

ZONE SYSTEM



The Zone System focuses on two very important aspects of photography –

- (1) Image exposure...and
- (2) Development, which naturally centers on the f-stop (the size or opening of the aperture as expressed by a number indicating the amount of light transmitted through the lens).

Unlike the vast colors, tones and brightness found in nature, the Zone System recognizes the limitations of film and/or digital image processors and works within these limitations. Sadly, no single camera, lens or film available today can absolutely equal nature's immensity. However, by utilizing the techniques of the Zone System we can reproduce as precisely as possible, images that express the tonal ranges you could see in nature and communicate your own unique vision as a photographer.

Imagine a ladder. The bottom rung of the ladder represents pure black (Zone 0).

The top rung of the ladder represents pure white (Zone 9).

The mid-point of the ladder (Zone 5) represents “18% gray” – **middle grey** – or the accepted average reflectance of light from a given subject, which is interpreted by your camera's integrated light meter as the correct exposure for both B&W and color images.

The first thing you need to know is that exposure meters are dumb, really dumb. They are clueless about what they're photographing. They assume that all scenes have the same average tonal value — middle gray — roughly Zone 5. If a scene is different, for example a snow scene, it will be exposed incorrectly. It will come out middle gray — underexposed. If you follow the meter's average reading, every scene will have the same average middle gray density. You'll get lots of bad exposures, especially if you photograph in challenging light, as in beach scenes or snowy mountain scenes.

From the mid-point, Zone 5, each sequential step or zone represents a change of one f-stop.

Zone 4 requires an exposure of one f-stop less than your meter reading (or Zone 5).

Conversely, Zone 6 requires an exposure of one f-stop more than your meter reading.

Therefore, the entire Zone System encompasses a nine-stop differential, which is more than adequate to address even the most daunting high contrast scene in nature.

Now, let's add values to these Zones. These are values Ansel Adams associated with the Zones, shown below:

http://www.luminous-landscape.com/tutorials/zone_system.shtml

Zone 0 – key black or pure black – carbon or photo paper black.

Zone 1 – near black – shadows in faint light or rooms without light.

Zone 2 – dark gray/black – only subtle textures are visible.

Zone 3 – very dark gray – distinct shadow texture is visible.

Zone 4 – medium dark gray – slightly darker “black” skin, dark foliage or shadows in landscapes.

Zone 5 – medium gray or 18% gray – darker “white” skin or lighter “black skin,” light foliage or the dark blue of a clear blue sky.

Zone 6 – mid-tone gray – average “white” skin or shaded areas in snow on a bright, sunlit day.

Zone 7 – light gray – pale “white” skin, a concrete walkway in sunlight.

Zone 8 – gray/white, near white – distinct highlight detail, like a white wall in sunlight or brilliant surfaces in flat light.

Zone 9 – known as key white or pure white – pure white paper or snow in bright sunlight.



Zone	Description
0	Pure black
I	Near black, with slight tonality but no texture
II	Textured black; the darkest part of the image in which slight detail is recorded
III	Average dark materials and low values showing adequate texture
IV	Average dark foliage, dark stone, or landscape shadows
V	Middle gray: clear north sky; dark skin, average weathered wood
VI	Average Caucasian skin; light stone; shadows on snow in sunlit landscapes
VII	Very light skin; shadows in snow with acute side lighting
VIII	Lightest tone with texture: textured snow
IX	Slight tone without texture; glaring snow
X	Pure white: light sources and specular reflections

Remember your camera is calibrated to read middle gray as “correct” and assumes that is the desired amount of light reflectance. This is zone 5.

The Zone System eliminates this problem by assigning these familiar “values” to each zone. The key to success with the Zone System is to **carefully pre-visualize** your subject and apply the correct Zone values to the important exposure areas. Then, you must adjust your exposure settings accordingly to accurately produce the results you want.

Let’s say you are on vacation and want to take a photo of snow-covered mountain in the Eastern Sierras. It’s a typical sunny day in California. You take a spot meter reading of the snow, which suggests a shutter speed of 1/500 and a corresponding aperture of f/16. If you snap the photo using these settings, the resulting image will be dull middle gray (Zone 5) and discarded as muddy.

According to the Zone System, snow in bright sunlight falls under Zone 9, which is four stops above Zone 5, or mid tone gray. Therefore, you must first open up four stops to f/4 and shoot at 1/500. Now, your photo will clearly show the brilliance of the white snow under the California sun.

What should you do if you want to photograph an interesting rock formation with a bright blue sky and fluffy white clouds in the background? The rock formation is moderately shadowed with lots of texture. You want to bring out as much detail in the rock formation as possible.



