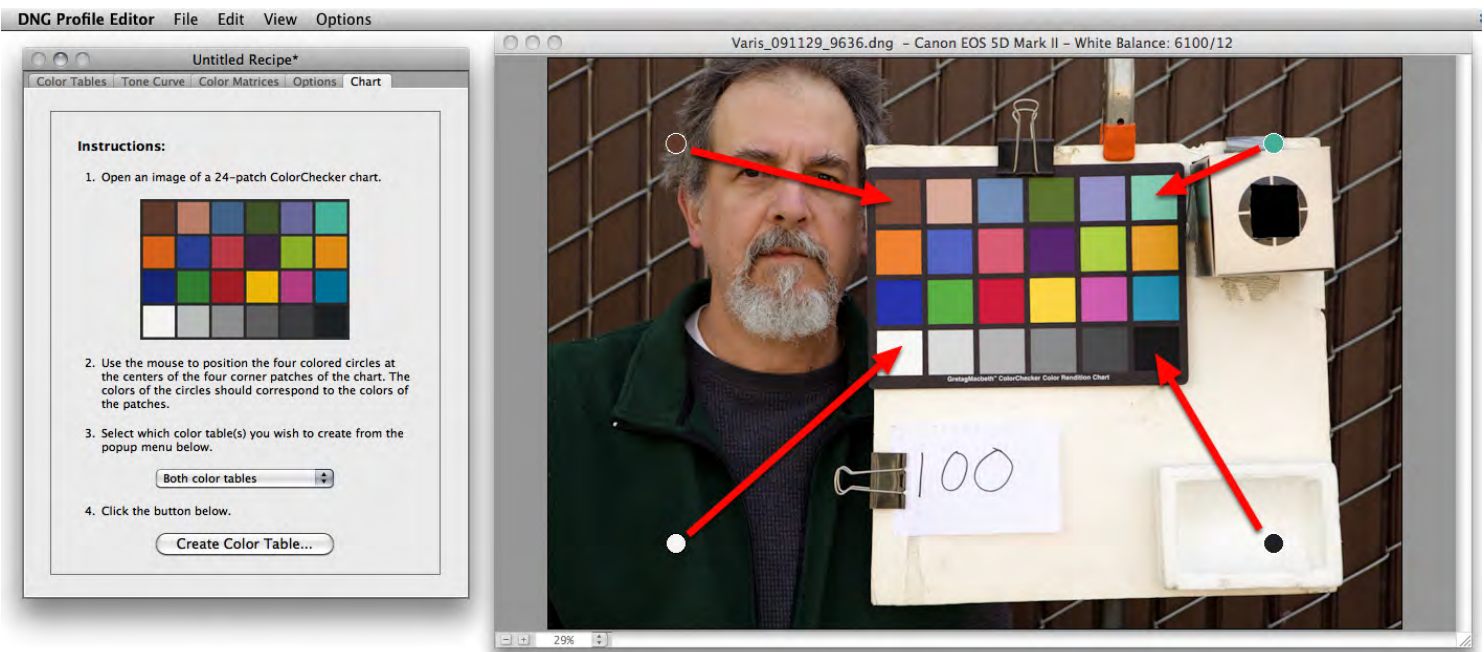


The Chart tab gives you the instructions for creating a lookup table from the image. Drag the 4 colored dots that appear in the image over the corresponding color patch in the image...

## Select the Table to Create
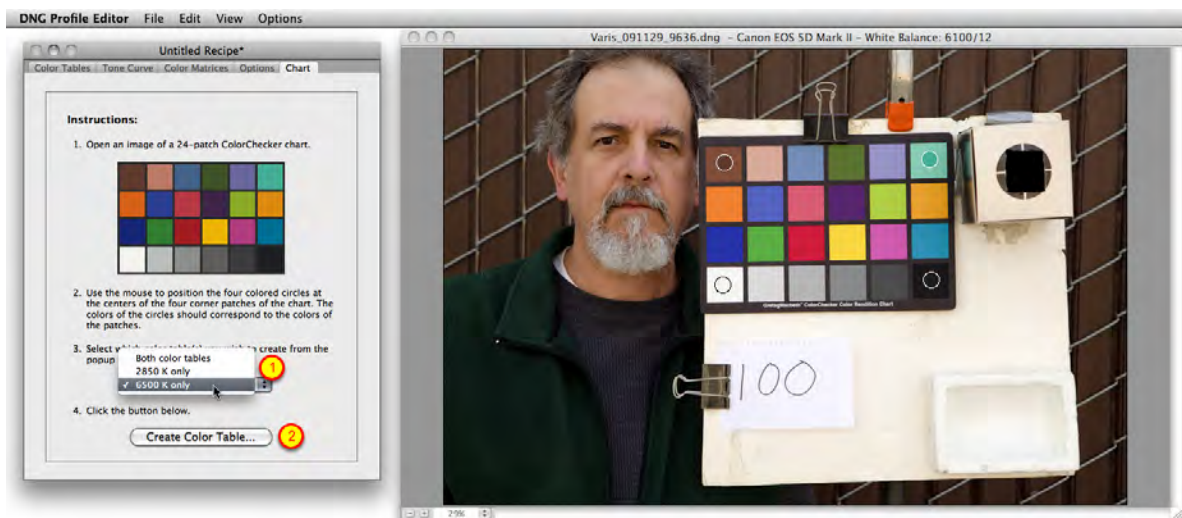


**(1)** Select "6500 K only" from the tables pop up. We are using the shade image file to create a lookup table for the 6500 k color temperature of the open shade lighting. In this case we will end up with a "Profile" for the camera that interpolates between 6500 k and 2850 k ( actually 3200 k in the file I use here – in practice the

difference is insignificant). Next **(2)** click on the "Create Color Table" button. This creates the table that corrects the actual colors recorded to match the ideal colors of the chart...
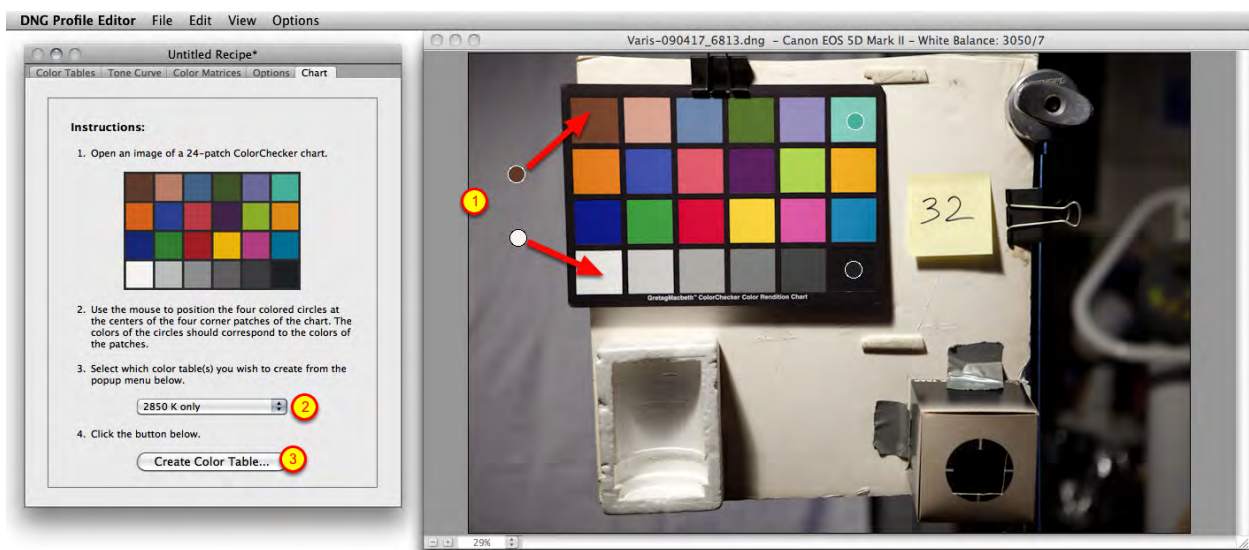
## Color Table is Built
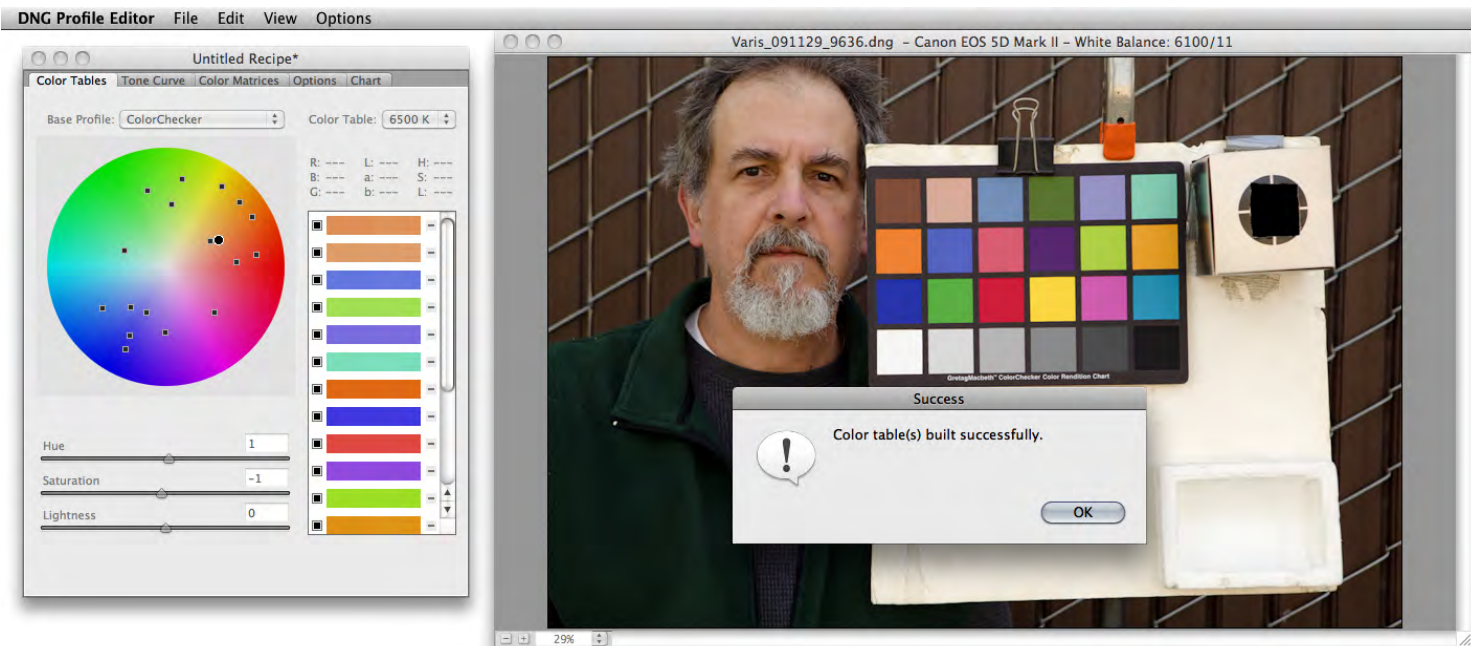


