

PHOTOGRAPHY:  
TRICKS OF THE TRADE

# Exposure Mythology

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## Agenda for the evening

- Welcome and introductions
- Overview of general problems in photography
- Components of exposure
- Review of the histogram as an exposure tool
- Consider exposure “rules”
  - What the rules are
  - When to break the rules
- Difficult exposure issues
- Using camera exposure modes
- Wrap-up by 8 PM

## Camera Characteristics

- Type (phone, Point-and-shoot, super-zoom, mirrorless (MILC), Single lens reflex (dSLR))
- Brand
- Shooting modes – Auto, Program, A, S, Manual, Bulb
- Image capture - RAW or JPEG
- Sensor – size, pixels, resolution, sensitivity, digital noise
- ISO range
- Shutter speed range
- Burst rate
- Other bells and whistles



## What ruins a photo?

- Unintentionally blurred image
  - Out of focus
  - Subject moves
  - Camera shake
- Improper exposure
  - Over-exposure
  - Under-exposure (sometimes fixable in PP)
- Poor composition
  - Lack of subject, foreground, background
  - Complicating / distracting components

Modes  
and the  
histogram  
may help

## Learning Objectives

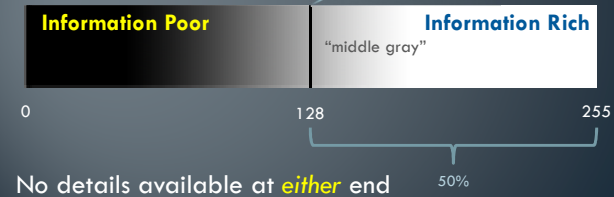
At the end of this session, you will be able to:

- Explain the role of the histogram in photography
- Identify complex or difficult light situations
- Use the exposure triangle to optimize capture
- Discuss exposure rules and when to break them
- Use the camera as a light meter / use exposure modes
- Use exposure compensation to alter camera settings
- Identify solutions for high, low, and mixed light conditions

## Luminosity

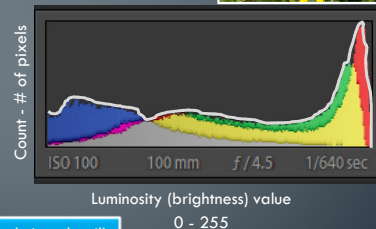
Defined for every pixel  
(Red, Green, Blue)

- Degrees of brightness (8 bit;  $2^8$ ; 256 levels)
- 0 = pure black
- 255 = pure white



## The Histogram

- Key to exposure and contrast
- Myth? - Shoot to the right
- Key: Don't blow-out the whites



8-bit JPEG files  
are capable of  
 $2^8 = 256$  tones

Red - Cyan  
Green - Magenta  
Blue - Yellow

0 = black (no resolution, detail)  
255 = white (no resolution, detail)  
1 - 254 = shades of gray

## Chimping in the field

- Make sure image was captured
- Check the general composition
- Check the focus
- Determine the best exposure for your image
  - The histogram!

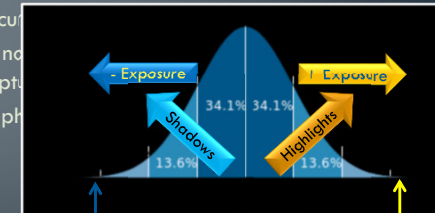


## The myth of a bell-shaped curve

- A statistically 'normal' distribution is a bell-shaped curve
  - Mean, median, and mode are equal
  - About 68% of values are within 1 standard deviation
  - About 95% of values are within 2 standard deviations
  - About 99% of values are within 3 standard deviations
- The bell-shaped curve describes a 'normal' population
- Photographs are not 'normal' so a bell-shaped curve is not a goal
- There is no ideal photographic histogram

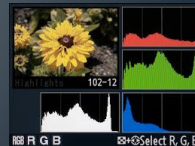
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## In Camera and Post-processing

- Histograms are everywhere!
- Luminosity and RGB graphs in camera
- Basic image control in Lightroom and Cameraw
- Grid and Loupe views in Library module in Lightroom
- Develop module in Lightroom
- Tone curve in Lightroom / Photoshop



## Exposure Control Triangle

- Three elements control exposure
- ISO sets sensor sensitivity
- Aperture controls amount of light
- Shutter speed controls duration of exposure

Any change in one factor requires an equal and opposite sum change in the other two factors

One "stop" or EV (exposure value) implies a doubling or halving of exposure.

