



Photography Knowledge Sharing

The Basics Using a Modern DSLR

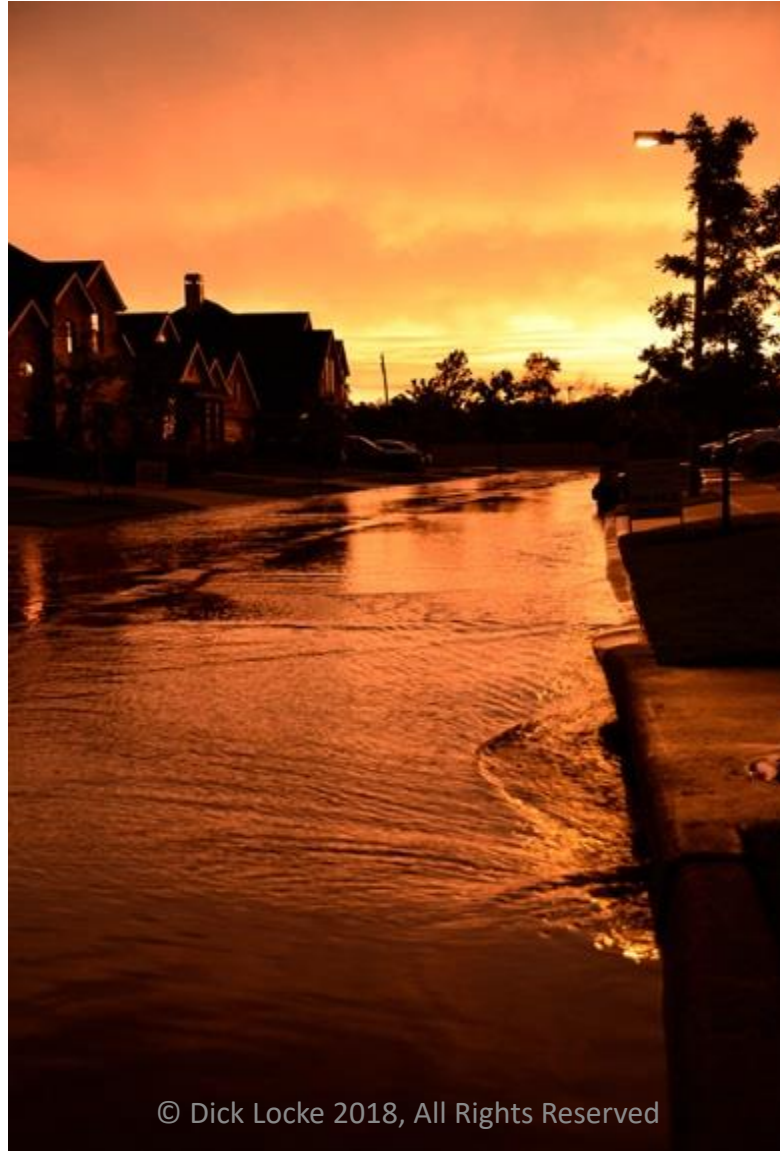
Richard Locke

DSLR Basics: A Great Time to Learn

- Get out your camera if you'd like
- Hands-on is best
- Lessons from 30+ years of photography
- I wish that I knew what I know now!
- Easy to learn photography today...
 - Some effort required
 - Work \sim Rewards

Practical Advice: Take Lots of Pictures

Sunsets are a Great for Practice

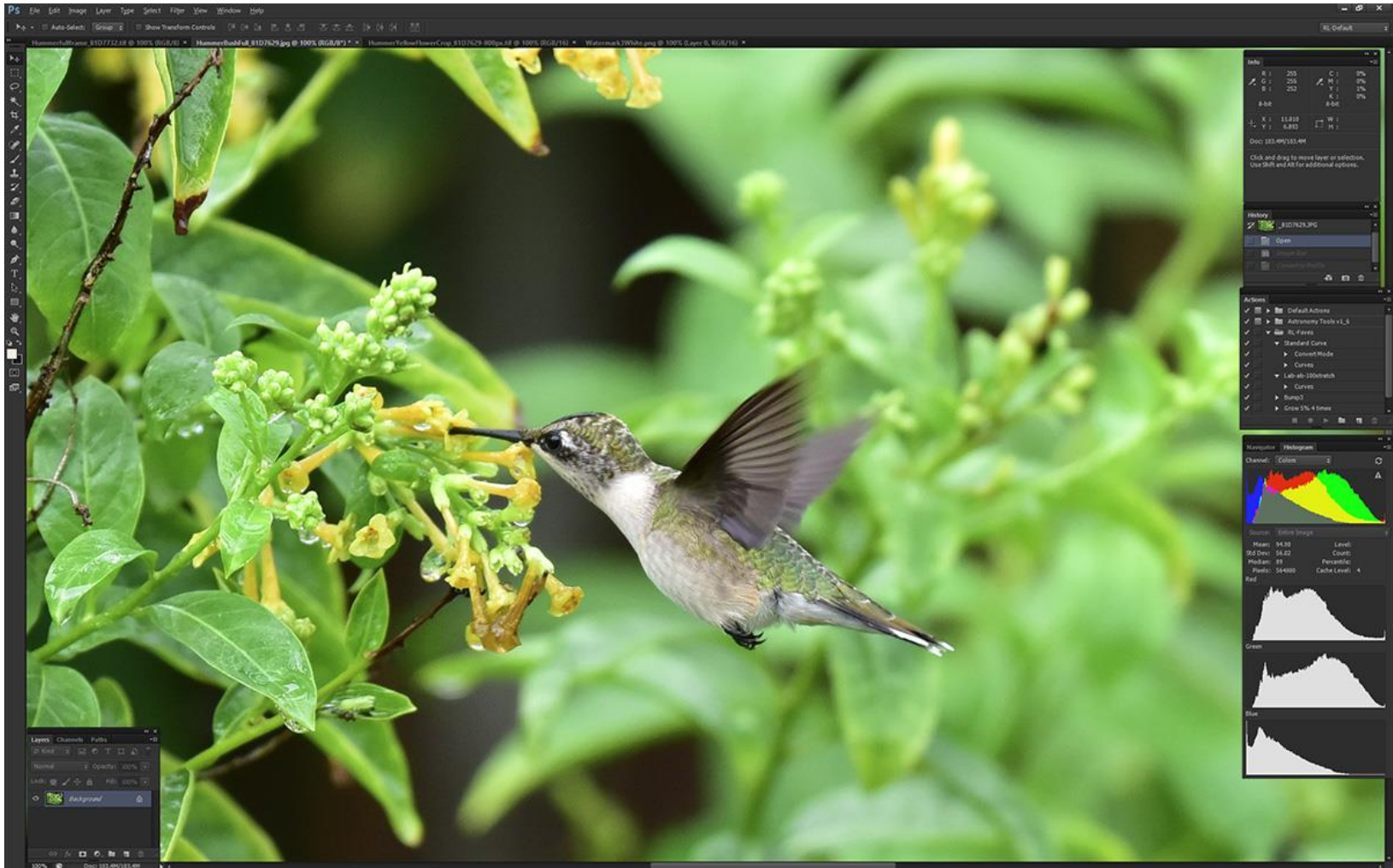


Kids & Pets are Great Subjects!



Try with and without flash

Examine Your Photos at 100% Magnification and Learn from “Mistakes”



Agenda

- Knowledge is power – take control of your camera
- Technical elements of photography
 - Pixels & histograms
 - Equipment basics: Cameras and lenses
 - Exposure, focusing, file types
- Producing good photos
 - How to take the best possible photo with the equipment I have
 - Workflow & processing basics (half the battle)
 - Practice & what to photograph
- Equipment revisited

Poll

Biggest problem with your pictures?