At this point we are only halfway done with the profiling process. When you elect to build only one table you are, perhaps counterintuitively, obligated to build a second table before you can create a complete profile. Click OK... We now must open the tungsten image (or bring it to the foreground)...
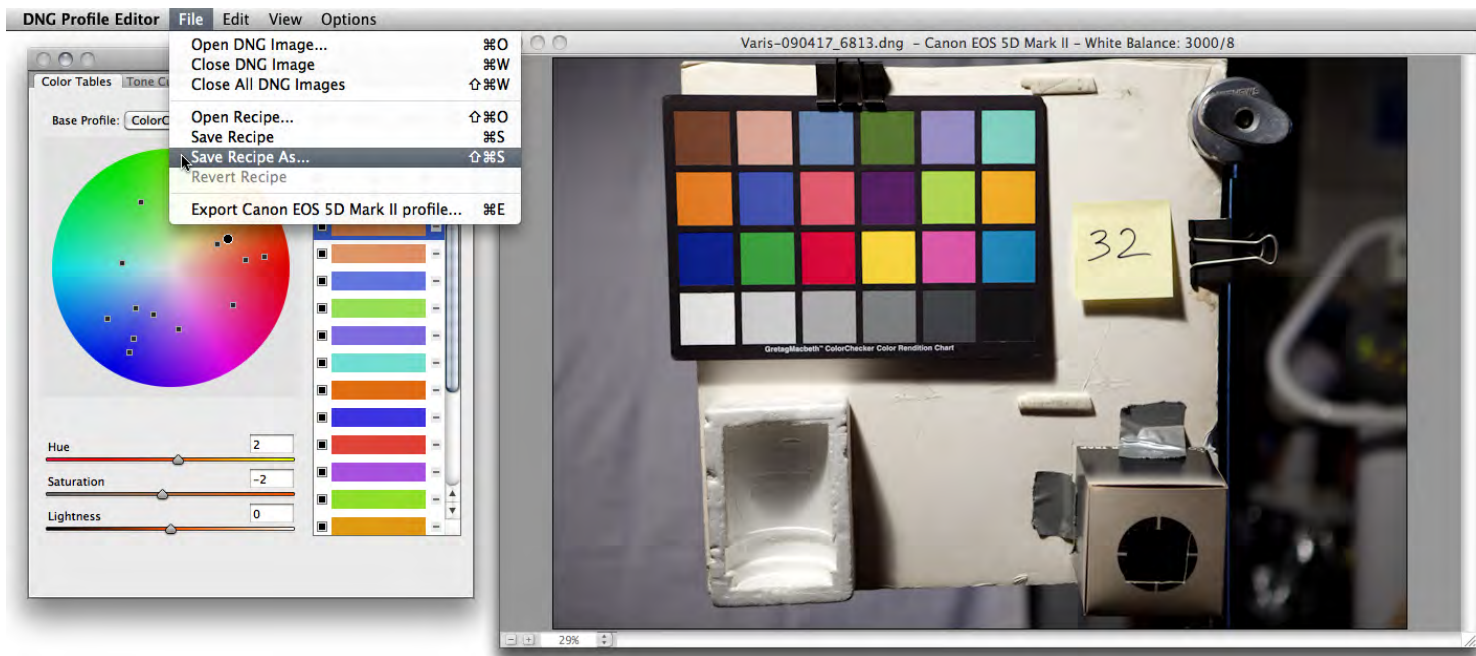
## Select 2850 for the Tungsten Image
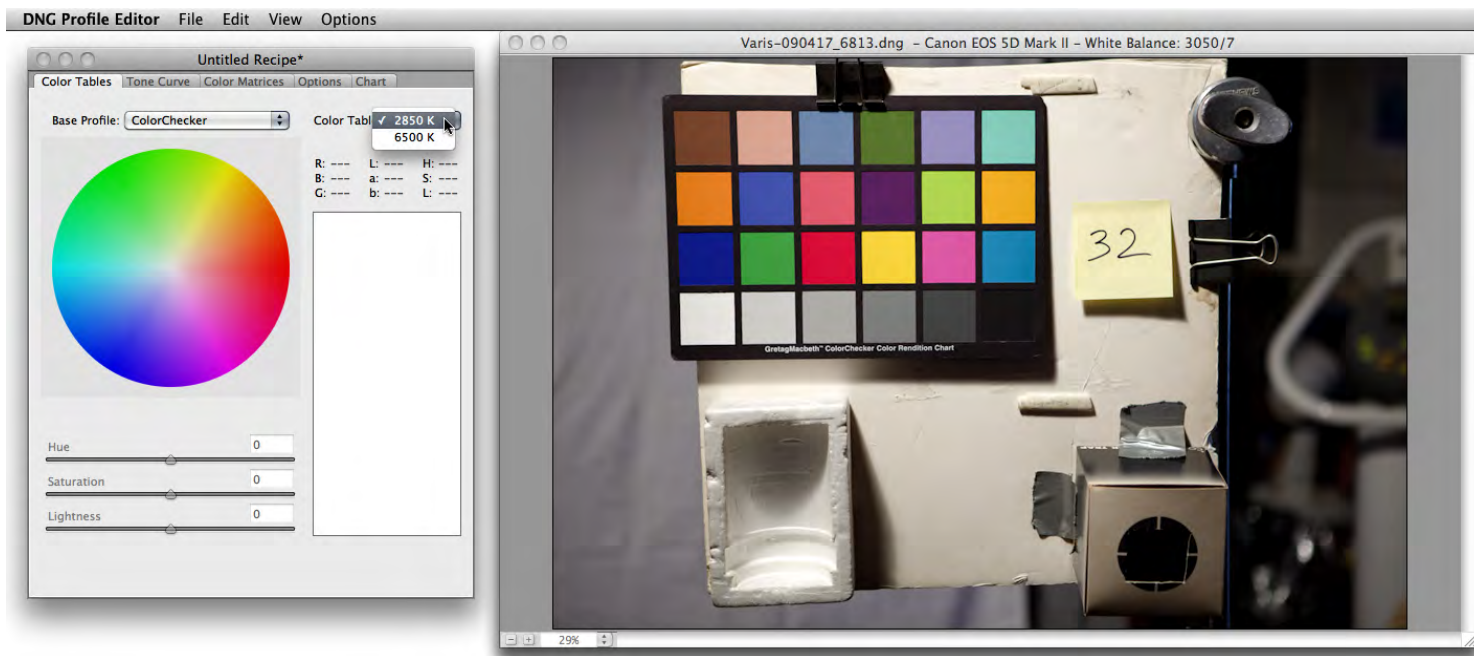


Select 2850 fro the Color Table pop up and then click on the Chart tab...

## Build the 2850 table



(1) Drag the dots to their corresponding colors... (2) select "2850 K only" from the pop up and (3) click the "Create Color Table" button.. The 2850 table is created immediately and, after clicking OK you can save the "Recipe"...
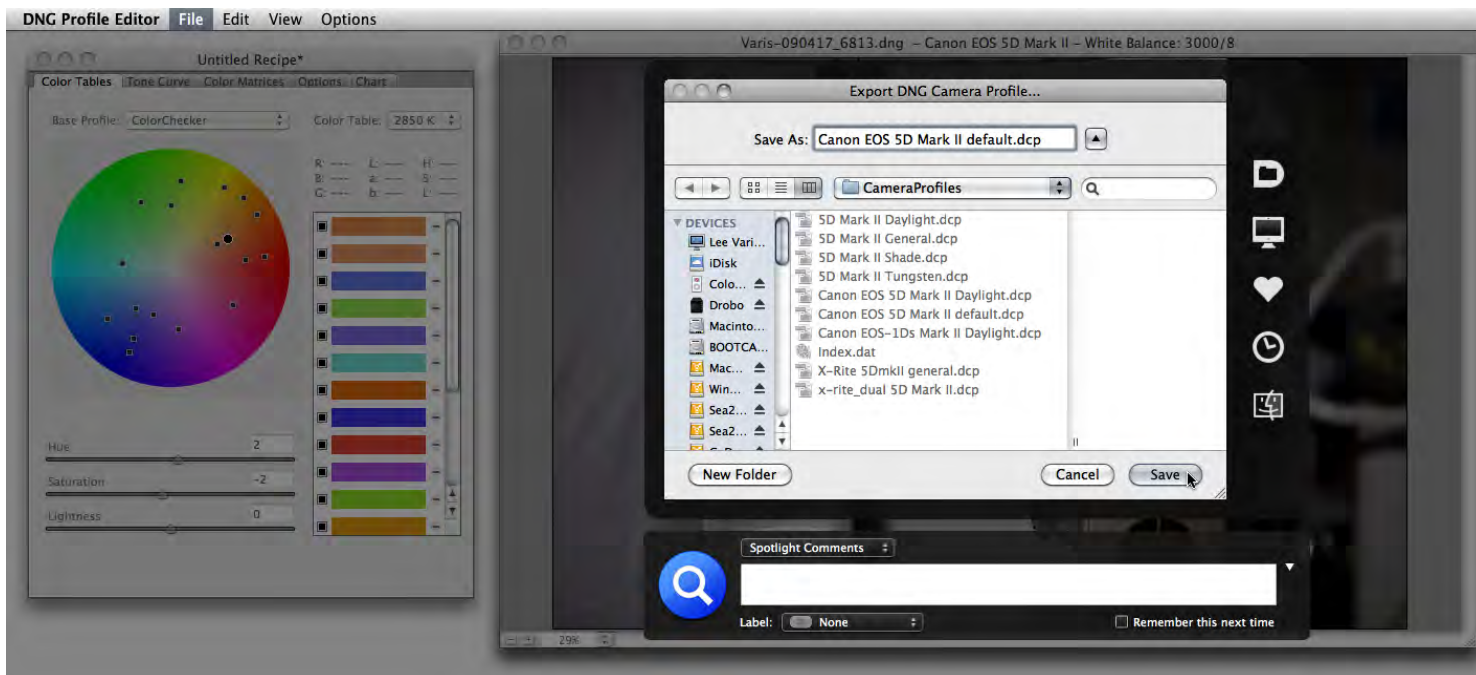
## Save the Recipe