## Stops or Exposure Values (EV)

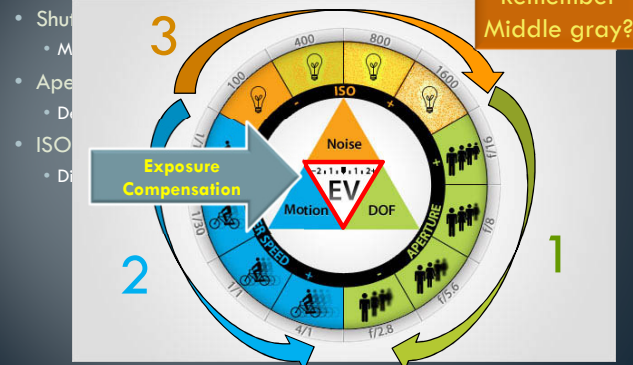
- A 1-stop increase doubles the effective exposure
- A 1-stop decrease halves the effective exposure
- Effective exposure is influenced by ISO
  - Doubling ISO doubles effective exposure
- Shutter speed influences exposure
  - Doubling shutter speed doubles effective exposure
  - Remember shutter speed is usually a fraction of a second
  - 1/100 sec is half as long exposure as 1/50 sec
- Aperture size influences exposure
  - A 1-stop increase doubles effective exposure
  - A 1-stop decrease halves the effective exposure
  - Remember  $f/2.8$  is large and  $f/22$  is small

## Exposure Control

- Shutter speed – How long is the exposure?
  - Motion blur
- Aperture – How much light gets to the sensor?
  - Depth of field
- ISO – How sensitive is the sensor?
  - Digital noise (grain)

Michael Zhang – PentaPixel 10-3-12

## Exposure Control



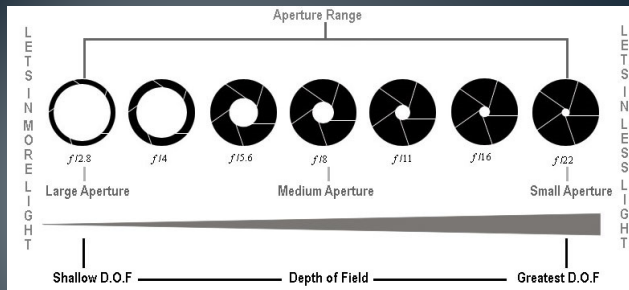
Michael Zhang – PentaPixel 10-3-12

## Aperture Influences Exposure

- Aperture is measured in  $f$ -stops
  - A larger aperture has a lower  $f$ -number
  - A smaller aperture has a higher  $f$ -number
- $f$ -stop is a fraction comparing the minimum diameter of the lens to its focal length
 

$$f = \text{focal length} / \text{minimal diameter of light path}$$
- A “fast” lens has a smaller  $f$ -number
  - $f/2.8$  is twice as “fast” as  $f/4$
  - $f/2.8$  is 4x as “fast” as  $f/5.6$





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## Mode Selection

- **Auto** (Green zone)
  - Camera metering determines optimal ISO, shutter speed, aperture, and flash
- Professional
  - Set the ISO and camera metering determines optimal combinations of shutter speed and aperture; photographer chooses the combination
- Time / shutter speed priority\*
  - Set ISO and shutter speed and camera metering determines the optimal aperture
- **Aperture priority\*\***
  - Set ISO and aperture and camera metering determines the optimal shutter speed
- Manual
  - Set the ISO, shutter speed, and aperture using the through the lens or remote light meter
- Bulb
  - Set ISO and aperture and depress the shutter for the time estimated to produce proper exposure

\* = S (Nikon) or Tv (Canon)

\* = A (Nikon) or Av (Canon)

## Mode Selection



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## The myth of **Auto** Mode

- **Auto** mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - Camera determines aperture, shutter speed, and ISO
  - Camera may activate internal flash (unless set to always off)
  - No exposure compensation for variation in subject light
- **No** creative control of camera

## The myth of Program Mode

- Program mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set best combination of aperture and shutter speed
  - Camera sets ISO
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
- Very limited creative control of camera

## The myth of Shutter-priority Mode

- Shutter-priority (Tv) mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set shutter speed; camera sets aperture
  - ISO is pre-set (unless in auto-ISO mode)
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
- You control motion blur

## The myth of Aperture-priority Mode

- Aperture-priority (Av) mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture; camera sets shutter speed
  - ISO is pre-set (unless in auto-ISO mode)
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
- You control depth of field

~80% of  
“advanced”  
photographers

## The myth of Manual Mode

- Manual mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture, shutter speed, and ISO
  - Exposure compensation using in-camera light meter
- You have complete creative control of camera
- You see the light meter in your camera
- You gotta make lots of decisions quickly