1. Blurry, or not sharp
2. Too bright or too dark
3. Problem with the subjects, e.g. eyes closed
4. Colors don't look right

Early Look

Exposure Settings – Exposure Triangle

1. Shutter Speed – how long is the exposure?
2. Aperture – how much light per exposure?
3. ISO – controls the camera's sensitivity to light – can be thought of as gain

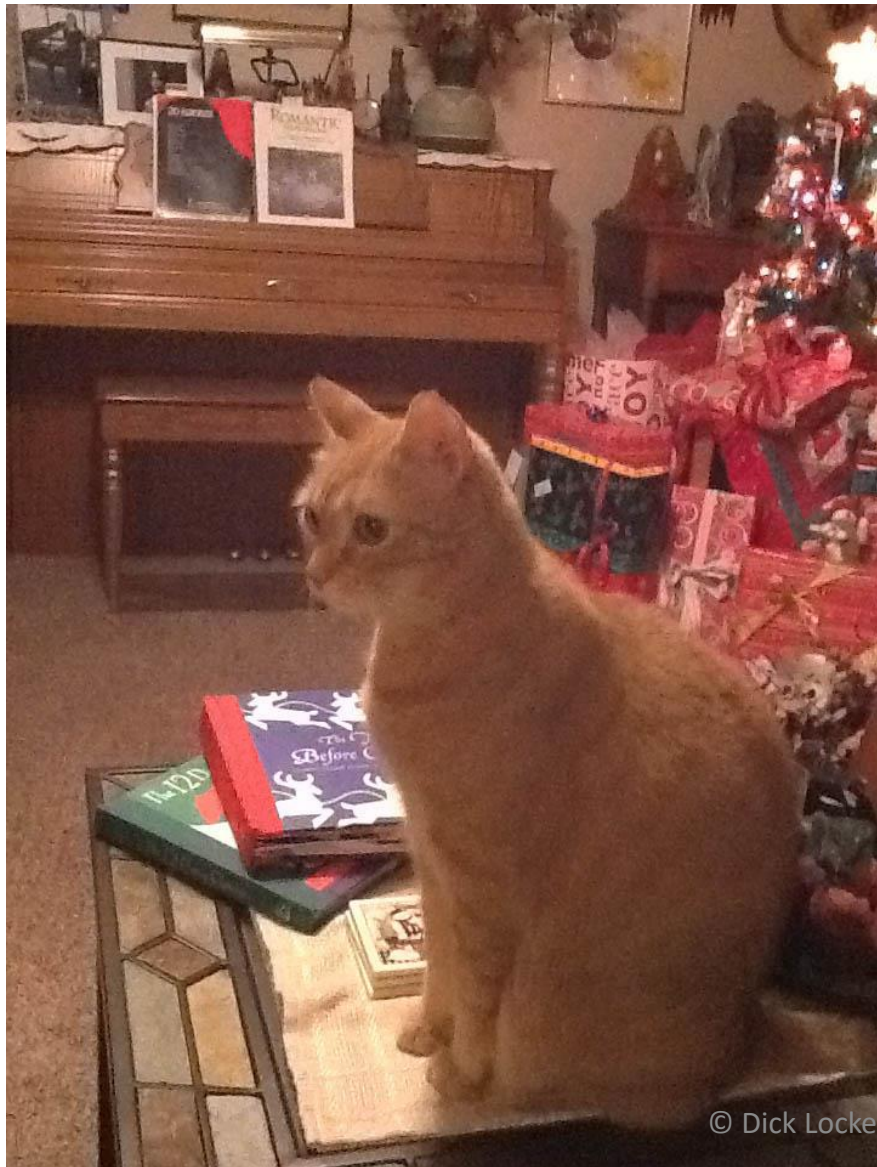
Practical Advice: Be Prepared

1. Always leave your camera ready to shoot with good general purpose settings
2. Leave it on (but verify doesn't drain battery)
3. Sometimes there's only one chance
4. If you're a beginner "dummy" mode may be good
5. After this class there may be better options

Cameras

Do I Need a Camera?

iPad 2



Camera



Above: Nikon D7000, 18-200mm VR, f5, 1/20s, ISO 1600, Matrix metered, no flash, Tungsten (2850 K) white balance (indoor light).

Left: iPad 2

Cameras Are Really Smart! Can't I just point and shoot?



Above: Camera's "correct" exposure.

Right: Best save via Photoshop



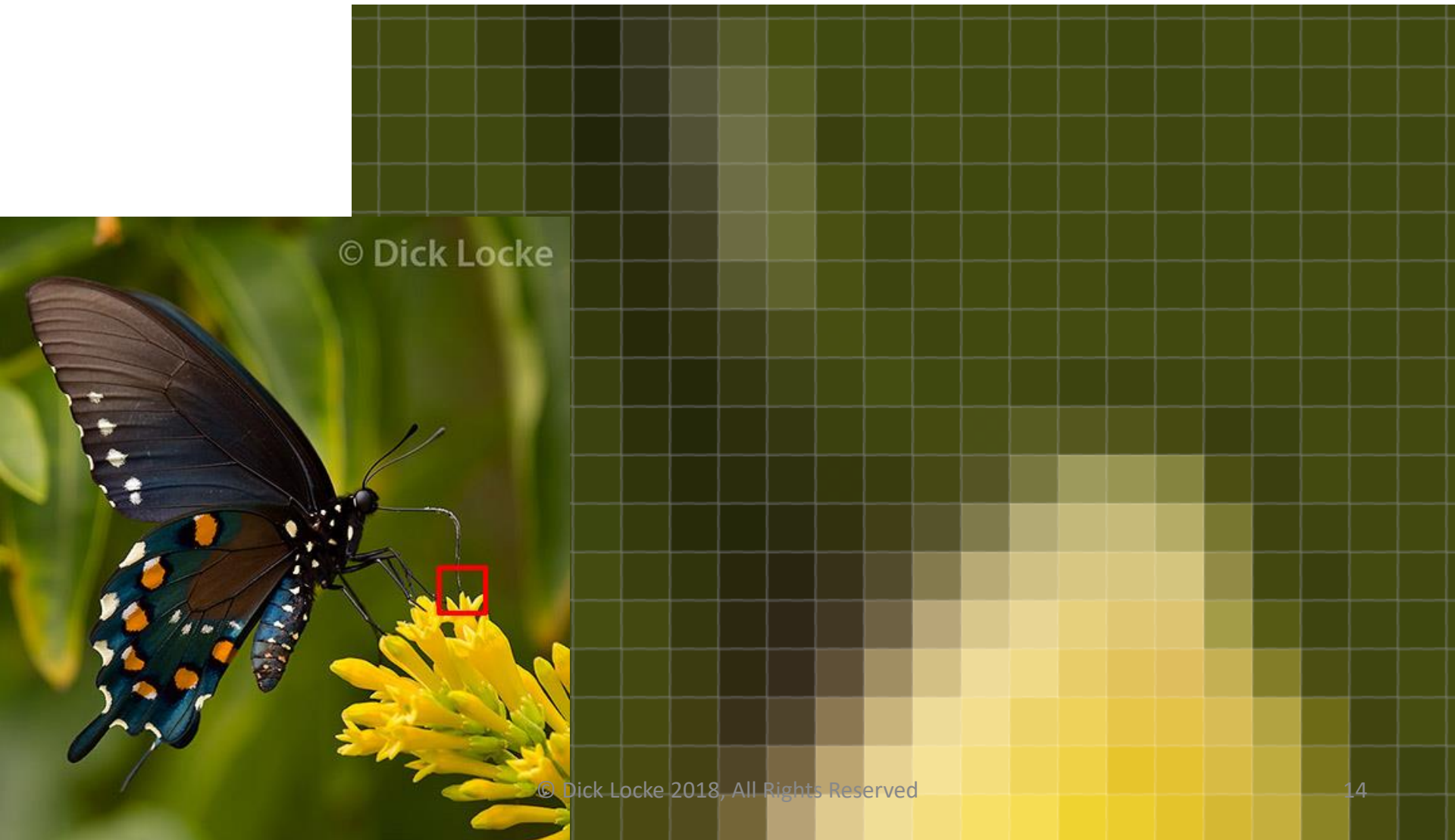
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What you really want

DLSR Cameras

- Film DSLRs were [amazing machines](#) for their time
- Modern cameras are truly incredible
- Key specs example: Nikon D750 DSLR (\$2k)
 - 24.3MP FX-Format CMOS Sensor
 - This is a “full frame” sensor, ~24x36mm
 - 6016 x 4016 pixels
 - Most “consumer” DSLRS have a smaller sensor with a 1.5x (Nikon) or 1.6x (Canon) crop factor
 - Native ISO 12800, Extended to ISO 51200
 - Excellent low-light performance
 - Shooting up to 6.5 fps & “fast focus” features
 - Build quality/the bells and whistles
- [Wikipedia diagram](#)