You can save a "Recipe" for the two tables - this needs a little explaination. A "Recipe" is not a "Profile" ! The screenshot above shows the selection of "Save Recipe as..." right below that is "Export Canon EOS 5D Mark II profile... This is, of course, the actual profile that can be used in ACR and Lightroom. The "Recipe" is the saved state of the DNG Profile Editor. We can save this "state" with the values input from creating the two tables so that we can return to this later if we want to "edit" the tables and create a new "profile". For the most part, you don't need to edit the profile so you can skip this step and...

## Export the Profile
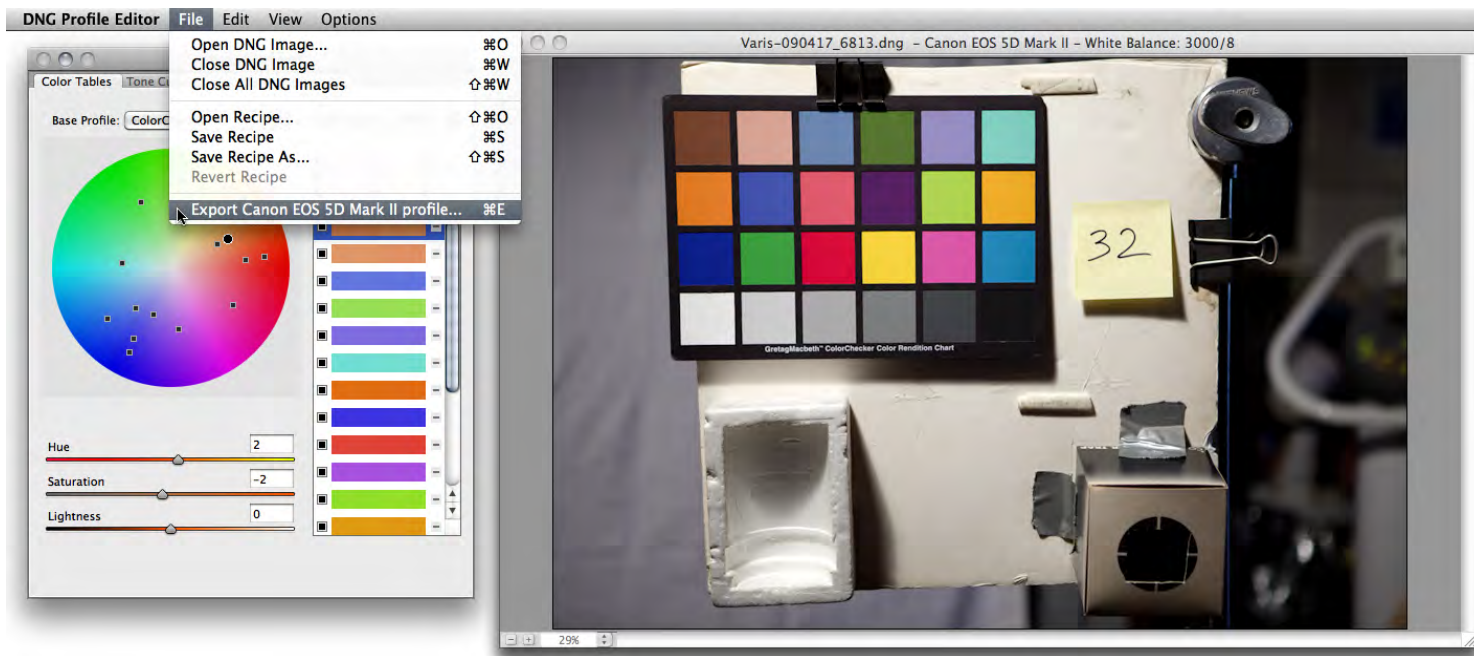


Export the profile... the DNG Profile Editor automatically recognizes the camera and the default name includes the camera model. A profile built like this from the two different color temperatures works as a good generic camera default profile.

# Save the Profile



The DNG Profile Editor automatically finds the right place to save the camera profile for use in ACR and Lightroom. You can build profiles for different cameras and have each on recognized automatically. But you can only assign one profile per camera as a default. (more on this later). If you have an unusual lighting condition you can build a profile for jus that specific condition...

PROFESSIONAL DIGITAL IMAGING TECHNIQUES

## Specialized Profiles
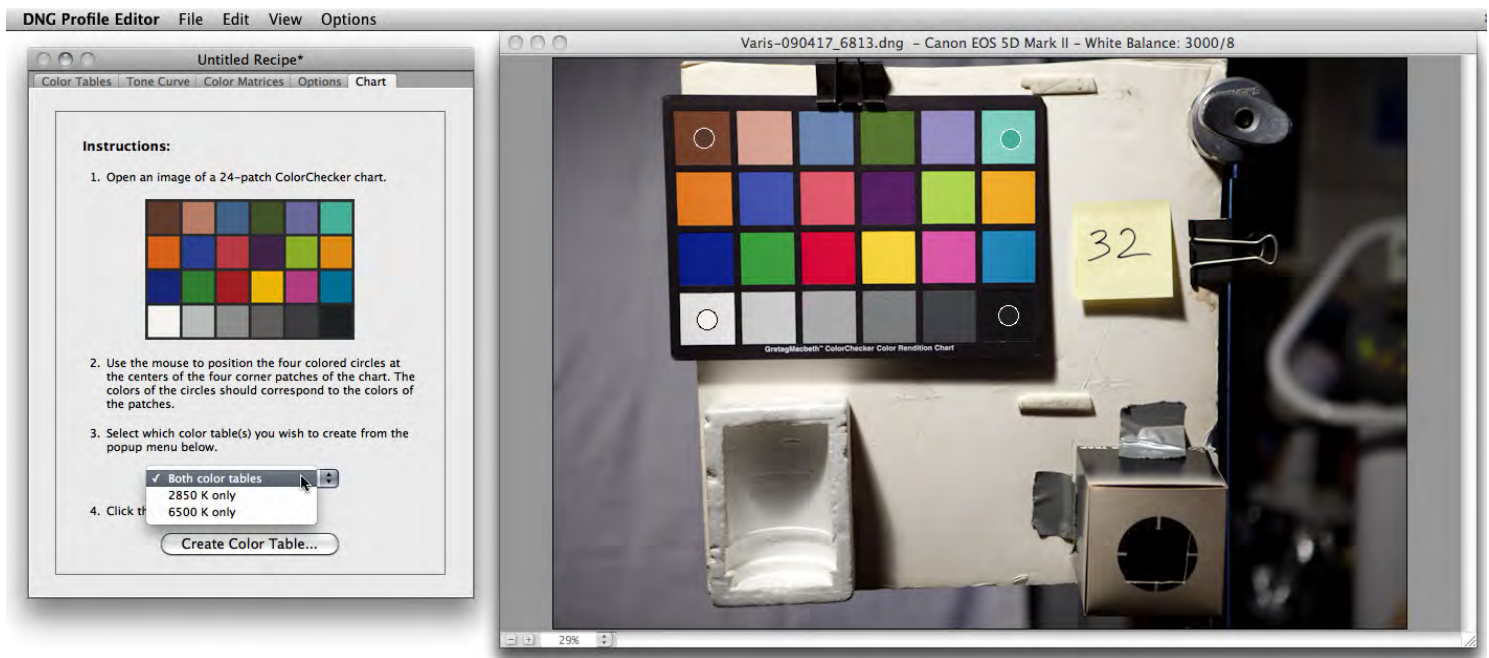


For a single purpose profile, lets say you wanted to create something for flourescent light, select "Both color tables from the pop up in the Chart tab. Obviously, you'd use an image shot under the specialized lighting condition you wanted to profile. The rest of the process is the same except that you'd only create the one Table and then export the profile, naming it for that lighting condition. The idea here is that you would not use this as a default but rather manually select it for use with the special ight condition only.