## The myth of Auto-ISO Mode

- Auto-ISO mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture and/or shutter speed according to your mode dial selection
  - Camera adjusts ISO – you may set highest ISO and longest shutter speed
  - Exposure compensation using in-camera light meter
- You choose best shutter speed or aperture
- Camera ‘helps’ with highly variable lighting

## Myths of Aperture Selection “Rules”

- $f/8$  and be there
- Bryan Peterson’s critical  $f$ -stops
  - $f/2.8$  to  $f/5.6$  – shallow depth of field to simplify background
  - $f/16$  to  $f/22$  – wide depth of field for landscapes
  - $f/8$  to  $f/11$  – who cares?
- Sunny  $f/16$  rule
  - On a bright day shoot  $f/16$  at a shutter speed =  $1/\text{ISO}$
  - Not important as a rule but very helpful when adjusting exposure
  - Example: What shutter speed do I use at  $f/22$ ? At  $f/4$ ?

## $f$ -stop Pro and Con

### High $f$ -stop

- Small aperture
- Wide depth of field
- Slow shutter speed
- Star-effect in bright light
- Motion effects
- Diffraction softening

### Low $f$ -stop

- Large aperture
- Narrow depth of field
- Fast shutter speed
- Freeze action
- Minimize camera shake
- Corner softening

## Use your camera histogram

- “Shoot to the right”
- No blown-out whites
  - Watch for ‘blinkies’
- May have some clipped blacks
  - Handle in post-production editing
- Negative EC for “blown” whites
- Positive EC for blacks



## Myths of Post-processing / Editing

- Exposure / luminosity – intensity of light
- Contrast / tonality – range of luminosities
  - White & black points, highlights, shadows
- Blown whites are gone forever
- Can recover highlight and shadow detail
- May recover blacks
- Digital noise reduction

This is where  
the histogram helps.

## Camera Exposure Modes

~~Aperture / Program~~

- Aperture priority (A, Av)
- Shutter priority (S, Tv)
- **Exposure compensation**
- Manual

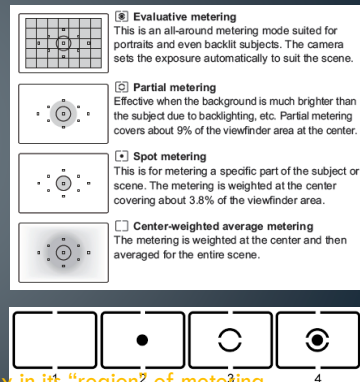
Difficult  
Lighting

### Your Camera's Exposure Dials



## Camera Metering Modes

- Evaluative / Matrix
- Partial (Canon)
- Spot
- Center-weighted



Each assumes 18% middle gray in its "region" of metering

## Filter Considerations

- UV or Haze filter
  - Controversial – lens protection / light effect
- Circular Polarizing Filter (CPL)
  - **Only effect that cannot be done in post-processing!**
- Graduated Neutral Density (Grad)
  - Soft or hard edge transition
  - Usually 2-3 stops reduction
- Neutral Density
  - Fixed 2 or 3 stops reduction
  - Variable 1-8 stops reduction
- Color correction – not needed with post-production



## Difficult exposure situations

- Bright sky – either clear blue or overcast
- Harsh mid-day light
- Back-lighted subject
- Shooting into the sun (sunrise/set, silhouette)
- Shooting into the sky
- Dark conditions (interior, dense shade)
- Harsh shadows (variable light)

## Difficult Exposure Summary

- If reflections (minimizing them) and colors are most important, control the incoming light by using a filter.
- If motion effects are a priority, set your shutter speed first.
- If low noise is vital, set a low ISO and balance the other factors from there.
- If depth of field is critical, give preference to aperture.

[Jason D. Little](#)

## Exposure Key Points

- Histogram is your primary exposure guide in-camera
- Expose to the right but don't blow-out the whites
- Histogram is your primary guide to exposure, white point, black point, highlights and shadows control
- Choose your camera mode for your subject
- Use the most effective metering mode for your image
- Remember the limitations of post-processing



## Good to Great Photographs

- Good photographs
  - Proper exposure
  - Sharp focus
  - Nice composition
  - Good subject
- Great photographs
  - Emotional impact / visual tension
  - Creativity and style
  - Feeling and emphasis
  - Seeing and understanding
  - Unique perspective / lighting

## Summary

- The Teton Photography Group and Art Association of Jackson Hole thank you for joining us today and invite you to future presentations
- Enjoy your photographic opportunities
- Understand your photography gear
- Critically review and share your images
- Experiment with new techniques and perspectives
- Learn composition techniques
- Practice, practice, practice but most of all enjoy making photographs

Thank you for joining us!