Pixels



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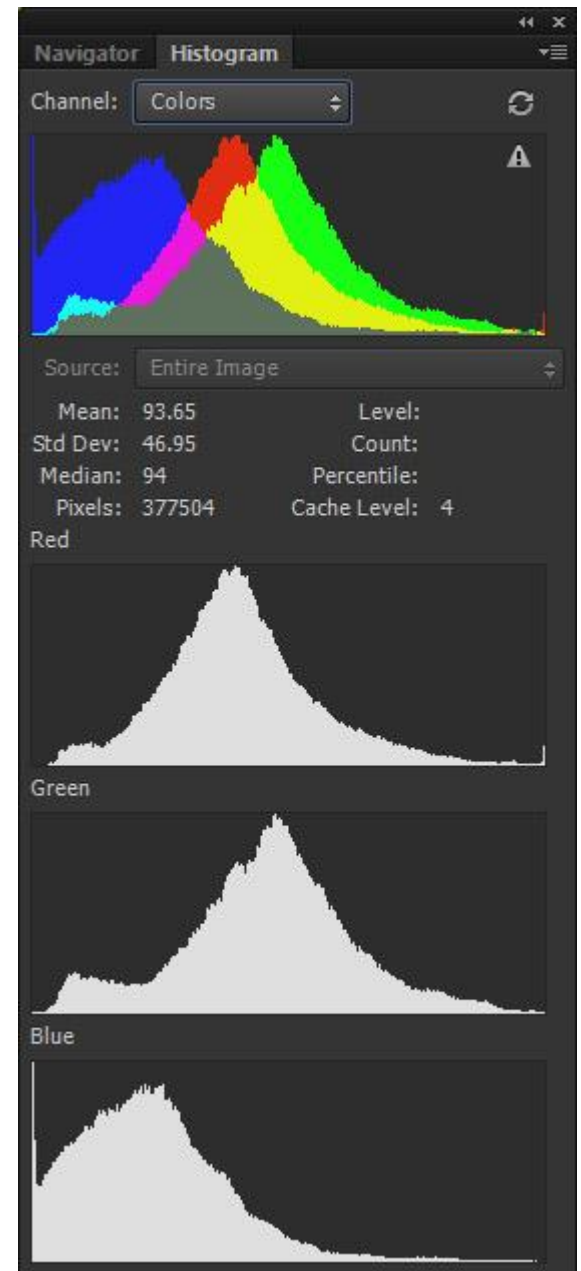
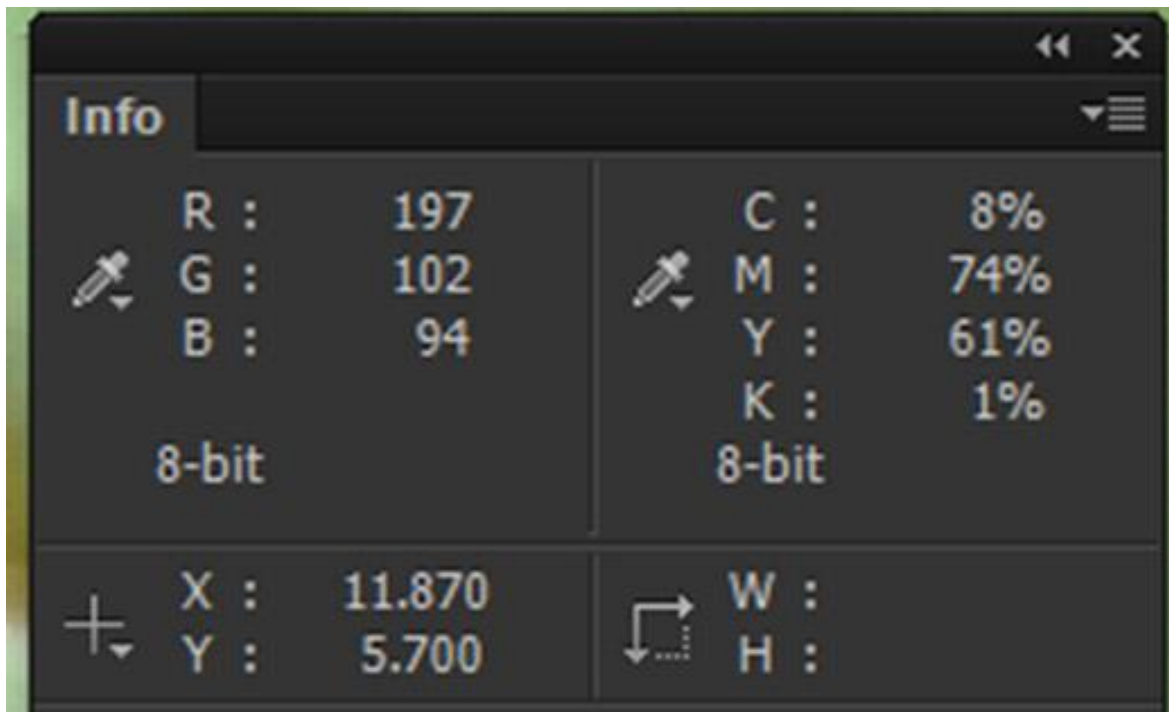
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What is a Pixel?

- Camera images are composed of millions of pixels (Megapixels or MP)
- Pixels have numerical color values for Red, Green, and Blue (RGB)
- 0 = none, 255 = max “brightness”
- Black = 0,0,0
- Gray = 128,128,128 (all #'s = is always gray)
- White = 255,255,255

Histograms Graph Pixel Values (Right)

Photo Editors show single pixels or grouped samples as RGB values (Red, Green Blue) (Below)



What Makes a Good Picture?

(Much more than a good camera...)

- **Interesting subject**
 - Technique matters, but subject is king. As National Geographic photographer Jim Richardson said, *“If you want to be a better photographer, stand in front of more interesting stuff.”*
- “Technical” considerations
 - Good focus, subject is not blurry
 - **Focus on the eyes of people and animals**
 - Viewers perceive picture in focus when eyes sharp
 - Subject **exposed properly**, based on artistic intent
 - Sharp, noise (“grain”) minimal or controlled
 - Use the full “dynamic range” (light to dark)

What Else Makes a Good Picture?

- Composition
 - Free from distracting elements
 - Often a shallow depth of field is desirable
 - Post processing can help but can be very time consuming
 - Artistic considerations
 - Rule of thirds
 - Cropping is your friend
- Colors are pleasing
 - White balance settings control some of this
 - Post processing can almost always improve colors

Example: Composition & Distractions



Back to Cameras – 2 Types

- Full Frame (Prosumer to Pro Bodies)
 - Bigger pixels = lower noise, better in low light
 - Wider field of view
 - Easier to find and frame objects that move!
 - Pro features & generally better image quality
- Crop Body Benefits (Consumer to Pro-ish Bodies)
 - Cost usually much lower (bodies & lenses)
 - More apparent reach at telephoto end (1.5 or 1.6x)
 - Lighter, easier to carry
 - Can use both crop and full frame lenses
- All Modern Cameras Are Terrific

Digital Camera Evolution

- Trend to more megapixels
 - We really have enough, maybe more than enough
 - ([Ken Rockwell's thoughts here](#))
- More value
 - Lower costs especially for consumer models
 - More features & capabilities
 - Better camera firmware
- Better sensors for low-light performance
 - Focusing (especially with higher-end cameras)
 - In-camera image processing

D750 Low Light Image



Summer Milky Way & Satellite Flash

Tripod Mounted! [Nikon D750, 14mm on the 14-28mm lens, F2.8, ISO 1600, 30 second exposure.](#)

D200 (Release 2005) Low Light



Summer Milky Way: Nikon D200, 18-200mm lens at 18mm at f5, ISO 1600.

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We've Come a Long Way Baby! Nikon D100, Release 2002

Ten Years Ago...

You have Canis Major, the big dog, on the left. Sirius, the brightest star in the sky, shines brightly in the dog. The dog follows Orion, the hunter. The hunter is after the Taurus, the bull. Jan 3, 2006, about 2:00 a.m. local time. Fixed tripod, Nikon D100, 30 seconds, ISO 1600, Sigma 14mm lens at f3.5.