## Editing Profiles
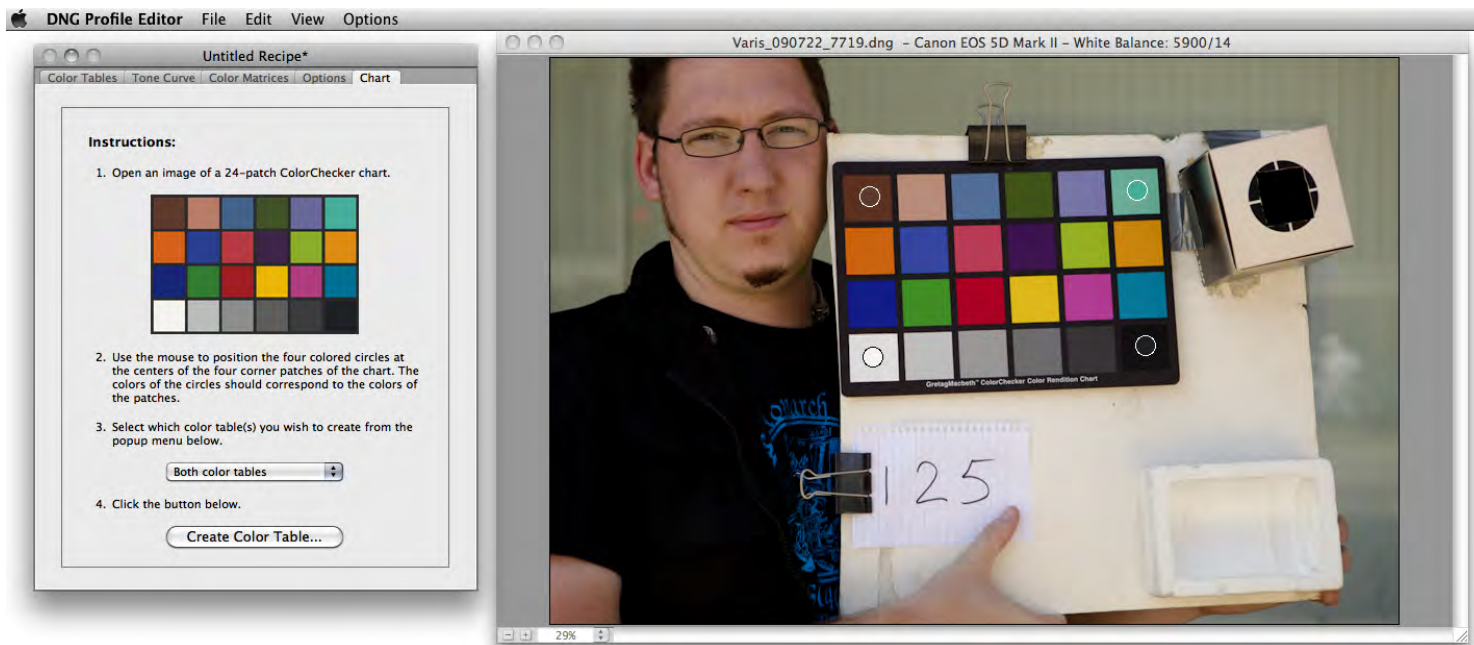


In some special cases you might want to "edit" a profile to achieve some sort of inage enhancement automatically. Inthis example I wish to edit the camera profile to correct the tendency to render skin tones too red with certain subjects. Te subject in this image has a natural skin color with a tendency to render too pink, especially in the freckled complexion. Here I am building a table for use in open shade (where the problem is most obvious) using "Both colot tables" in the tables pop up...

## Select the Bad Skin Color
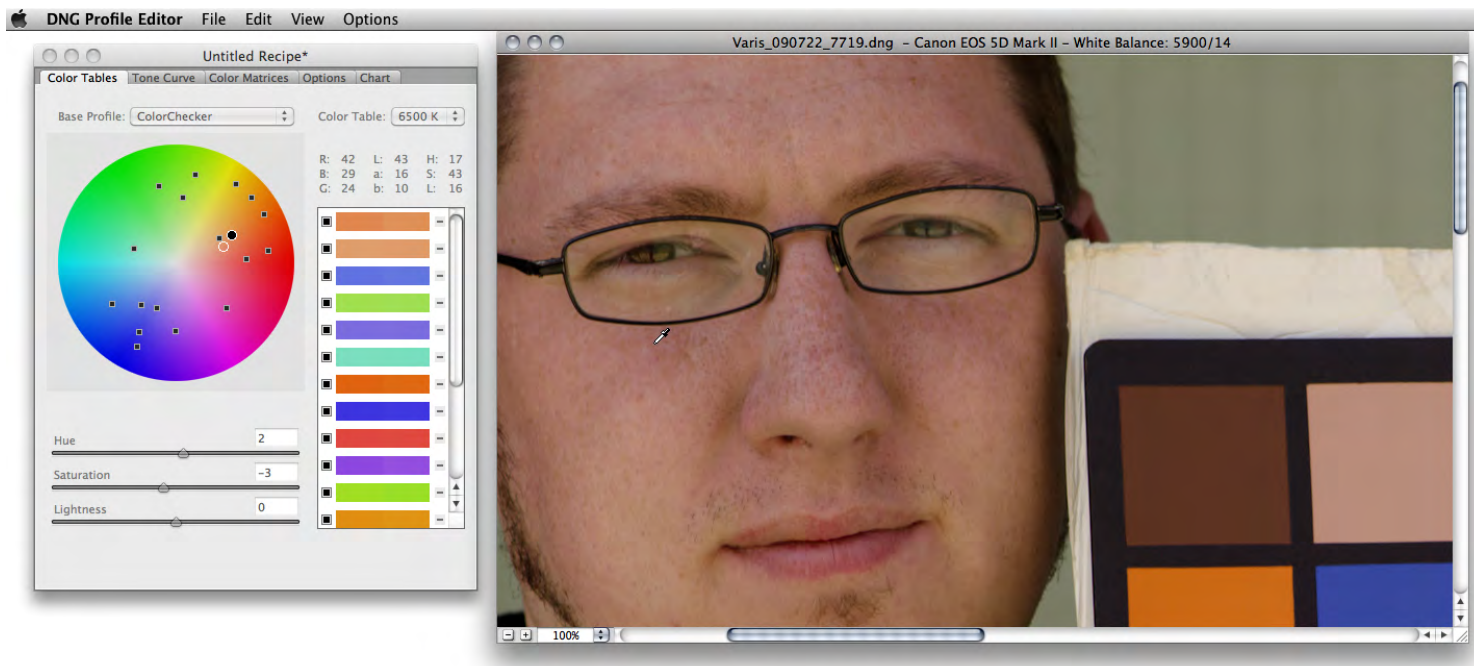


Zoom in to the area where the problematic color exists and click on the overly pink skin color to select that specific color in the Color Table tab...

## Edit the Color
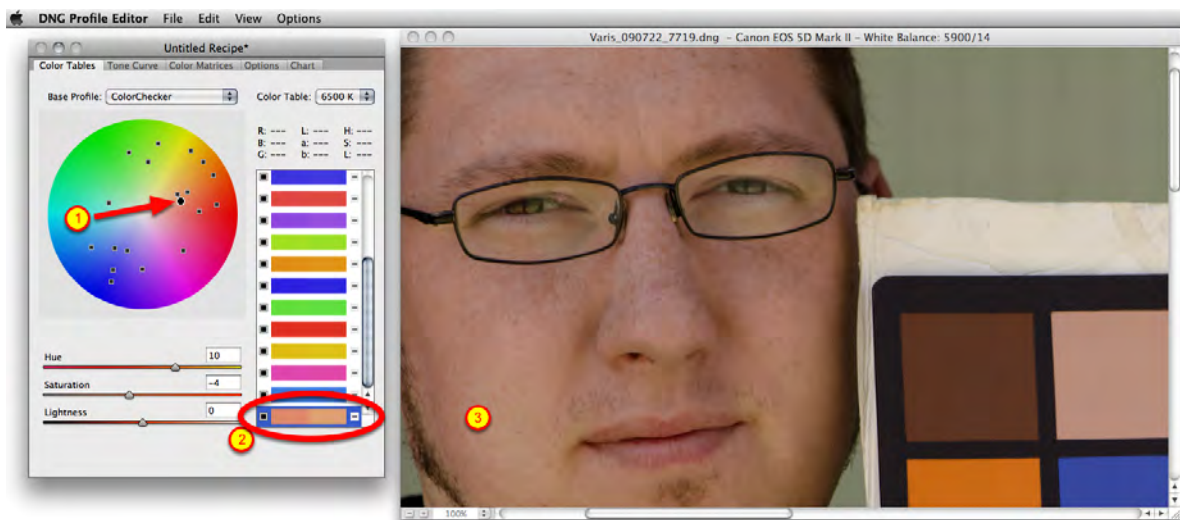


**(1)** The sampled color appears as a black dot on the color wheel - click and drag in the direction you want the color to move. **(2)** the sampled color will also appear in the patches to the right of the color wheel. As soon as you move the color the sampled patch will "split" and the new color will appear at the right side of the patch. **(3)** The

image will also update to show the effect of the color edit. This way you can make subtle corrections to edit-out the overly red skin color and achive a more pleasing skin tone. You can save this "Recipe" for futher editing later on or simply export the profile for use the this type of subject.

