

## "More Detail and Smoother Tones: Optimizing Your Digital Exposure"

By: Bob DiNatale

### The Problem: *How does one achieve predictable optimum exposure in digital photography?*

It has been ten years since Michael Reichmann introduced ETTR (exposure to the right). <sup>1</sup> Though it has generated much discussion and reworking, photographers still struggle to "optimize" their digital raw exposure.

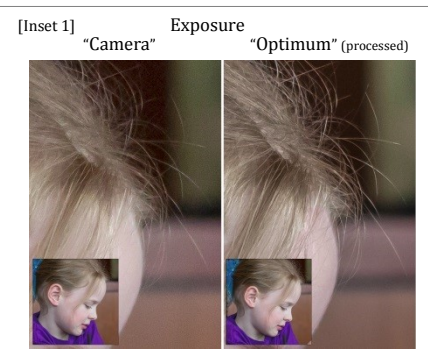
Some of these reworks attempt to digitize Ansel Adams' Zone System. These attempts will attract adopters because of its name. However, the basic premise of Adams' zone system, "*expose for shadows; develop for the highlights*," has no relevance in digital photography. The axiom for digital photography is "**Optimum exposure for maximum data**".

Digital processing far exceeds film processing... it can be all non-destructive with full re-editing capability! Camera Raw processing software has advanced since first introduced. We can better process our captures taken years ago... *and digital processing technology will only grow*. If we optimize our digital capture, there is no telling what detail we will be able to produce from the same data 10 years from now. The Camera RAW capture is **the perpetual latent image!**

### Objective: To determine the optimum exposure when capturing a RAW digital image.

This optimum digital exposure will minimize noise, increase image detail, have smoother tonal transitions, and allow more control over tonality when processing the raw captured data. To determine this "Optimum"

we need an exposure method that will provide a predictable way to "place" the exposure optimally on our sensor for each scene. [See Inset 1]



### Facts:

We now know that when capturing digital images there is a benefit to exposing the scene so our values to the right side of the histogram - "Expose to the right" (ETTR). The original benefit was primarily to separate the signal from the noise of the sensor, especially in earlier digital cameras where this was a major limitation.

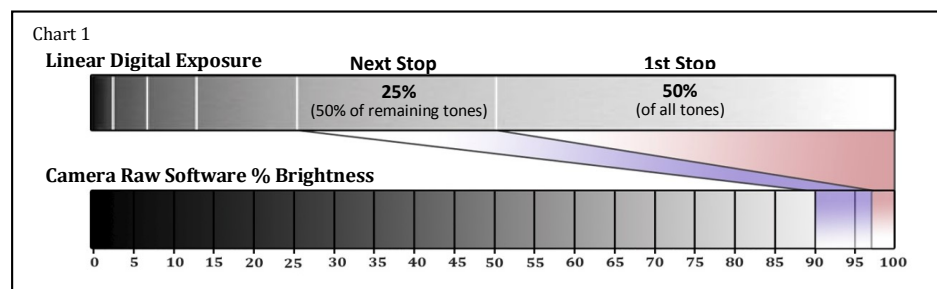
However, a *more significant* benefit of *increased exposure* is having *more tones* that define our image. We know that unlike the geometric nature of film capture, digital capture is linear. Starting with the brightest tones, the 1<sup>st</sup> stop of exposure contains 50% of all captured tones; the next stop uses 50% of the remaining tones, etc. <sup>2</sup>. Said another way – the first 2 stops of our digital exposure contains 75% of all the data that makes up our digital capture.

An even more important aspect of digital capture is: <sup>3</sup>

**75% of all our tones reside in the top 10% of the digital exposure.**

**50% of all our tones reside in the top 3-5% of the digital exposure.**

[Chart 1] shows how critical "optimum" digital exposure is when comparing linear digital exposure to the percentage of brightness in our camera raw software. (Example software is Adobe Camera Raw)



If you capture your exposure so the most important data in your scene is "placed" at...

- 97% brightness, your digital capture has lost 50% of the available scene data!
- 90% brightness, your digital capture has lost 75% of available scene data!

## Bob D's - "Digital Exposure" – Optimizing your Digital Camera Exposure

Version 7a

### Bob DiNatale's "One-Zone"™ (Optimum Digital Exposure)

The "One Zone" is 99% brightness.

The "One-Zone Method" *predictably places* your exposure at 99% brightness in your camera raw software. This optimum digital exposure will produce an image with more sharpness, more tones and less noise.

Procedure: (For detailed instructions, see Bob DiNatale's "One-Zone"™ Optimum Digital Exposure Method)

Determine an exposure for *your* camera/meter that *places* the selected metered part of the scene at 99% brightness in your camera raw software.

### Statement/Results/Findings:

There are 3 types of exposures: 1) *Camera* (recommend by camera's meter); 2) *Proper* (place exposure relative to scene brightness) and 3) *Optimum*.

They are all different!

- Their relation to each other varies depending on the subject
- *Rarely* are the "Camera" and "Proper" the same!
- The "Proper" exposure can be *closer to* or *further from* the "Optimum" depending on the subject.
- Most always, the "Camera" exposure is never optimum!

There is only one "Optimum Exposure" - the exposure that "places" the brightest area of your scene at 99% brightness in your camera raw software!