Practical Advice

- Invest in the best camera you can afford...
 - But lenses are more important
- 1-3 year old used or refurbished camera bodies for best value
- If you upgrade your camera you can
 - Sell your old body on ebay
 - Keep it as a backup

Lenses



Wide Angle 17mm



Full Frame film image with a cheap and bad Sigma lens – but not a bad picture

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Moonset – 300mm (450mm effective)



Nikon D7000, Nikon 300mm f4 lens at f4, 1/8s, ISO 1600. This is from my [West Texas 2012 trip.](#)

Lenses Control the Field of View

- Lens Focal Lengths – “full frame equivalent”
- **Control the field of view** and “zoom” (along with your feet)
 - **50mm** = about what our eyes can see (all-around lens)
 - 14-28mm (wide-angle, scenic shots, interiors)
 - 70-135mm short telephoto (portraits)
 - 200-800mm, telephoto (birds & wildlife, maybe bugs)
 - 400-3,500mm (telescope range)
- Multiply above by your camera’s crop factor

Zoom vs. Prime Lenses

Zoom Advantages – variable focal length

- Convenience
- Some are as sharp as primes
- May be cheaper than multiple primes

Prime Advantages – one focal length

- Better image quality
- Cost vs. fast zoom
- Smaller f-numbers
 - More control over depth-of field
 - Better for low-light

Teleconverters

- Teleconverters extend the focal length (1.4, 1.7, 2x) – at a cost
 - 1.4x reduces light by one stop, slows focusing
 - Image quality is reduced with a TC (20-30% or more)
- Good ones are pricey
- Stop down the lens for best results

Macro Lenses Excel for Close-ups

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Close-up Lenses

- Macro lenses allow close focusing & high magnification
 - 50mm (inexpensive, but you have to get very close)
 - 90-200mm (more working distance for bugs etc.)

Long Lenses Can Work for Bugs



300mm & up focal lengths can work well for bugs

Lenses: The Weakest Link?

1. The user is typically the weak link in the imaging chain
2. Lenses usually come next
3. In a properly recorded image, most flaws originate from your lens, not your camera
4. Lens design is subject to the laws of physics
 1. No lens is perfect, just a blend of design choices
 2. Trade-offs include **cost**, **weight**, zoom range, **aperture range**, sharpness center, sharpness corner, vignetting, distortion, target sensor size, build quality
5. Lenses vary from sample to sample
6. You generally get what you pay for
7. Any lens can produce a good picture within its limitations

Aperture – Brief Intro WRT Lenses



- Big aperture = small f number
- f1.2 (max aperture)
- Lets in lots of light
- “Fast” lens (can shoot with a fast shutter speed)

Lenses

- Camera brands have proprietary lens mounts
 - Different camera mfr lenses not interchangeable
 - 3rd Party mfrs (Zeiss, Sigma, Tamron, Tokina, Rokinon)
 - There are some compatibility gotchas within a brand
- Key specs example: Nikon AF-S DX NIKKOR 18-200mm f/3.5-5.6G ED VR II Lens (\$650)
 - F Mount Lens / DX Format (1.5 crop)
 - 27-300mm (35mm Equivalent)
 - Aperture Range: f3.5 (18mm) or f5.6 (200mm) to 22
 - Two Extra-Low Dispersion Elements (ED or L lenses)

Lens Vibration Reduction (VR)

The Good

- Usually helps produce sharper pictures
- Let you shoot at a slower shutter speed

The Bad

- Does not help with a moving subject
- Need to spin up – can make things worse if you mash the shutter release
- Adds cost & weight
- Reduces battery life

Camera & Lens Handling



- Left hand supports lens
- Right hand on shutter release
- Balanced stance

Minimize camera shake with proper handling technique

Lenses – Entry Level

- Key specs example: Nikon AF Zoom-NIKKOR 70-300mm f/4-5.6G Lens (\$170)
 - F Mount Lens/FX Format
 - Aperture Range: f/4 to 32
 - Minimum Focus Distance: 4.9'
- Notes
 - No “ED” will compromise sharpness & chromatic aberration (false color near bright areas)
 - You get what you pay for

Lenses – Professional Grade

- Key specs example: Canon EF 24-70mm f/2.8L II USM Lens (\$1800)
 - EF Mount L-Series Lens
 - Aperture Range: f/2.8-22
- Notes
 - Dust/water resistant, fancy coatings, sophisticated design, sharp, minimal chromatic aberrations
 - Pro grade, state of the art, cost to match



50mm Prime = Excellent Value

- Key specs example: Nikon AF-S NIKKOR 50mm f/1.8G Lens (**\$200!**)
 - F Mount Lens/FX Format
 - Aperture Range: **f/1.8** to 16
 - Minimum Focus Distance: 17.7”
- Notes:
 - 50mm lenses = outstanding image quality for the cost
 - No zoom = lower cost, “faster,” but less convenience

Fast Lenses Help for Indoor Sports

From the bleachers. Nikon D200 at ISO 3200, Nikon Nikkor 80-200mm f2.8 ED lens, f2.8, manual exposure set to 1/320s.



Lens Aperture Comparison @ 300mm

Entry

Nikon AF Zoom 70-300mm f/4-5.6G Lens (\$170)

- Slow AF at f5.6
- Not very sharp
- ~~Teleconverter~~
- No hood
- Lightweight
- Iffy build quality
- Zooms, inexpensive

Prosumer

Nikon 300mm f/4 ED-IF AF-S Lens (\$1300)

- Better AF at f4
- VG sharpness
- 1.4x TC possible
- Built-in Hood & Detachable Tripod Mount
- Hand-holdable (3.1 lb)
- V. Good build quality

Pro

Nikon AF-S 300mm f/2.8G ED VR II Lens (\$5500)

- Excellent AF
- Sharpness world class
- TC work well
- Hood & tripod mount
- Heavy (6.4 lb)
- Excellent build quality
- VR 2-3 stops

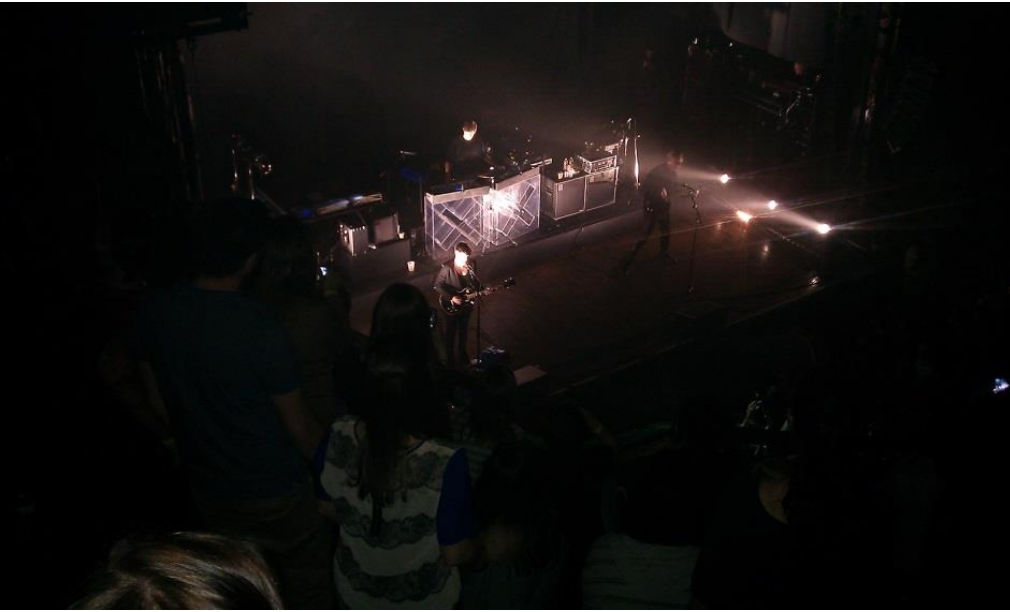
Practical Advice

- Invest in the best lenses you can afford
 - A good lens should last 15 years or more
 - My “bug lens” was introduced in 1993 and is sold unchanged today
- Sell old equipment on eBay (or keep as backup)
- Buy used or refurbished gear from a reputable dealer to save \$\$\$

Technical Elements of Photography

Exposure

Exposure



Shooting Settings Overview

1. Exposure Settings – Exposure Triangle
 1. Shutter Speed – how long is the exposure?
 2. Aperture – how much light per exposure?
 3. ISO – controls the camera's sensitivity to light – can be thought of as gain
2. There are many combinations of the above that produce an equivalent exposure
3. Metering Mode – how should the camera determine the proper exposure
4. Focus Mode – how will the camera acquire focus?