## Using Camera Profiles
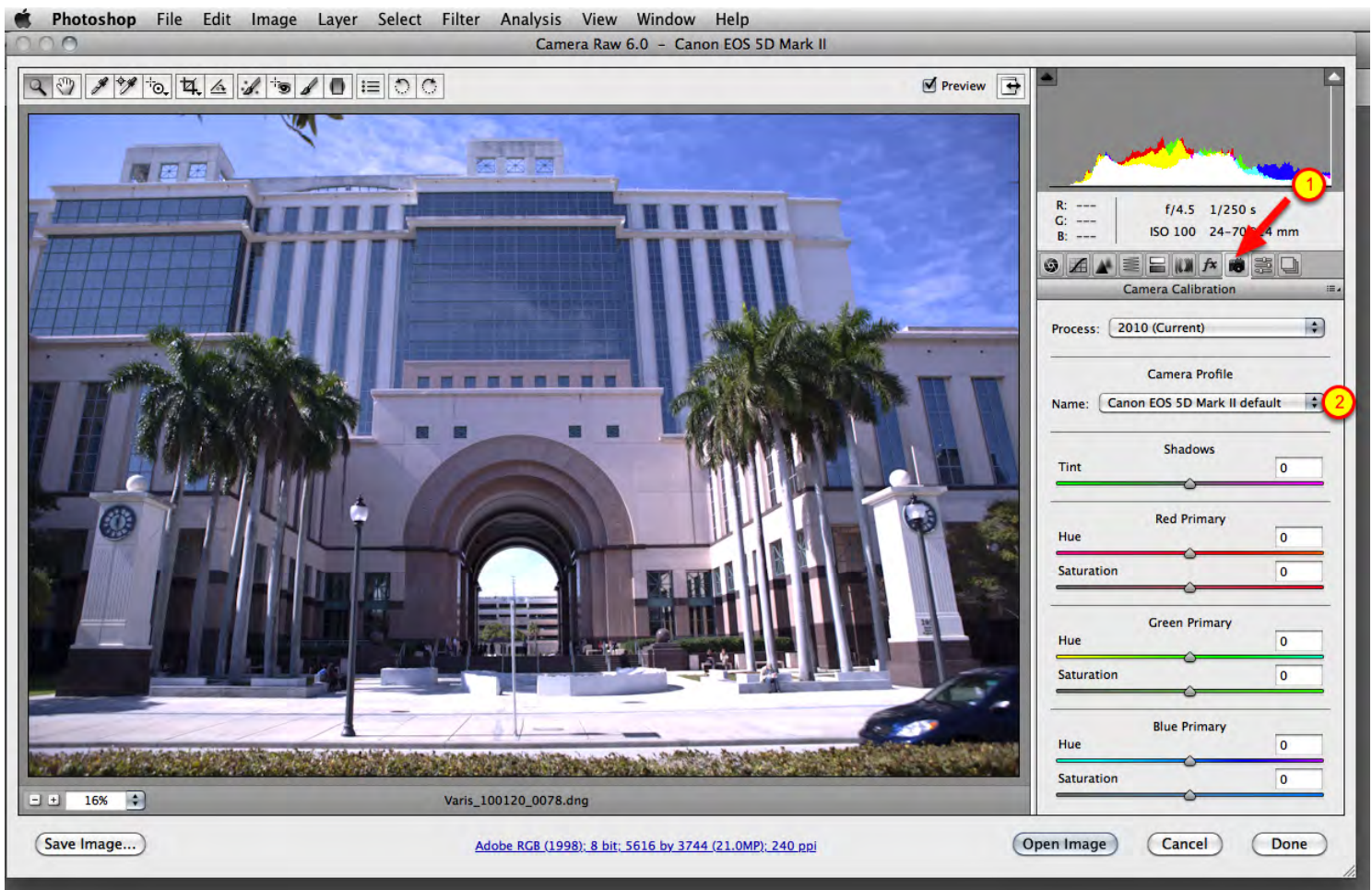


You select camera profiles for use in ACR using the **(1)** Camera Calibration tab, Select the profile you want from **(2)** the Camera Profile pop up menu...

## Save New Camera Raw Default
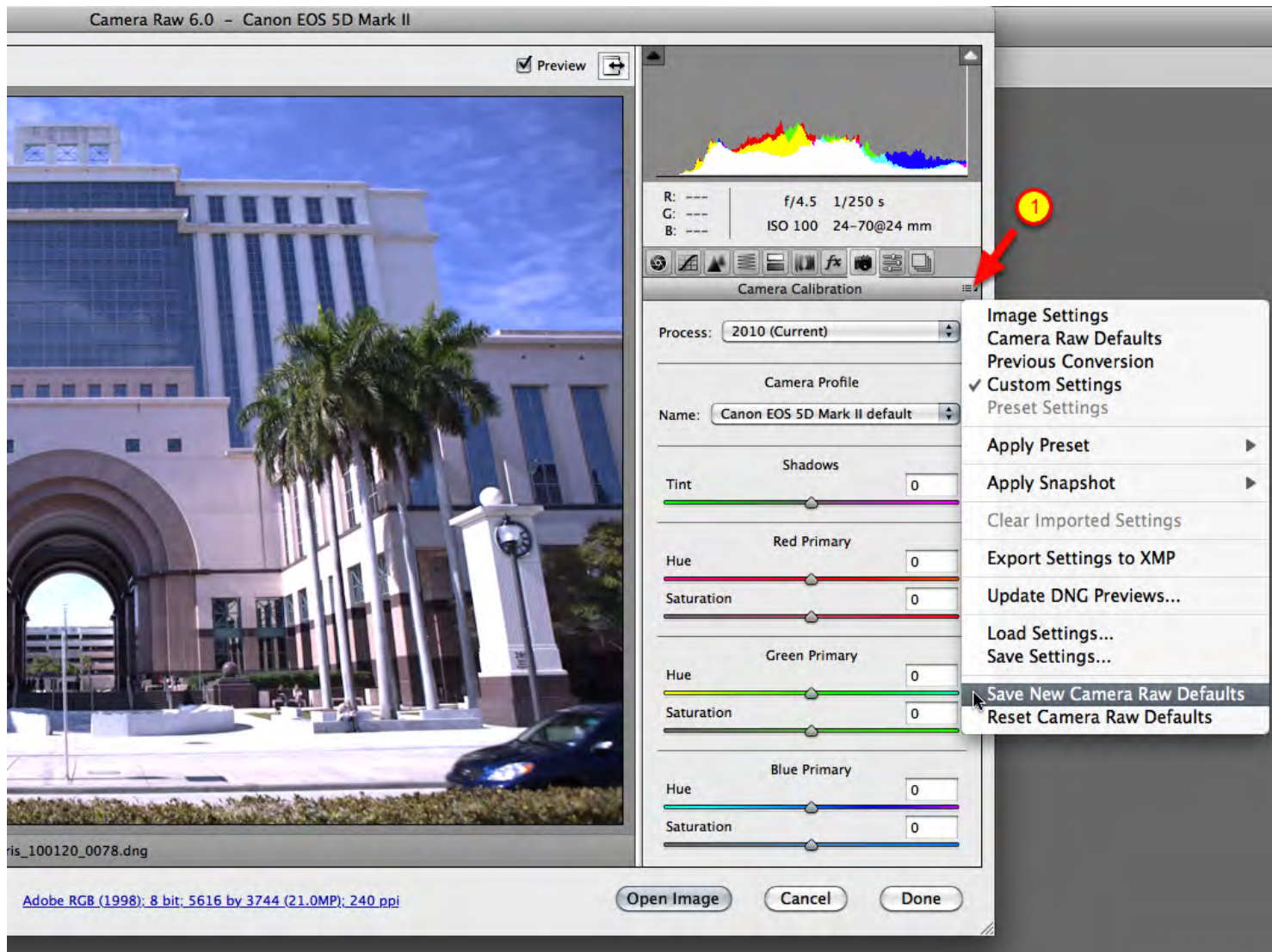


You can make the new camera profile the default for that camera by selecting "Save New Camera Raw Defaults" from the Settings drop down **(1)** This saves all the current settings into the default so make sure that you leave the White balance "As Shot" and only change setting that you want to apply to every image that you shoot with that camera.
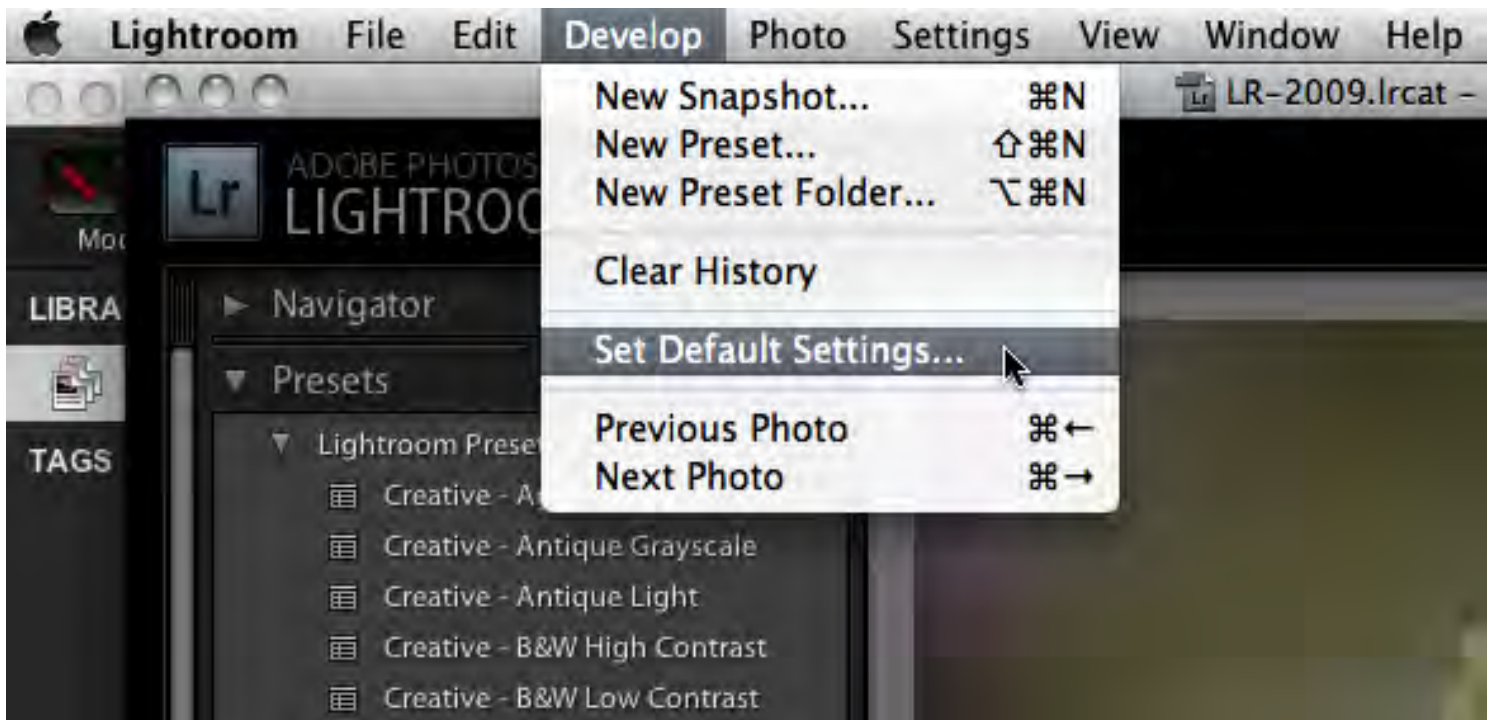
## Using Profiles in Lightroom