54 The Zone System



Ansel Adams
Silverton, Colorado

The print values are shown on the scale. The photograph was taken into the sun, and the maximum luminance was the glare from the roofs on the left. These approach Value X in the print, and were above Zone X on the exposure scale. The lowest value on the shadowed fence about was on Zone II.



You take a meter reading of the shadowed areas of the rock, which indicates a shutter speed of 1/60 with an aperture of f/2.8.

Then, you take a reading of the sky, which indicates the same shutter speed but an aperture of f/16. Keep in mind that in high contrast scenes, using film, shooting **negatives** – you would expose for the shadows if you want to reveal the shadow details.

Sometimes this means sacrificing some of the highlights in your subject landscape. You decide that the shadowed areas fall within Zone 2.

Therefore, you must stop down three stops and shoot at 1/60 at f/8. Of course, this means that you will lose some of the highlight detail from the bright sky. Don't despair. All is not lost.

Recall that the Zone System integrates nine f-stops. Yet, the latitude or exposure range of most readily available film varies from a low of three f-stops to a high of seven f-stops. Likewise, photo paper, in general, has a range of no more than five f-stops.

f/1, f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, f/32

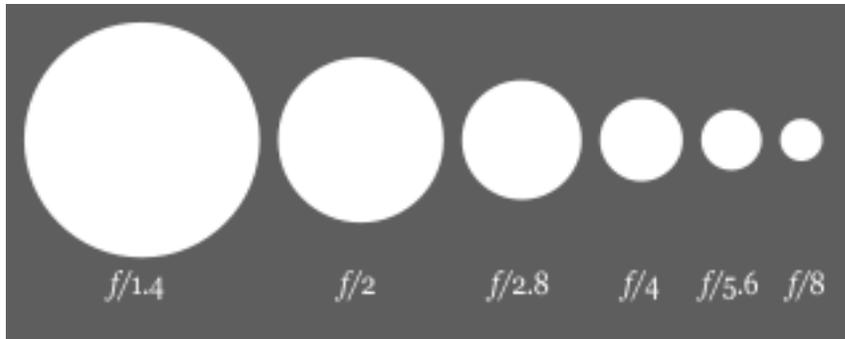


Diagram of decreasing apertures, that is, increasing f-numbers, in one-stop increments; each aperture has half the light gathering area of the previous one. The actual size of the aperture will depend on the focal length of the lens.

How, then, can you compensate for the limited latitude of film and photo paper? The Zone System incorporates both exposure AND development techniques. Ansel Adams used large format “sheet” film affording him more control over the development of each individual negative.

By varying development time, plus or minus according to a comparative f-stop scale, Ansel Adams was able to effectively defy the limited latitude of his film and photo paper.



Moonrise over Hernandez, New Mexico

Back in the film days, when you were dealing with **negative film**, tonal values were manipulated by exposing for shadows and developing film for highlights. Concentrating on the range of brightness in a given image negative, Ansel Adams established the following development scale:

Normal development time, plus 100% @ 3 stops

Normal development time, plus 50% @ 4 stops

Normal development time only @ 5 stops

Reduce normal development time by 20% @ 6 stops

Reduce normal development time by 40% @ 7 stops

You can further manipulate bright and dark areas by *dodging* and *burning in* areas that are too dark or too light in your image.

Burning in refers to darkening specific areas of your image. Dodging refers to lightening specific areas of your image.

For digital applications, you can use the tools in Adobe Photoshop. For film, you can appropriately mark your prints for these advanced development processes.

By employing both the exposure and development techniques of the Zone System, you will be able to produce amazing images like those of the masters. Ansel Adams was, indeed, an innovator. He popularized a unique and valuable tool, in fact, a legacy for all photographers.