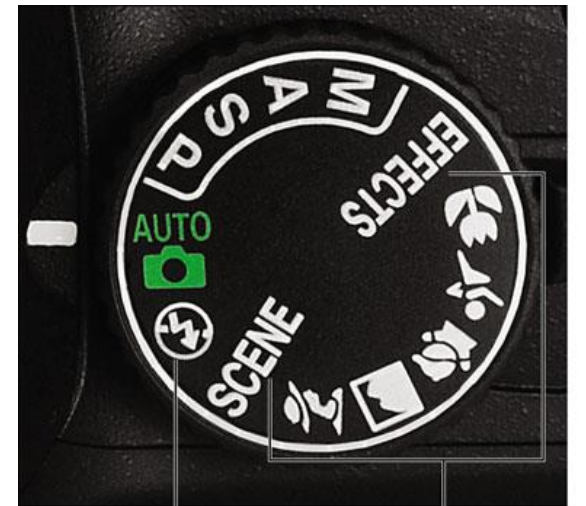
Equivalent Exposures

- f1.4 1/1000
- f2 1/500
- f2.8 1/250
- f4 1/125
- f5.6 1/60
- f8 1/30
- f11 1/15

What if your lens only goes down to f5.6?

Exposure Modes

1. Auto (Dummy Mode) – Camera does everything
2. (P)rogram: Auto exposure but with control
3. (S)hutter: You set the shutter speed
4. (A)perture: You set the aperture
5. Scene: Camera makes a best guess



Auto Flash Off

Primary Scene modes

Metering Modes

1. Metering - determine the proper exposure based on light coming in through the lens; common modes are:
 1. Matrix – good balance
 2. Spot – when the subject is differently lit than the rest of the frame
 3. Center-weighted – rarely used
2. The camera does not always do what you want!
3. Exposure compensation
 1. Select a negative to reduce the exposure, as when something in the frame is too bright, e.g., -1.0 EV
 2. Select a positive change when picture is too dim, e.g., +1.3EV
 3. Note 1 EV is “a stop”

Exposure Revisited



Left: Camera's
"correct"
exposure.

Right: Best save
via Photoshop



Exposure compensation
or manual exposure was
needed for above

Left: What you really
want, properly
illuminated subject

Spot Meter

Spot metering is useful for difficult lighting conditions

Advanced:

1. Meter very close to subject
2. Set manual controls based on readings
3. Recompose & shoot



Shutter Speed

1. Shutter Speed: 30 seconds to 1/4000 second
2. Critical to avoid blur due to movement
3. Rule of thumb: $1/(\text{effective lens focal length})$ to avoid blur when hand-held
4. VR helps but not with moving subjects
5. Calculation for D3300 & 200mm focal length
 1. D3300 chip has 1.5x crop factor
 2. $1.5x \text{ crop} * 200\text{mm} = 300\text{mm}$ effective focal length
 3. Shoot 1/250 (iffy) or **1/500** to be safe at 200mm
6. Birds/action? Aim for 1/1000 or faster to freeze

Freeze Action 1/500s



Rear-end moving. Nikon D810A, Nikon 500mm VR lens at f4, **1/500s**, ISO 720, fill flash.

Freeze Action 1/1000s



All but wings frozen. D810A & 500mm VR lens, f4.5, **1/1000**, ISO250, matrix metered at shutter priority and auto-ISO.

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Long Exposure & Blur



Flowing water often looks best with long exposures & blur

Several second exposure, tripod, Nikon F3 film camera & Fuji Velvia 100 film

Long Exposure & Blur



Flowing water often looks best with long exposures & blur

Nikon D200, 18-200mm VR lens at 1/15s, f14, ISO 800, 29mm, hand-held

Aperture Controls Depth of Field



Depth of Field = Range of distances in focus

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Aperture in Detail



- Big aperture = small f number
- f1.2 (max aperture)
- Lets in lots of light
- “Fast” lens (can shoot with a fast shutter speed)



f16 setting on f1.2 lens, notice closed aperture blades

Aperture

1. The lens aperture controls **how much light** passes through and controls the **depth of field** (what's in focus)
2. The setting is referred to as an f-stop or f-number
 1. The bigger the f-number
 1. The smaller the lens opening
 2. The greater depth of field
3. Examples
 1. f4.0 lets in twice as much light as f5.6, which is twice as much as f8, and so forth.
 2. More of the front-to-back image will be in focus at f8 versus f4

Aperture Hands-on Demonstration

Definition from Wikipedia: In optics, the **f-number** (sometimes called focal ratio, f-ratio, **f-stop**, or relative aperture) of an optical system is the ratio of the lens's focal length to the diameter of the entrance pupil. It is a dimensionless **number** that is a quantitative measure of lens speed, and an important concept in photography.

Aperture Affects Sharpness

1. $f8$ = max resolving power... most lenses are sharpest around $f8$
2. Lenses are at their worst sharpness wide open and at large f numbers (e.g., $f22$)
3. Above $f11$ or so diffraction reduces resolution
4. Stopping down about 2 stops improves corner sharpness and vignetting
 1. Big benefits for wide angle lenses
 2. Inexpensive lenses need the most help
5. Lenses are sharpest in the center of the frame, stopping down evens this out (improves corners)

Practical Advice Aperture

1. Set aperture based on desired results
 1. Portraits: Use a smaller fstop such as f2
 2. Landscapes/Macro: Use a larger fstop, f8 to f22
2. What if your lens doesn't go to f2?
 1. It can still be used for portraits
 2. Background control more important
 3. PhotoShop can help

Depth of Field Examples

Native Focal Length (mm)	Crop Nikon 1.5x	Crop Canon 1.6x	Remarks	FF f2.8 DOF in inches, f2.8, 10' away	FF f4 DOF in inches, f2.8, 10' away	DOF at f4, 1.5x Crop Body, inches
10	15	16	Ultra-wide (crop body)			
14	21	22	Ultra-wide on a Full Frame (FF) body			
18	27	29	Very wide			
24	36	38	Widest "normal" FF zoom range	133.2	250.8	132
28	42	45	Standard wide-angle lens (FF)			
35	53	56	Normal lens			
50	75	80	Normal lens, OK portrait	24.72	35.28	24.48
100	150	160	Short telephoto, portrait	6	8.52	6
200	300	320	Telephoto			
300	450	480	Bird and bug range!	0.6	0.84	0.6

There are many depth of field calculators online such as [this one \(Cambridge Color\)](#) or [this one \(DOF Master\)](#).

“I do not recommend calculating the depth of field for every image, but instead suggest that you get a visual feel for how aperture and focal length affect your image. **This can only be achieved by getting out there and experimenting with your camera.**” ([Cambridge Color, “IN PRACTICE”](#))

Depth of Field Limited for Macro



DOF ~ 0.04 inches
f4, Nikon D750,
Nikon 200mm
macro lens

ISO: Let's Talk About Noise



Noise is related to ISO setting
Higher ISO = more noise
Camera also critical for noise

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ISO

1. ISO – controls the camera's sensitivity to light – can be thought of as gain
 1. Low ISO; e.g., ISO 100
 1. Good in bright light
 2. Cleaner image (i.e., less noise) & sharper
 3. Need lower shutter speed or lower fstop or both
 2. High ISO, e.g., ISO 1600 and above
 1. Good for low light – freeze action & avoid blur
 2. Noisier and lower quality image (loss of fine detail)
 3. But new cameras do very well at high ISO settings
2. Auto-ISO is a significant and relatively new feature, especially on Nikons

Can't I Just Crank Up the ISO in Low Light?

- Maybe!
- Newer and more \$\$\$ cameras do much better with high ISO settings
- Full frame cameras are better
- You will lose sharpness (“fine detail”) as you raise the ISO

ISO Issues & Save

ISO 5600



High ISO Photoshop Save



ISO 5600, color corrected, 2x Neat Image noise reduction tool, sharpened & cropped
1/2000s at f4

Summarizing Exposure

Exposure: What's a stop?

