

# Understanding the Histogram

by Hudson Henry  
and Rick LePage



A short guide to photography's best-kept secret.

# Understanding the Histogram

*A short guide to photography's best-kept secret.*

By Hudson Henry and Rick LePage

A companion to the video course  
*Mastering Contrast in Photo RAW*

*Edited by Rick LePage*

©2021 Hudson Henry Photography and CDP Press LLC

ALL RIGHTS RESERVED. No part of this work covered by the copyright herein may be reproduced, transmitted, stored, or used in any form or by any means graphic, electronic, or mechanical, including but not limited to photocopying, recording, scanning, digitizing, taping, Web distribution, information networks, or information storage and retrieval systems, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the publisher.

# Contents

<b>Introduction.</b>	<b>1</b>
<b>1: Introduction to the histogram</b>	<b>2</b>
Different views of a histogram	2
White vs. black	3
What is contrast?	4
<b>2: Dissecting the histogram</b>	<b>5</b>
Evenly distributed histograms	5
Exposing to the right	7
Adding contrast in underexposed scenes	8
Spreading the tones in flat or hazy scenes	9
Working with complex high-contrast scenes	.10
Bracketing high-contrast scenes for HDR	.11
<b>3: Shooting for the histogram</b>	<b>13</b>
Decoding the three-channel histogram in the field	.14
Shooting low-contrast images	.17
Bracketing in extreme high-contrast situations	.19
Wrapping up	.20

# Introduction

We teach workshops in beautiful places around the globe every year (well, most years, this past one was an anomaly), and one of our core teaching principles is the idea that your work in the field informs your work on your computer and vice versa. Understanding that connection is, in our view, one of the keys to becoming a better photographer. And for us, the secret to that is the histogram. Histograms are like the Rosetta Stone for understanding your image data, regardless of how and where you view them.

On a workshop, it's a delight for us to see the light go on inside someone's head when we spend a few minutes explaining the histogram: first in the field, and the next day during class time. Once you 'get it,' the histogram becomes the tool for going from previsualization to finished image; it ties neatly into all aspects of photography:

- You look at a scene with your camera in the field and use the live histogram to get a sense of where there might be issues that could affect exposure. You use that information to adjust your aperture, shutter speed and ISO accordingly.
- Looking at the histogram of the captured image on the back of your camera, you check for areas of pure black or pure white—which can cause trouble during the editing process—and reshoot. Or, you might choose to take multiple shots of a scene, with an eye towards creating a blended HDR shot.
- When you get back to your computer, or are working in the field on a tablet or phone, you use the histogram to edit your image to get the best balance of tones to fit your vision for the scene.
- And, when you're ready to print, the care with which you paid attention to the histogram as you edited your image will help ensure that you get the best possible print.

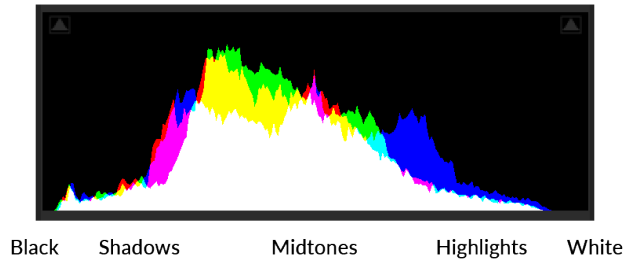
As photographers, we know that the image is paramount. In order to ensure that the vision with which we saw and took the shot is preserved all the way to sharing or the print, we need a tool that helps us as we work through all sides of the process, across the various devices and screens of our digital world, and even into the print. The histogram is that tool, and it's easier to master than you think. It doesn't replace compositional skill, or understanding how to use your camera or your image editor, but it does make it much easier for you to realize your vision.

*Hudson & Rick*

# 1: Introduction to the histogram

Histograms can be found in almost every image-editing app on all operating systems, and on every digital camera sold today. Understanding how to use histograms effectively isn't difficult; it's just a matter of understanding what they tell you about your photos.

Simply put, a histogram is a bar graph of distribution of the tones in an image, ranging from the darkest (pure black) to the brightest (pure white). More specifically, it is a bar graph of the three color channels—red, green, and blue (RGB)—used to generate picture data for most computers and digital cameras. When you open a photo on the back of your camera or in your image editor, the RGB values for each pixel are scanned in a fraction of a second, and displayed in that photo's histogram.