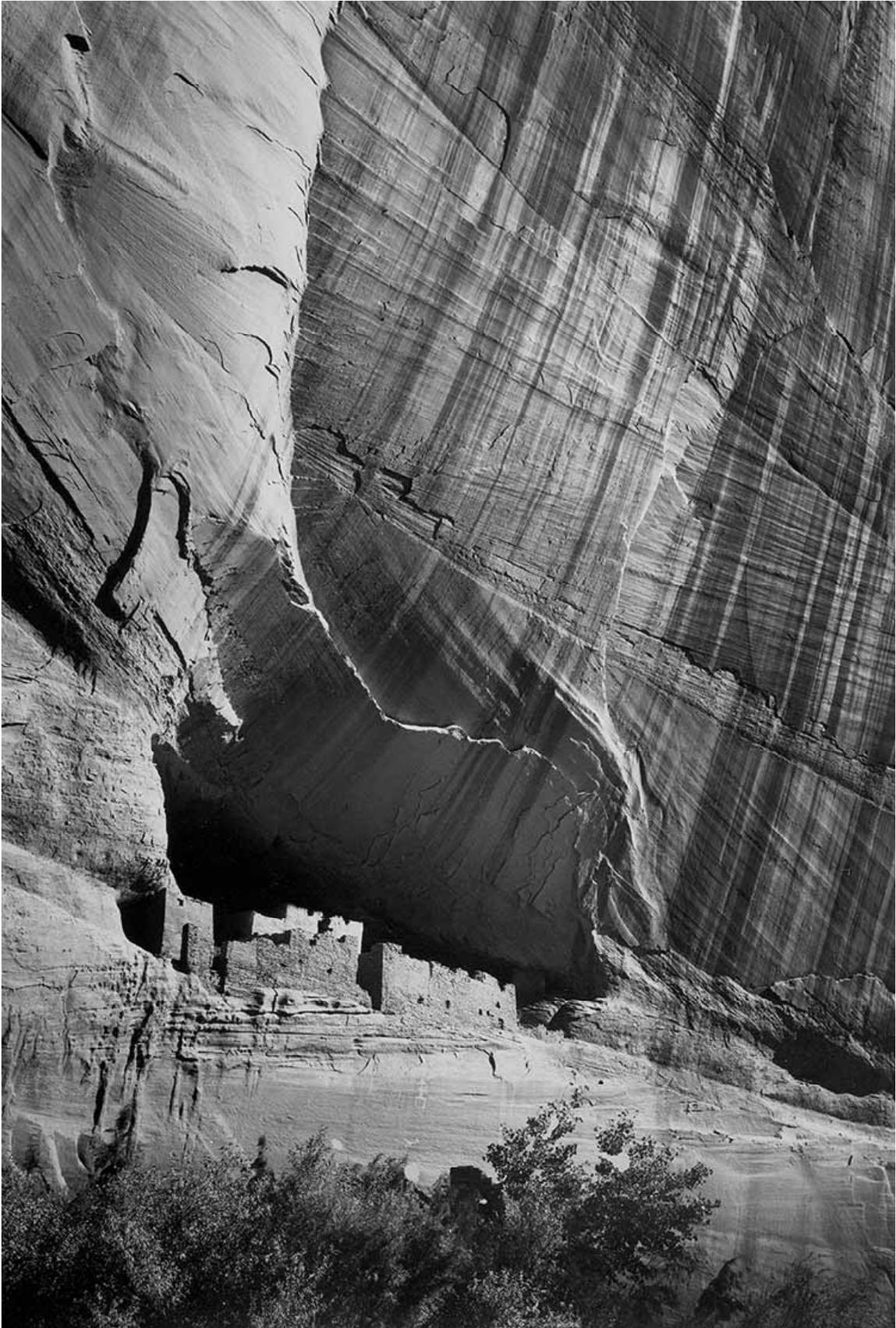
Cathedral Peak and Lake, Yosemite

I hope this article will help you to realize that the Zone System is not complicated or mysterious at all. It merely requires a reasonable investment in time, effort and careful but straightforward calculations to achieve extraordinary results. If you are wondering whether or not the effort is worthwhile, simply take a look at a few of Ansel Adam's photographs.



Discussion:

Norman Koren, http://www.luminous-landscape.com/tutorials/zone_system.shtml



Ansel Adams and Fred Archer popularized the zone system in the late 1930's in order to translate the range of brightness in a scene to the tonal range of a print, via the camera.

Why is this still relevant for digital photographers?

You have even more tools to adjust tones. Metering still exists; you as a photographer would shoot on Manual and control exposure based on the spot metering system that is built into your camera.

You still must shoot with purpose and intention. These rules still apply.

Instead of the chemical darkroom, you have a digital darkroom as an integral part of your creativity – your image editor, i.e.: Adobe PhotoShop.

We as photographers have unique ideas about how an image should look tonally. The Zone System allows for this individuality in the black and white world. Used successfully, the Zone System will ensure that the print matches the way you see the scene, which may differ from the way someone else may see the same scene.

Another benefit of the Zone System is that it allows for the fact that the paper you print on has a narrower range than the camera's dynamic range.

What is dynamic range?

Dynamic range is basically the range of input a device can capture.

The human eye can see a wide range of light from the brightest sunlight to the dimmest moonlight. The range of human vision far exceeds that of most cameras and print materials.

Because the dynamic range of film (the old days) and digital capture is more limited than what the human eye can see, photographers must be selective about what is important in a scene, and make exposures with this scale of limitations in mind.

Like film, if a part of a digital image receives too much light or over exposure, that portion falls beyond the sensor's recording ability – resulting pure white. That portion is “blown out,” holding absolutely no image data. Refer to zone 9 using the zone system. PhotoShop would record that area as 255 in an 8-bit world, as no pixel value resulting in no image detail.