Profiles are selected in the Camera Calibration Panel in Lightroom...
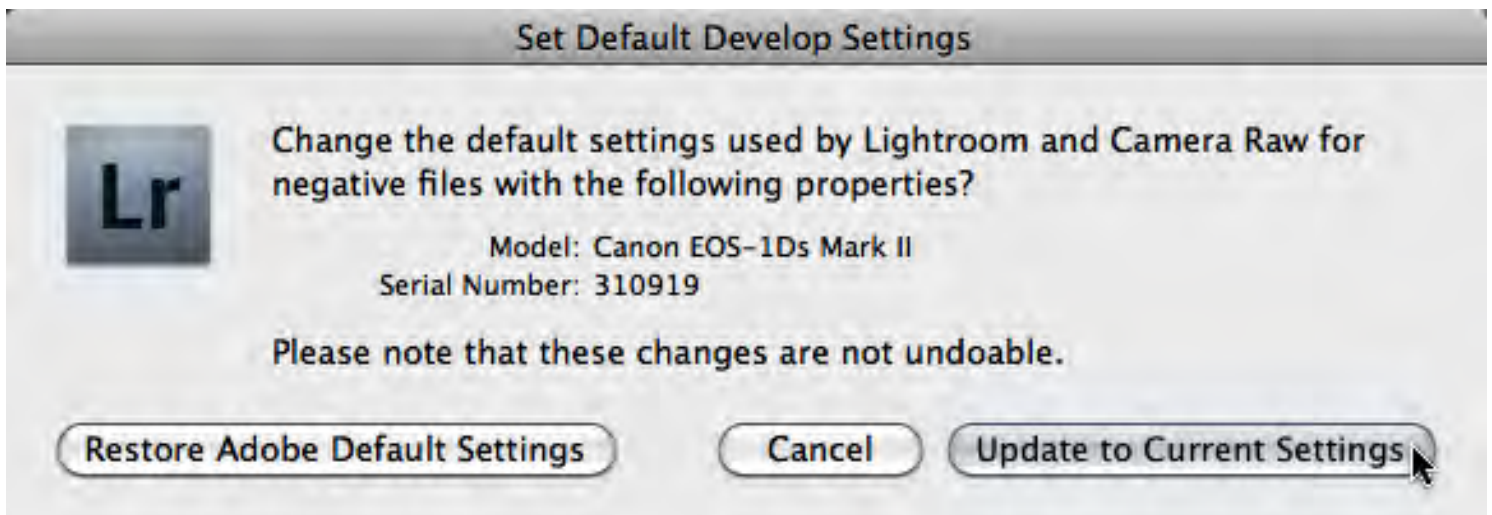
## Select the Profile
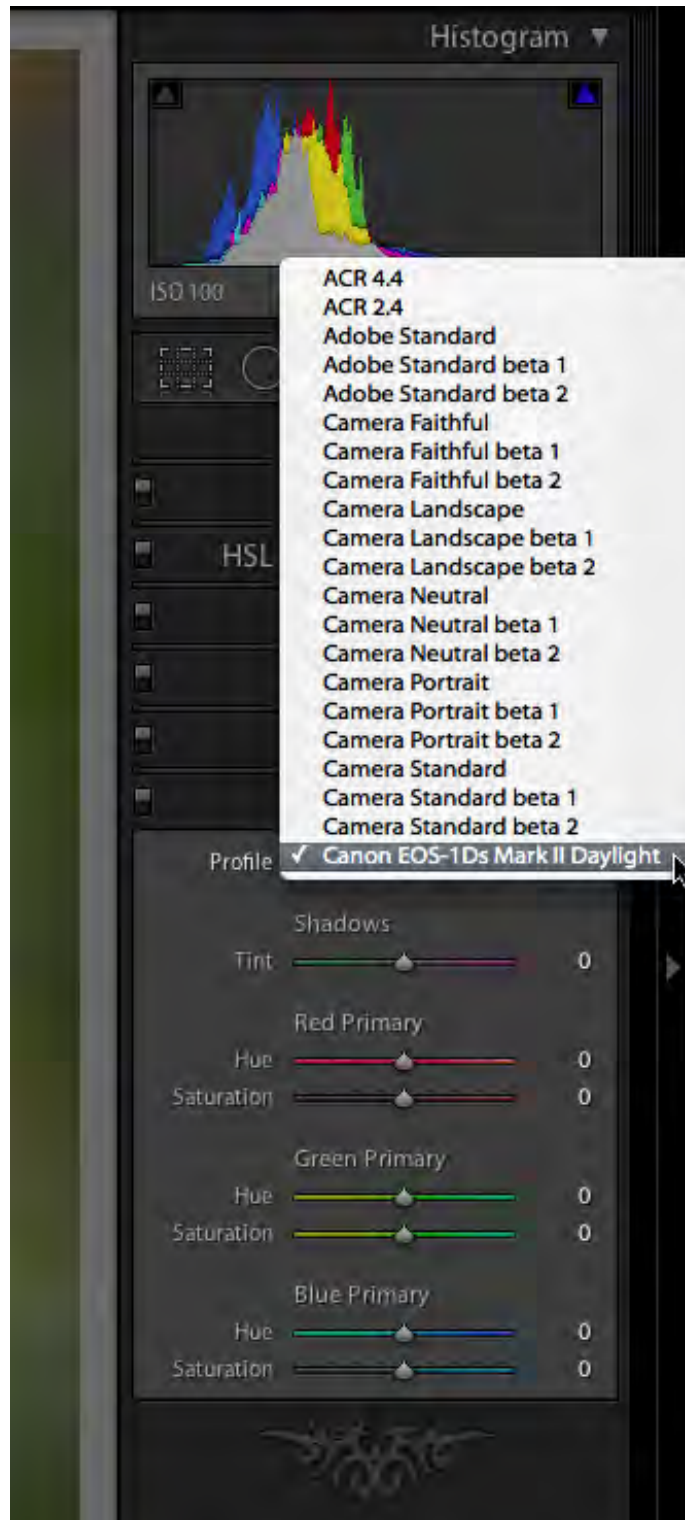


Select the Profile you want to use from the "Profile" pop up...

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## Set Camera Default



To set a new default profile for the camera, select "Set Default Settings..." from the Develop menu.

## Default Settings to Match Camera



All current settings are saved as a new default for the camera used in the currently selected shot - so again, be careful that you only change settings to what you want to use for every shot taken with that camera.

Ideally, once you have constructed a good generic profile using tests shot under the two lighting conditions

representing 6500 K and 2850 or, in most cases, 3200 K you can use that profile for just about everything you shoot with that camera. In other words you only have to shoot the tests once. There are occasions when it might be nice to get a good specialized profile but most of the time you can accomodate unusual lighting conditions through adjustments in ACR or ightroom without the need for a custom profile.