- Exposure is based on the relationship between ISO, shutter speed, and aperture (exposure triangle)
- With a given “proper exposure”, you can vary these parameters to affect the final picture
- ISO “stops” are 50, 100, 200, 400, 1600, 3200
- Shutter speed examples: 1/30, 1/60, 1/100, 1/250, 1/500, 1/1000, 1/2000
- Aperture stop examples: 1.4, 2.8, 4, 5.6, 8, 11, 16
- Exposure compensation: 1 stop per “EV”

Exposure Compensation

1. Allows you to override the camera, to expose more or less based on your actual results
2. Use if camera is not doing what you want
3. I use it all the time outdoors, usually at -0.33 to minimize blown-out highlights
4. Use it under unusual lighting conditions

Correct Exposure – Depends!



1/200s at f4.5, ISO 200,
manual exposure

About 12 stops
difference



1/1.7s at f4.5, ISO 200,
manual exposure



8s at ISO 400 & ~f7

How many stops can a camera record?

- Your eyes can see well even when there is a large contrast between light and dark areas
 - 10 to 14 stops with a given pupil dilation
 - 24 stops if you include dark adaptation
- Camera are limited to about 7 stops
 - A bit of a controversial topic, newer sensors and RAW processing allow more
 - The take-home point is to expose properly for your subject

Exposure Mode Review

1. Auto (Dummy Mode) – Camera does everything
2. (P)rogram: Auto exposure but with control
3. (S)hutter: You set the shutter speed
4. (A)perture: You set the aperture
5. Scene: Camera makes a best guess



Auto Flash Off

Primary Scene modes

Exposure modes- Scene

Scene – camera adjusts exposure triangle values based on your guidance



Auto Flash Off

Primary Scene modes

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Focus

Nikon D750 camera,
200mm f4 macro lens at
f9 and 1/1250s, ISO 800.

Focus

Focus Technique – Focus on the Subject

1. People/animals: **Focus on the nearest eye**
2. Landscape: Focus 1/3 of the way into the frame

Focus Points

1. Dummy mode, may include facial recognition – pretty good these days
2. Multi-point schemes
3. Single point – **most control, most challenging**

Focus Modes, AF-S (Single) vs. AF-C (Continuous)

1. Single best for still subjects
2. AF-C provides continuous focus tracking - when shutter held down ½ way – good for sports and moving subjects
3. Manual at night, through obstructions

Continuous Shooting

- AF-C (Continuous Focus) setting
- Multiple pictures when pressing the shutter
- Useful for action shots
- Buffer may fill up quickly and you may miss a key shot
- Understand what your camera can do by experimenting

Focus Via Viewfinder/Live View

Viewfinder

- Optical view through lens via mirror & prism (DSLR)
- Mirrorless cameras may have electronic view
- Convenient & works in daylight

View screen on the back

- “Live view” on DSLRs – mirror flips up
- Not great for outdoor daylight/night
- Can be hard to see screen unless it articulates
- Can be better for critical focus by hand

Focus – Subject Not Centered?

Focus & Recompose Technique

1. Settings: Single-point focus, AF-S
2. Focus on the subject (depress shutter 1/2 way down, hold)
3. Hold shutter ½ way down, recompose the shot
4. Fully depress shutter to capture image

Not sharp? Blur?

What causes an image not to appear sharp?

1. Movement of the subject relative to the camera, and a shutter speed too slow to compensate (motion blur)
 1. I.e., **shutter speed to slow**
2. Subject, or desired part of subject, **not in focus**
3. Limitations of the lens or camera
4. Note: Not all images have to be sharp, or sharp throughout the frame (you may want to emphasize motion with some blur)
5. Often problem related to difficult lighting conditions
6. Tripod and/or flash may be needed

Putting it all Together

Technical knowledge helps, but there's more

1. Preparation
2. Be there
3. Execution
4. Post-processing



Camera Setup

1. Prevent shutter release without a memory card
2. Set the camera to display the image histogram and/or highlights after shooting (review whenever possible)
3. Display grid lines in viewfinder to help framing
4. RTFM if at all possible

Use RAW Plus Highest Quality JPEG

1. RAW records all the image data from the exposure
 1. RAW provides maximum flexibility for editing & fixing problems later
 2. Easy to experiment with different settings with RAW
 3. JPEG throws away your precious data
2. Why record high quality JPEGs?
 1. Record camera's highest quality (you paid for the megapixels!), and size down later
 2. Easier to use/share/edit than RAW
 3. In-camera processing often produces excellent results
3. To succeed with this advice do not cheap out!
 1. Get a huge memory card or two (SD prices reasonable, 128GB SD < \$50)
 2. Hard drives are cheap (8TB ~\$300) and you need backup space anyway

What to think about before you click

1. What is your subject?
2. What do you want to be in focus?
3. How is your subject lit, and what are lighting conditions in the frame?
4. What else is in the frame? (Advanced, but important)
5. Movement: subject, you, camera
6. Camera settings – control for above

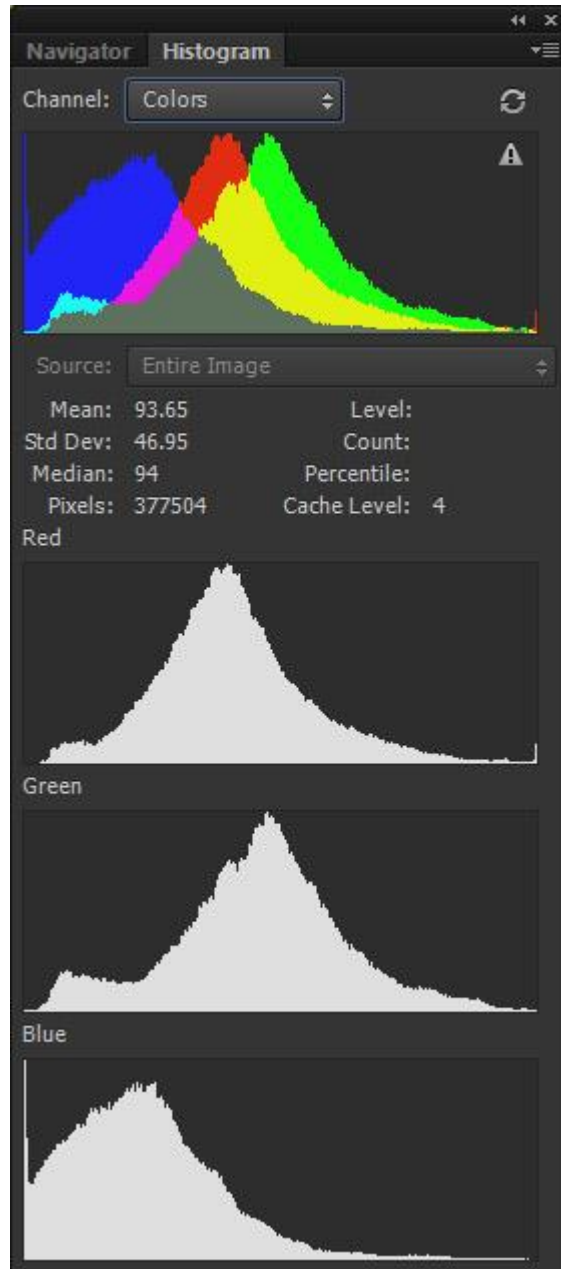
General Advice

1. Check primary camera settings before shooting and do a test shot
2. Be aware of what you can't fix
 1. Over-exposure with 100% blown-out highlights
 2. Subject problems; e.g., people with their eyes closed
 3. Unintended blur
 4. Under-exposure can be corrected when shooting RAW and when it's moderate