When the brightness amounts for each of the three channels are combined, they produce the color and tones that we see on our screens. When there is no red, green or blue channel data in a pixel, you have pure black; when all three channels are at 100 percent of their maximum possible value, the pixel is pure white. In between, the combinations of the various values for each channel result in the different colors in your image. The height of the graph indicates how much of each tone is in the image, and is most helpful when trying to determine which part of the histogram corresponds to which part of an image.

The look of a histogram will differ from source to source, but they all display data in the same essential manner: dark tones and shadows on the left, middle tones in the center, and highlights and bright tones on the right. What you see in the histogram of an image on the back of your camera will be the same as when you look at that image in Photo RAW on your computer. The representation of the data—which represents the tones—will be the same. The histogram doesn't change.



*The histogram for an image will have the same shape, regardless of the viewing source. Here, we have three histograms of this image taken at Yellowstone: a three-channel histogram as seen on the back of the camera (top), the histogram from ON1 Photo RAW 2021, and from within Photoshop (bottom).*

## Different views of a histogram

The histogram displayed in most image editors, like Photo RAW, is presented as a single overlay of the data in the red, green and blue channels. You'll see each channel's information displayed in the histogram, and where there is data from every channel, you'll see white (or gray, depending upon the device or app you're

using); where there is only data from a specific channel, it will be displayed in that channel's color; and any areas where there is data from two channels, they will be displayed as the addition of those channels: yellow for red+green, magenta for blue+red, and cyan for blue+green.

Today's cameras generally have two different views of the histogram, depending upon whether you're shooting in live view or looking at an image via playback mode. In live view, most cameras' histogram displays don't display the RGB data; they just show the tonal distribution as a guide for the scene you're shooting.

In playback mode, you'll see a three-channel histogram, which can be extremely useful in evaluating your photos in the field. (You might have to press the Display button on the back of the camera to cycle through the different view options until you see the histogram view.) The three-channel view will show separate histograms for each RGB channel as well as the composite of the three channels. This view is extremely useful in the field, and can inform how you might want to proceed with shooting the current scene. It can also help when working with extremely bright or dark subjects: looking at each channel's histogram can tell you if there might be data in one channel that will help you recover highlights or expand shadows without trouble. You might decide to re-shoot with a bit of over- or underexposure, or you might decide that you have such bright highlights and such dark shadows that you can't capture it all in a single frame. In those instances you'll want to bracket a series of shots to build an HDR composite of the scene, to get the widest dynamic range you can.

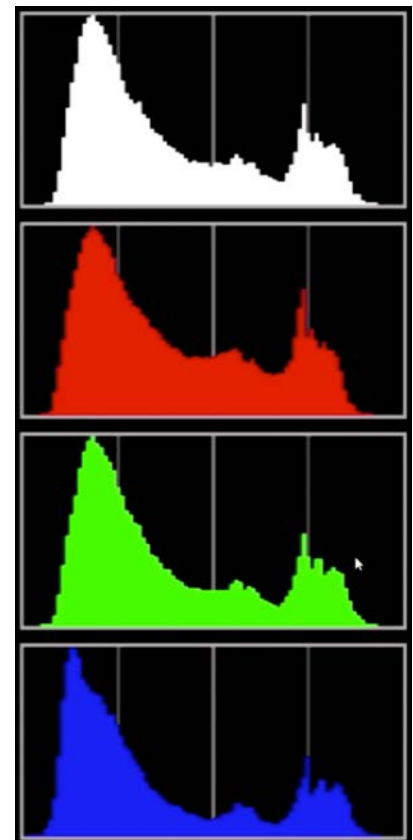
## White vs. black

It's important to note that there is no right or wrong histogram; it simply is the graph of the tones in your image. If you're shooting a scene that has a lot of shadows, then the histogram will show that there are more dark tones than light. In a bright scene, the majority of the tones will be on the right side of the histogram. What is more important is that you get a good distribution of tones for the scene you have shot.

However, as you work with histograms, you want to be aware of the amount of pure white or black in your scene. This is crucial when you're in the field; if you look at the histogram of a scene and you see white spikes at either end of the range, it means that each of the RGB channels has no data for those pixels.