With digital imaging, you can only "place" the brightest part of the scene at the optimum white point. Where the lower tones fall will depend on the dynamic range of the scene. If the dynamic range of the scene is greater than our sensors *dynamic range* then we need to add light to the shadows to lower the *dynamic range* of the scene. Our other option is to take multiple exposures and create an HDR file.

You cannot rely on the camera's histogram or flashing Hi Alert warning to produce the Optimum exposure. (*My camera's Hi Alert warning for digital raw captures occurs 1 full stop before my software's Highlight Warning!*) The camera's LCD should be used for composition and expression, *NOT* exposure! [See Inset 2]



[Inset 2]

Camera blinkies not reliable

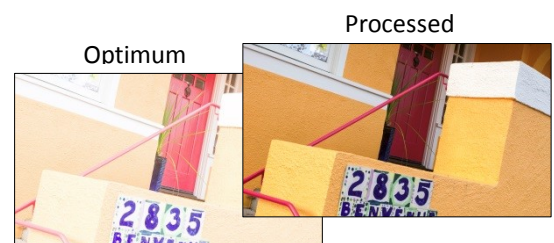
**Most of the digital image is constructed by our digital raw software! 4**

The more data we provide the software the better the digital image— that means more image sharpness, more detail, less noise, smoother tonal transitions and more control over tonality when digitally processing the raw captured data.

### More Exposure Observation...

#### **Camera Raw Capture – "Over-Exposed" or "Optimum"?**

More times than not, the optimum digital exposure will not appear good on the camera LCD monitor! I can state with confidence that it certainly will not look to be "the best" exposure in a series when viewed before processing. Remember, our film negatives could not be judged until they were developed... the "Optimum Digital Negative" should not be judged BEFORE it is developed by the RAW processing engine!



#### **Do we really want to "Get It Right In The Camera"... and, what is right?**

Getting "the right" exposure in the camera sounds good but what does it mean? "What is "Right"? An exposure that looks good but is 1 or 2 stops less than optimum? This exposure could leave behind 75% of the possible scene data. *The correct exposure is the one where the maximum number of tonal details is captured without losing critical highlights— no matter what it looks like in the camera or when opened in the software prior to processing.*



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### **The Camera's Recommended Exposures are Generally Wrong!**

I can also say that, unless you are pointing your camera at a gray card, your camera's recommended exposure is biased and more than likely incorrect! This is "brightness subject failure".

Your exposure error could be +/- 1 stop (or more) depending on the "subject failure"—and that is assuming your camera's ISO is accurate. Your camera could be exposing +/- 1/3 stops of the stated ISO and still be within ISO standards; that is another 2/3 stops of possible error. And, we have not even considered that some camera meters are set to 12-14% grey reflectance or slight underexposure which would even make reading an 18% gray card an incorrect exposure!

As you can see there are many different possible exposure settings—only one can be right! That is "the optimum exposure"... the exposure that "places" the brightest part of the scene at 99% brightness in our camera raw software. There is no creative expression or interpretation here; that is done with your digital image software when processing your *optimum exposure*.

### **Optimum Exposure at Higher ISO Produce Equal or Better Results!**

Probably one of the more surprising observations was that "Optimum Exposure" at 4x higher ISOs produced *equal to* or *better* results than lower ISOs at the recommend "Camera Exposure".

I believe this is due to the fact that most of the digital image is created by our digital raw software. <sup>4</sup> Therefore there is more data for our processing software when we *optimize our digital exposure*. [See Inset 3]

[Inset 3]



### **Summary**

Undertaking this study, I realized is that my experience with digital exposure is similar to the evolution of my technique for producing B&W negatives many years ago. When I started getting good prints was when I started to produced what I would have initially described as "thin negatives". My early days in the B&W darkroom, I produced negatives that were "heavy" and very dense. That was contrary to what I needed to produce the "optimum" print. I recall an old darkroom axiom, "a good negative was one that you could read a newspaper through. I believe the digital photography equivalent may be – "a good digital exposure is one that looks like it has been dipped in skim milk!"

*In digital photography we need to expose for maximum scene brightness as far right of our histogram without "over-exposing" and let the rest of the tones fall into place. We then "digitally process" our maximum data for all tones to express the "Artist's Vision"*

### **References:**

<sup>1</sup> [Expose \(to the\) Right - Michael Reichmann](#)

"The simple lesson to be learned from this is to bias your exposures so that the histogram is snugged up to the right..."

<sup>2</sup> [Understanding Digital Image Capture – Bruce Fraser](#)

"This means that if a camera uses 12 bits to encode the capture into 4,096 levels, then level 2,048 represents half the number of photons recorded at level 4,096. This is the meaning of linear gamma - the levels correspond exactly to the number of photons captured."

<sup>3</sup> [Revisiting The Zone System - George Jardine](#)

"What I found was how dramatic the tonal compression truly is up in the very high Exposure Values... Am I really using 50% of my possible gray levels between 97.5% and pure white? And 75% of them just to get to 90% (which is where Adams' Zone VIII might fall—white with textures

<sup>4</sup> [Luminous Landscape.com - Mark Dubovoy](#)

"I was once told by the Chief Technical Officer of a major camera company that the sensor is only 10% of the equation and the rest of the electronics and the software represents 90% of the ultimate result."

### **Further Reading:**

> My Book: "The Optimum Digital Exposure" <http://onezone.photos/purchase-book/>

> My Article: "The Optimum Digital Exposure" <https://luminous-landscape.com/the-optimum-digital-exposure/>