There is another profile building product that makes the process so easy that you'll find yourself making custom profiles more frequently to get the best color rendering possible.
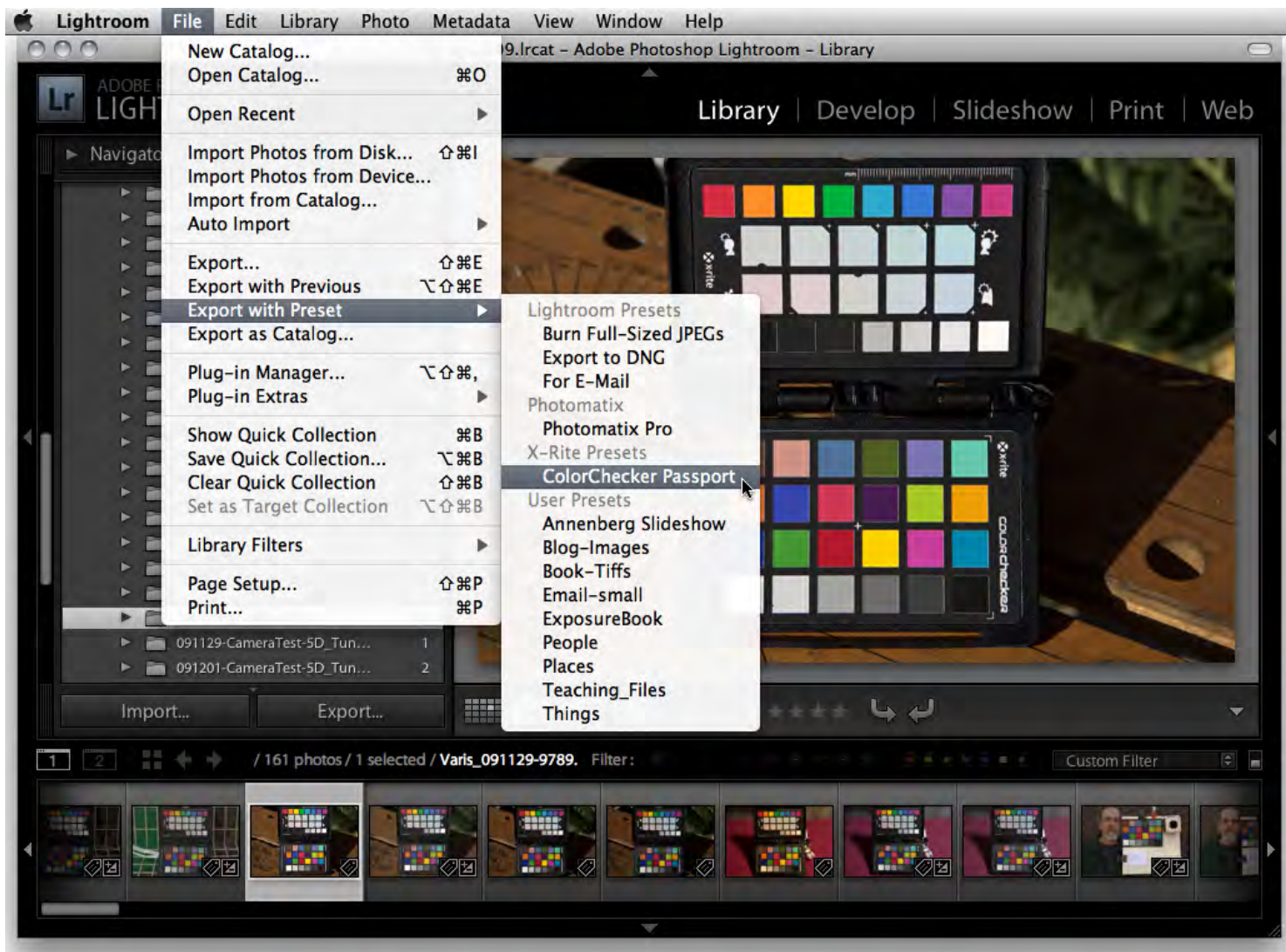
## The X-Rite ColorChecker Passport
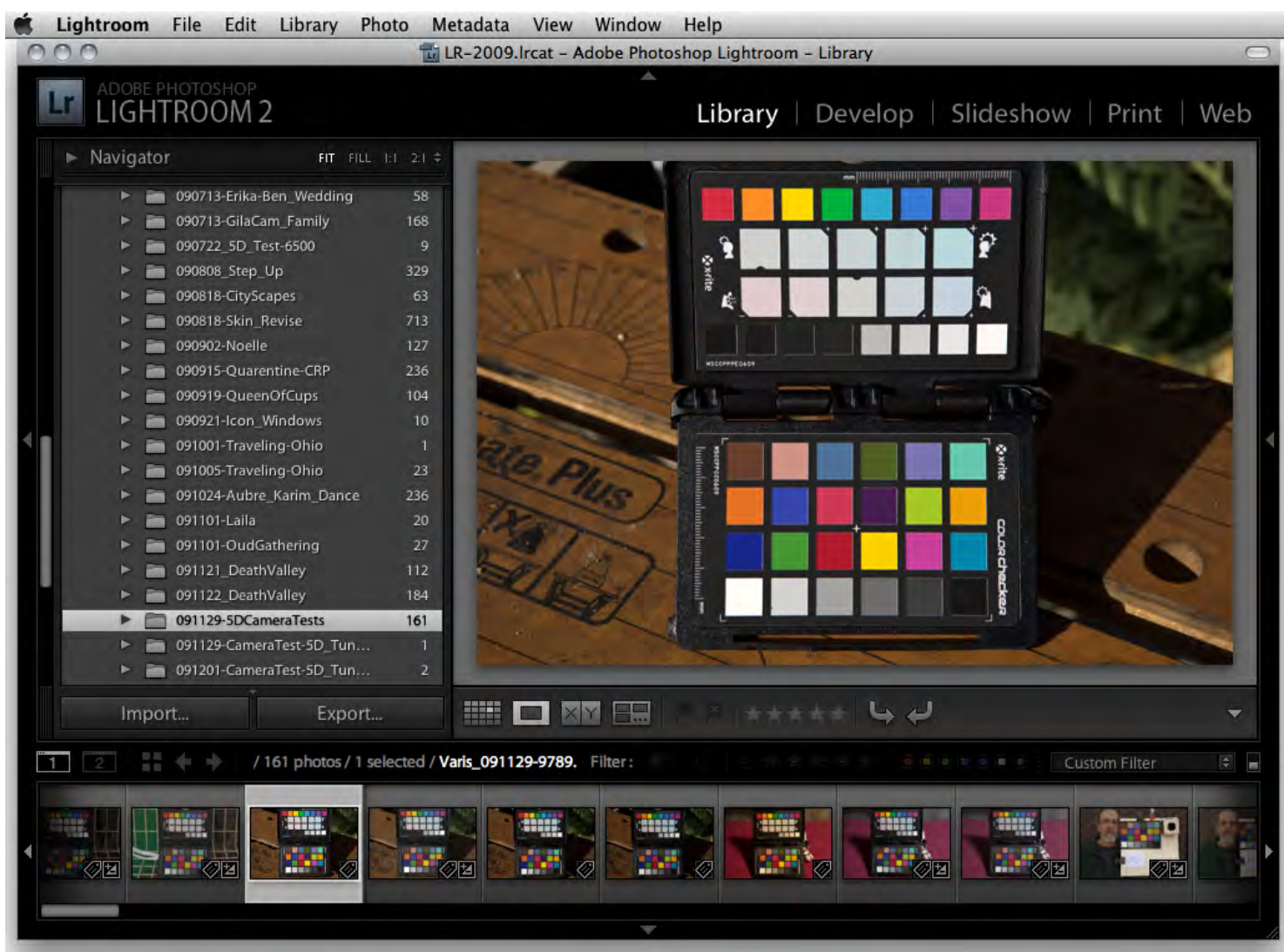


The X-Rite ColorChecker Passport is a complete system that comes with a special ColorChecker target in a nice self-enclosed compact plastic case and software as a standalone as well as a Lightroom plug-in. The Lightroom plug-in is so easy to use that it makes building custom profiles a trivial process. Simply shoot a reasnably well
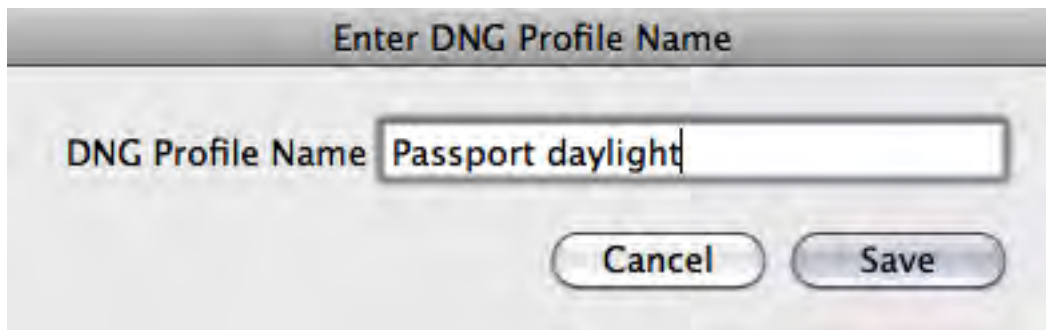
exposed shot of the target...
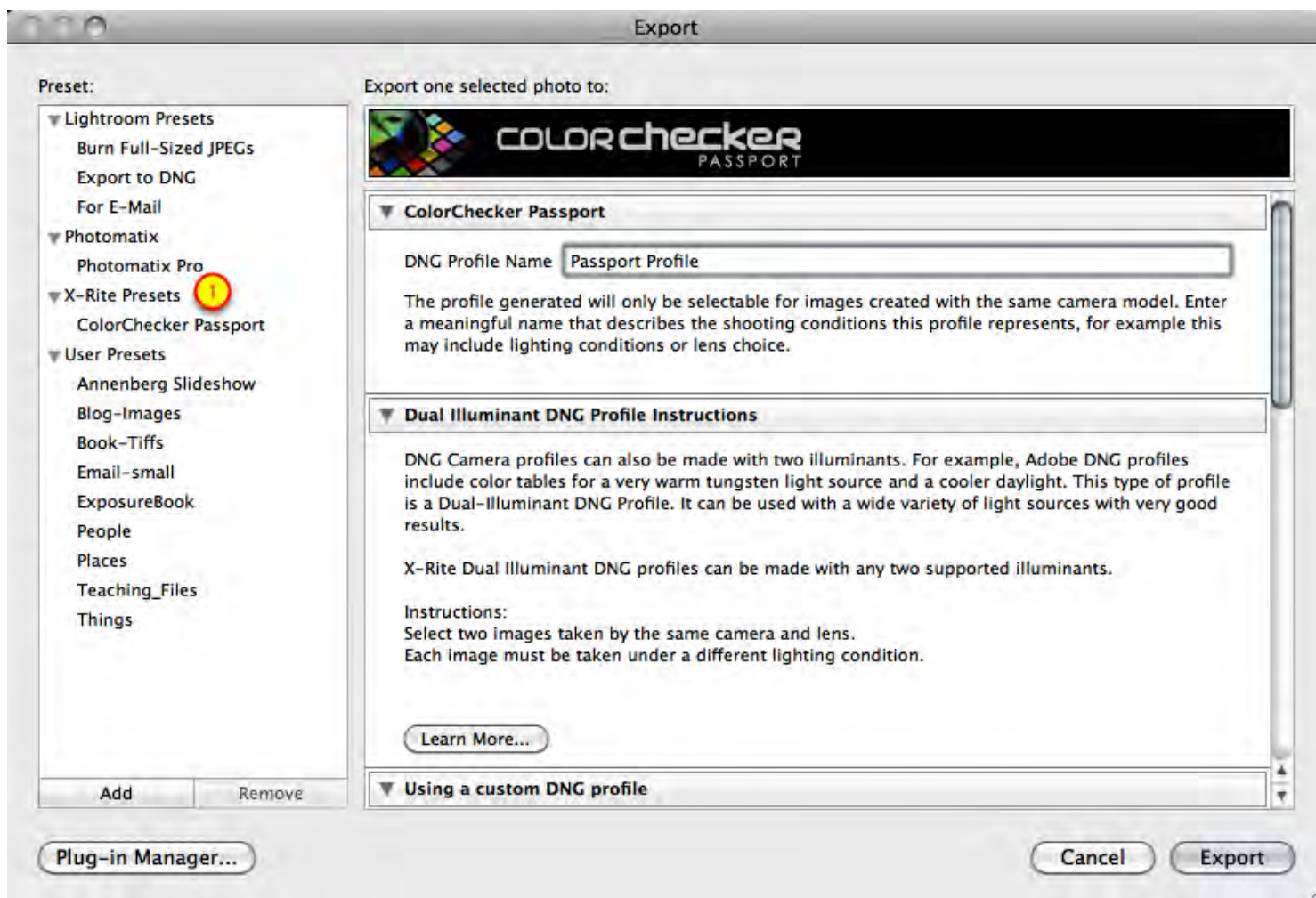
## Export to ColorChecker Passport