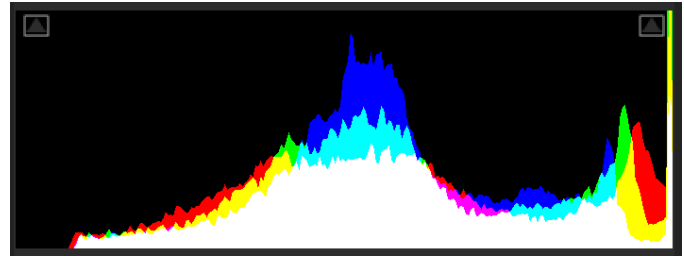
Most mirrorless cameras (and DSLRs with live view) can display a basic histogram (circled in the shot above) as an overlay to help gauge exposure as you're composing a scene.



The three-channel histogram found in most cameras' playback mode can be extremely useful evaluating a shot. It lets you make a far more nuanced assessment of the tonal information captured by the sensor and whether further adjustment—or HDR capture—is warranted.



Having significant amounts of white is especially problematic: because pure white represents the absence of detail, you can't get that data back. While small areas of white that appear as specular highlights can be fine in a finished photo, big expanses of pure white in an image can be distracting to viewers. The good news is that, while you're in the field, you have a fantastic tool—the three-channel histogram, once again—which can help you evaluate whether you still have some data in one of the channels. (We'll talk more about this in the third chapter, “[Shooting for the histogram](#)”)

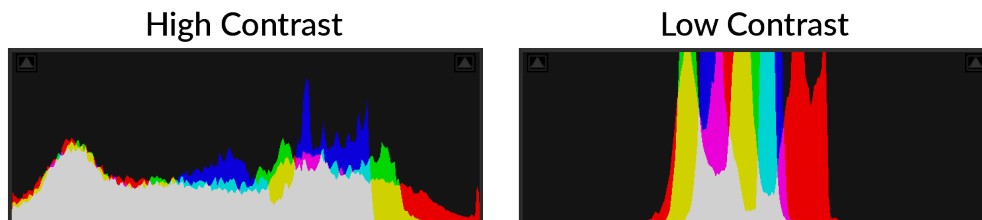


*This spike on the right side of this histogram indicates that the three RGB channels are all maxed out, resulting in blown highlights.*

Pure black tends to be less of a concern than white, but it's still a good thing to pay attention to the distribution of shadow and dark tones in the field. Shadow tones are often more recoverable from images with pure black in them, but you can still run into noise or contrast issues if you try to open the shadows too much in your image editor.

## What is contrast?

Contrast is related to the spread of tones in a photo. If an image has a wide distribution of tones from black to white, it is termed high-contrast. If the spread of tones is much narrower, it is called low-contrast. High-contrast photos tend to pop more off the screen or print; with a wide range of tones, you have a lot of data with which to work in your editor. And, because some scenes have so much contrast that it's hard to capture the full range of tones, you'll want to think about bracketing them, taking one shot exposed for the darker tones, and one for the higher tones, and blending them together in Photo RAW.

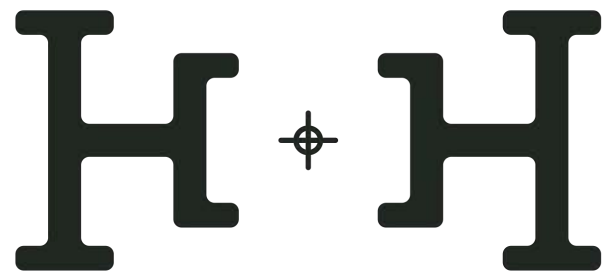


*High-contrast images will have a histogram with a wide spread of tones throughout, while low-contrast images will have a much narrower band of tones, although some low-contrast photos will have very small amounts of data at one end of the tone spectrum.*

Because low-contrast images by their nature have narrower tones, they are often flat in appearance when you look at them on the back of the camera, but that softness can actually be quite beautiful. They take a bit of work to edit—with many photos, you have to be very careful that you don't stretch the tones too much—but, if you're careful, you can achieve great results.

Regardless of the type of contrast in your image, editing it is largely a matter of balancing the highlight, shadow and middle tones, being careful to keep your black and white points set so that you have the best representation of the scene as you saw it. Then, once you've got the essentials down, you can turn to finish editing to prepare your photo for output to screen or print.

Now, let's practice by looking at some histograms, and see what they tell us.



***HUDSON HENRY***  
**P H O T O G R A P H Y**

[hudsonhenry.com](http://hudsonhenry.com)