General Advice: Check On The Fly

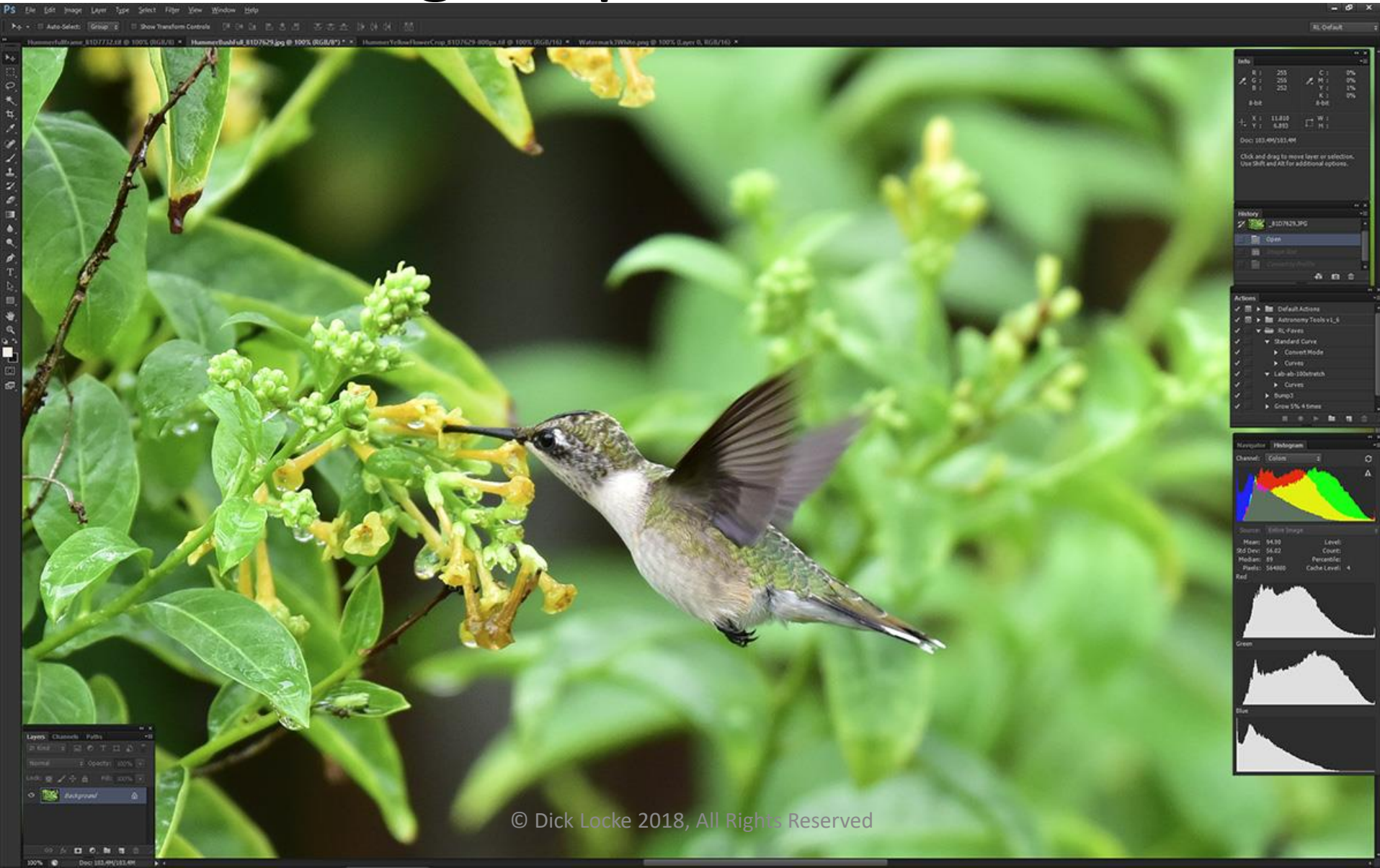
Check critical shots and/or representative shots for problems

1. Check the camera with a test shot first
2. **Check the exposure** – set your camera to automatically show highlights and/or histogram
3. **Check focus** – display the image and **zoom in as far as possible (1 button?)** – check the eyes
4. **Shoot multiple images** “to be safe”
 1. Especially with people – eyes often closed
 2. When photographing people tell them in advance that you’ll be taking several frames and to be patient



Check Exposure: [Histograms](#)
are your friends

Image Exposure Review



Exposure Not What You Want?

1. Change Exposure Mode (e.g., Matrix to Spot)
2. Use Exposure Compensation
3. Will flash help?
4. Manual Settings If Needed!

White Balance & Colors

- White Balance “should” correspond to lighting conditions
- “Auto” often does a good job
- “Picture Control” (Nikon) – colors/saturation
 - Set your camera control based on situation
 - “Vivid” nice for outdoor scenes
 - Other modes better for people
- Shoot RAW and you can worry about all this later

Tripod & Flash: Next Level



Tripods, Monopods

- Long focal lengths & slow shutter speeds require support for best results
- Carbon Fiber is the best material
 - Lightweight
 - Strong
 - Minimizes vibrations
- Monopods – good for big lenses and sports

Tripods, Monopods

- Tripods
 - Pros use them for almost every shot practical
 - Needed for best results in low light, macro, and night photography
 - Needed when depth-of-field with maximum sharpness is the priority (e.g., landscapes at f16 and ISO 100)
- Use an off-camera shutter release for slow shutter speeds (<1/30s)
 - Wired
 - Wireless

Use a Tripod for Macro Work



- 1) Cloudy weather is great for flower pictures
- 2) Fill the frame if you can
- 3) Stop down to f11-f22
- 4) Use off-camera shutter release

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Camera Flash: The Good

- Helps greatly in poor lighting conditions
 - Dim light
 - Sunlight (**fill flash** makes people look better, fills in shadows, improves color fidelity)
- Camera makes good choices most of the time
- When done right, pictures with flash will can have better shadow detail, better colors, less noise, less blur
 - Manually set flash to -1.67 exposure is a classic fill flash setting for a subtle effect
- Dedicated flash units are flexible and awesome
 - Allow moving the flash head
 - Allow catch-light (in the eyes) and bounce flash for good portraits

Outdoor Portrait with Flash



Daylight Flash



Nikon D100, flash, 1/160, ISO 400, matrix metered, f16 (!)

- Backlit hair can produce a nice effect; this is a bit much
- Dummy mode, no hi-res produced
- Hi speed sync would have allowed a smaller aperture & faster shutter speed

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Camera Flash: The Bad



- Red-eye happens when camera is far from subject & flash is close to camera – but usually correctable
- Requires slower shutter speeds (1/60 to 1/200) so moving subjects can blur
 - But **high speed sync** fixes this
- Can result in glare and reflections
- Can result in a flat or fake looking image
- Can produce distracting shadows
- \$\$\$ Dedicated flash units are best, but expensive
- Not great for candid