After installing the plug-in, all you have to do is select the shot with the target and "Export with Preset" to ColorChecker Passport...
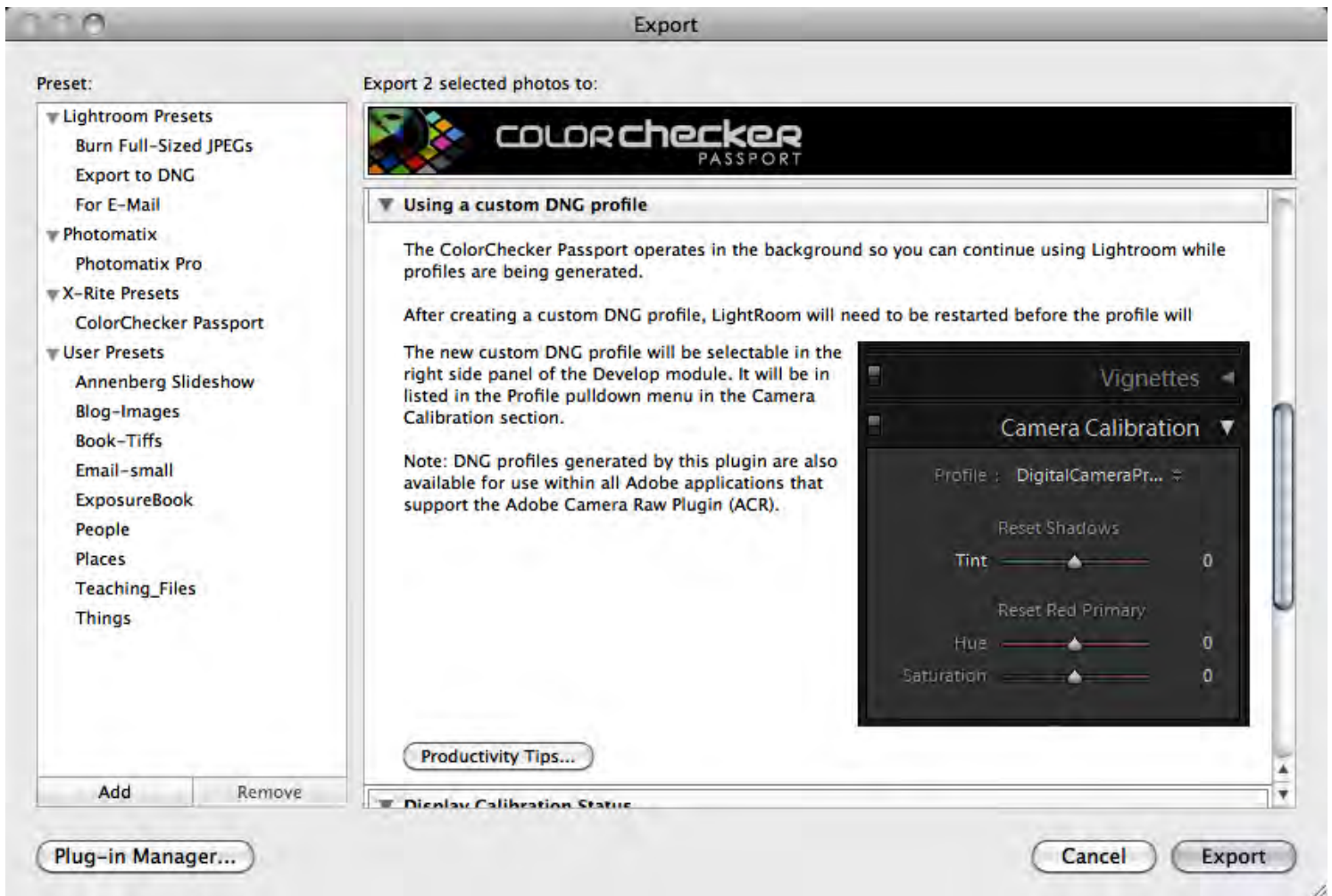
## Name the Profile



Give the Profile an appropriate name and then re-start Lightroom to select the new profile... thats it!
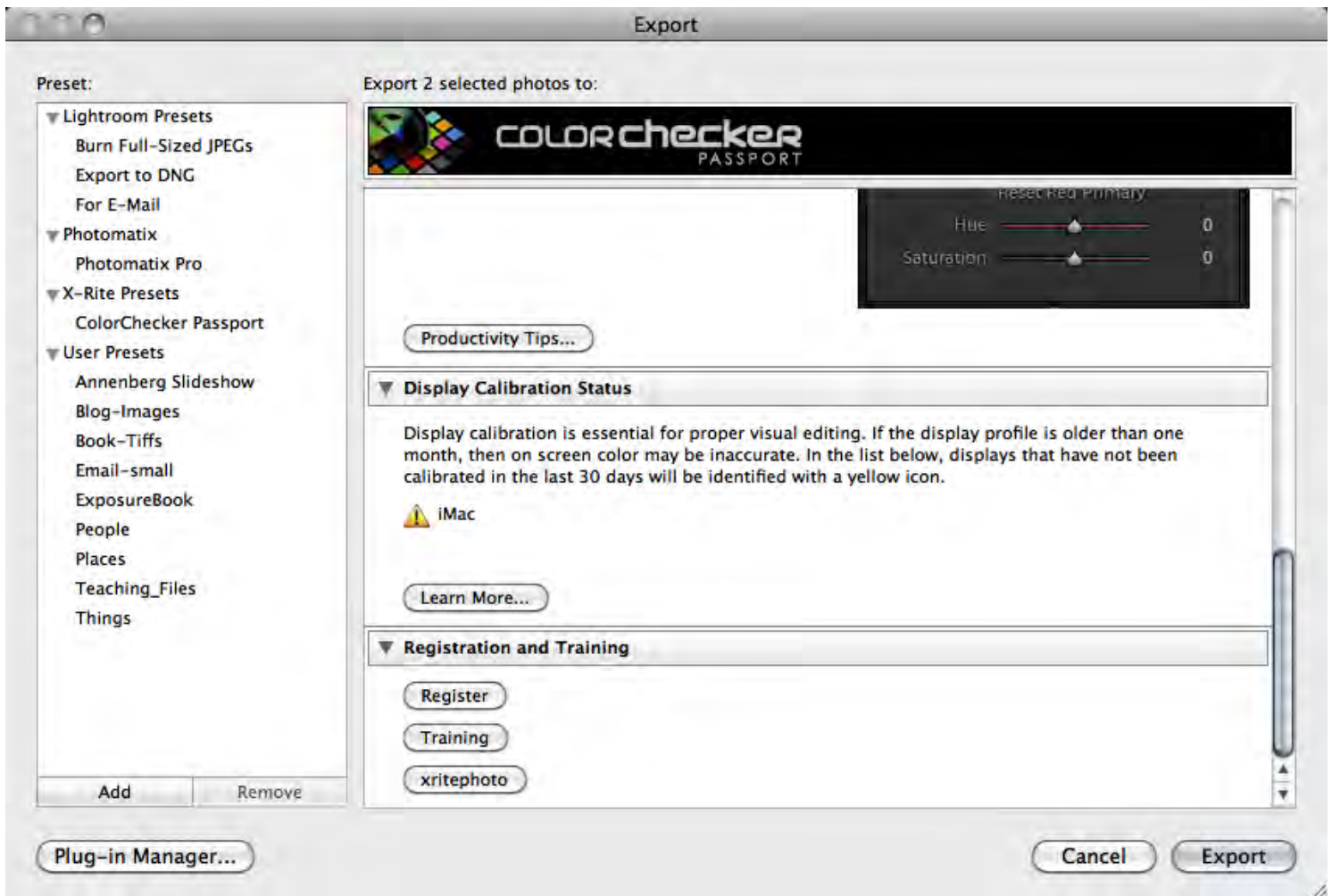
## Using the Export Dialog



You can also use the export dialog - select the X-Rite preset from the left **(1)** and name the profile...

## Helpful Instructions



There are also helpful instructions and tips in the export dialog if you nee a reminder for how things work...

## More Instruction



If thats not enough there are even more helpful instructions with clickable links to online instructions and workflow tips that show you how to get the most out of all the features of the ColorChecker Passport target.

These color calibration tools are so easy to use that it makes no sense NOT to use them. There are subtle differences between the color rendering achieved with each method. The X-Rite ColorChecker Passport gives slightly more saturated color and is easier to use so it tends to be a favorite among photograpers who've tried both. Adobe's DNG Profile Editor generates slightly less saturated color but it is extremely neutral AND it allows for "editing" the profile to achieve special custom color renderings. It is a bit more complicated to use so it appeals more to very sophisticated users who desire more customized settings. Either one works extremely well to create the best possible color rendering for your specific camera and so they both earn a place in the tool kit of the serious photographer.