The converse is true if part of the image receives too little light, and the capture data will fall below that which the sensor can record on the other end of the scale. The result is pure black. PhotoShop would record that area as 0. This would be zone 0.

A recognizable image – with some detail – is only recorded if the light hitting the film (old days) or digital sensor falls between a range of 5 F-stops. This is the approximate dynamic range of digital capture.

Exposing for digital capture is different than exposing for film, as digital cameras handle highlight and shadow information differently than film cameras did. With digital capture, extreme overexposure effectively saturates highlight information beyond recovery, and underexposure pushes shadow information and detail into noise.

What's the best strategy for exposure?

Expose for the highlights, reversing the rules of the film days – that taught us to expose for the shadows and develop for the highlights. If you have learned the Zone System in the film days, and practiced exposing for Zone 3, reverse it, as you are effectively shooting **positive** film using digital technology. Expose for the areas where you begin to see details in the highlights, as in Zone 8.

Why bother?

How does this relate to the digital photographer?

If you understand and practice the zone system, you can visually see your image results before you push the button. There are no lucky shots. You are in control of the tonality of the image.

As Ansel Adams states, in his book “The Negative:”
“...Visualization is a conscious process of projecting the final photographic image in the mind before taking the first steps in actually photographing the subject.”

You become aware of your vision's potential as an expressive image.

There are no longer any “lucky shots.” You are responsible for your own image...your photos no longer “come out,” as beginners' images might. Every image you create was done with a purpose.

In practice: Place your spot meter on the part of your image that you would like to be bright, yet hold some highlight detail. This would be "Zone 8." Take a reading. Know your camera's sensor sees mid tone grey, or what would be Zone 5. *Over expose by 3 stops.*

So, if the spot reading on that part of the image you want to be zone 8 portion states (the sunny part of a snowy mountain where you want to hold detail) reads:

F/22, assuming shutter speed is 1/1000 at ISO 200...

Where would you place your F-stop?

You will be shooting on MANUAL, using the SPOT METER function on your camera.



Answer: F/8, opening up by 3 F stops.

If spot meter on zone 8 snowy mountain highlight results in a reading of F/22, assuming shutter speed is 1/1000 at ISO 200

f/1, f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, f/32

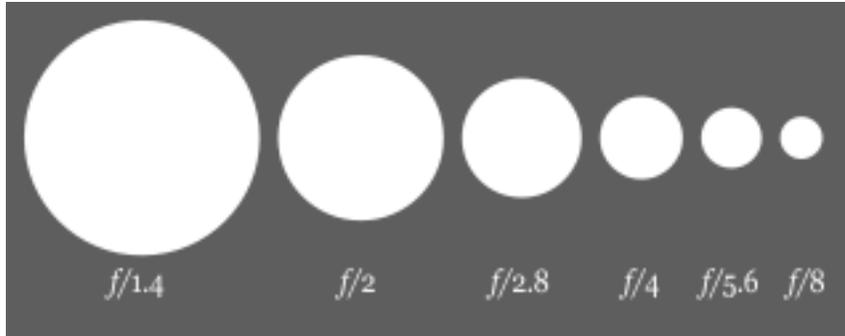


Diagram of decreasing apertures, that is, increasing f-numbers, in one-stop increments; each aperture has half the light gathering area of the previous one. The actual size of the aperture will depend on the focal length of the lens.



Conclusion:

Use the techniques of the Zone System to your advantage. You can reproduce as precisely as possible, images that express the tonal ranges you see in nature and communicate your own unique vision as a photographer. Pre-visualize.

You will manually adjust your exposure settings accordingly to accurately produce the results you want.

Use two exposures of the same scene if you have to, and piece them together and control your own “HDR” photography. Do not necessarily rely on the algorithms presented by PhotoShop, instead take control of the tonal ranges you want to see. Select the zones you want to best

display the shadow detail and for highlight detail you need, then knit your image together using your own exposure readings, using your own vision.



Go to: **Increasing Dynamic Range** (in Practice).

References:

Balsman Photography, LLC

<http://sergykalstudios.blogspot.com/2006/07/demystifying-ansel-adams-zone-system.html>

Norman Koren http://www.luminous-landscape.com/tutorials/zone_system.shtml

Ansel Adams, The Negative (1981)

Michael Freeman, Mastering Black and White Digital Photography (2006), The Zone System Pp. 86–89

Leslie Alsheimer, Bryan O’Neil Hughes, Black and White in PhotoShop CS3 and PhotoShop Lightsome (2007), Dynamic Range Pp. 39–41