A Little on Post-Processing

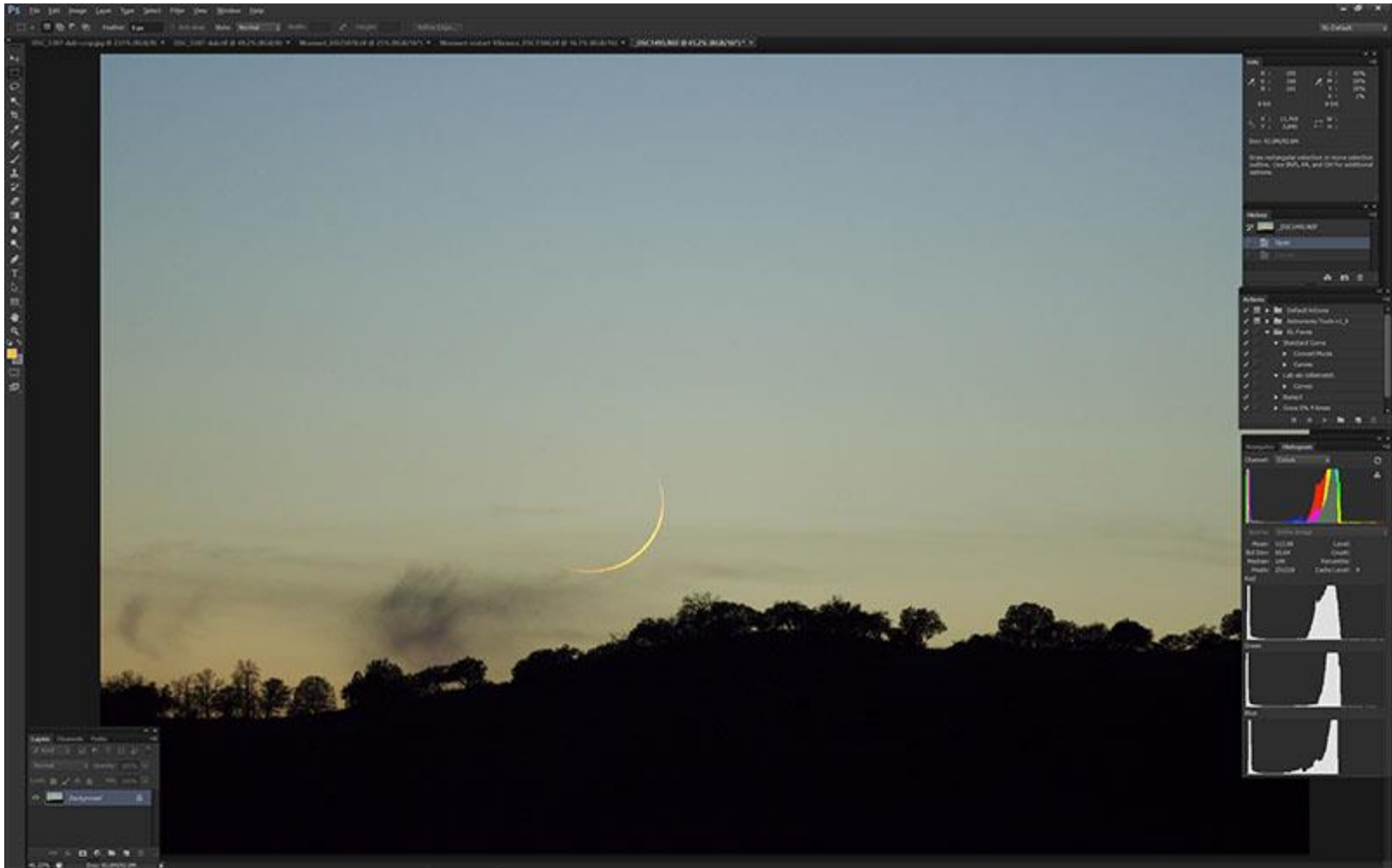
Importance of Cropping



Crop to Taste



Importance of Processing



Kind of cool but needs work

Nikon D7000, Nikon 300mm f4 lens at f4, 1/8s, ISO 1600. This is from my [West Texas 2012 trip](#).

Much Better with Simple Adjustments!



Nikon D7000, Nikon 300mm f4 lens at f4, 1/8s, ISO 1600. This is from my [West Texas 2012 trip.](#)

Processing Can Rescue a Blah Image



Post Production Workflow

1. First, do no harm

1. Do not edit and write over your original files
2. Do not use a lossy format such as .jpg to same intermediate images.
3. Save intermediate & final edits in .tif or other lossless format

2. Produce images optimized for your target viewing medium

1. Develop an imaging workflow to review images
2. Save final files in .tif (for printing) and .jpg (for web display/email)

3. May be a topic for another session

Thoughts & Advice

Recommended Starting Settings

- Program Mode
- Single point focus
- Matrix Metering
- ISO 400 with auto-ISO
- Auto white balance
- Raw + fine jpeg
- Experiment!

Be Out During the Golden Hours



Goat-Foot Morning Glory
Nikon N90s, Nikon 105mm macro lens, f45 1/1.6s, tripod mounted, Fiji Velvia 50



Nikon N90s, 105 f2.8 macro lens, f8, 1/125, Fuji Velvia 50 film (manual exp., based on center-weight metering)

© Dick Locke 2018, All Rights Reserved. (A trick with sunrise/sunset is to meter sky near sun, with sun just outside the frame)

More Advice: Lighting Conditions

- **Put the light source behind you**
- Bright sunlight is not optimal for pictures
 - Use flash for people to fill in harsh shadows
- Bright hazy clouds are great when sky not in frame
- Take pictures during the “golden hour”
 - 1 hour before sunset
 - 1 hour after sunrise

Golden Hour Cattle Egret



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More Advice: Flash for People/Pets

- Separate flash units much better
 - Reduce red-eye
 - Many options
- Bounce flash off a neutral ceiling for best results
- Extend flash card for catchlight in the subjects eyes
- Force lens wide-open for portraits

Experiment With Flash



Notice the catchlight in the eyes.

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More Advice: Click Away

- The incremental cost of taking a picture is essentially zero (*)
- Take pictures, examine them, identify what's good and bad
- Repeat

(*) But you'll want a fast computer and lots of storage

Sunsets are great for practice



Sunset Ecola State Park Oregon

More Advice: Avoid Clutter

- Check the frame for clutter
 - Move the clutter
 - Move the camera
- Much easier to move the clutter or reposition the camera vs. fix later
- A few seconds vs. many minutes or hours

Early Bird Gets the Worm



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Haystack Rock & Oregon Coast – I set the alarm on vacation to get out early

Rainy Weather Opportunities



Davis Mountains Rainbow... Nikon D200 camera (ISO 200), Nikon 18-200 VR lens at 200mm and f8 using auto-metering. This is a crop of about 1/5th of the original frame.

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Ponds are Great for Practice



Bird rig; f8, 1/640s, ISO 200, spot metered at -.33EV

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Don't Be Afraid of Low Light



Noise reduction tools are very sophisticated these days

Left: Noisy/grainy film image. Right: 2x applications of “Neat Image” noise reduction

Fast Lenses Help in Low Light



*Nikon N90s, Fuji 800 film, Nikon
300 f2.8 lens*



*Kodak 1000 film, 1/60, Olympus
OM2n & 85mm f2 lens wide open (I
think!)*

Opportunities Abound If You Work!



Your long lens may work well for small critters

Tripods: Required for Time Lapse



DSLRs Can Do Time Lapse

Time Permitting?

- Newer Nikons have a built in feature (lower resolution)
- Nikon Interval timer shooting allows full-resolution captures
 - Set interval to at least ~3 seconds longer than the shutter speed (for long exposures)
 - Older cameras can do 999 shots (not all night during winter)
 - Newer cameras can do 9,999 – big advantage for my work
 - AC Power best especially for night work
- [Time Lapse](#) Example 1
- [Time Lapse](#) Example 2

Time Permitting Auto ISO “Trick”

Example goals for birds on my f4 lens

- Shoot with 1/1000 shutter speed – freeze ‘em
- Smallest possible aperture for blurry background
 - But shutter speed non-negotiable

Settings

- Shutter priority 1/1000
- ISO Lowest possible setting (e.g., ISO 100)
- Auto ISO

Result:

- Bright light – Low ISO setting forces f4 on most shots, with highest resolution
- Dim light – Camera increases ISO as needed

Auto ISO “Trick” # 2 (Danger)

Manual mode, maybe for bugs in good light:

- 1/1000 shutter speed
- f8
- Auto ISO

Camera forces preferred shutter and aperture, varying ISO as needed to control exposure

Notes:

- Experiment before you try this on a critical shot
- Don't leave your camera on this setting when done

Conclusion

- Thank you!
- Questions?
- Equipment “up close” for those interested

Recommended Equipment

Buy Quality Gear for a Lifetime Investment

- DSLR Cameras
 - Nikon, Canon, Sony (mirrorless)
- Lenses & teleconverters
 - Manufacturer brand, else really do your research
- Flash, Batteries (keep an extra battery charged)
 - Manufacturer brand
- Tripods & Monopods (used tripods can save \$\$\$)
 - Gitzo, Manfrotto, Really Right Stuff (RRS), Carbon fiber – They will last forever if properly cared for
 - Long tripods are the most flexible
- Tripod heads – get “arca compatible” a semi-standard
 - Arca Swiss, Acratech, Really Right Stuff (RRS)
 - Wimberley gimbal heads for big lenses; or maybe a cheap knockoff
- Memory Cards (Buy bigger than you think you need, have extras)
 - Lexar, SanDisk
- Photography Stores
 - Local: Houston Camera Exchange
 - Internet: B&H, Adorama (no tax, very reputable)
 - Used: KEH, B&H, Adorama, Roberts, Ebay (with great care)
- Image Viewing & Editing
 - Camera vendor-provided tools
 - Get PhotoShop and learn the basics
- Camera Bags
 - Think Tank, Lowepro, Tamrac
 - Filters - Not recommended, except maybe a polarizer

Other References

- [Nikon's photography basics info](#)
- Always RTFM
- Many books and web-sites... Photography for dummies is a good book
- [Photo.net digital camera beginners guide](#)
- [DSLR Guide](#)
- [Virtual DSLR](#)
- Google “Dick Locke” (picture type) for images from web site