Dynamic Range

in Photography

A short introduction for the u3a Practical Photography Group

SPEAKER NOTES: Welcome everyone. Today we are looking at one of the most common challenges in photography — dynamic range. By the end of this short session you should understand what dynamic range means, why it matters, and have a toolkit of practical techniques to use next time you are out shooting.

What Is Dynamic Range?

The difference between the brightest and darkest areas a camera can capture in a single image — without losing detail in either.

Tonal range from shadow to highlight

Measured in stops — each stop represents a doubling of light.

Human eye

~20 stops of dynamic range

Modern camera sensor

~12–15 stops

JPEG file

~8 stops (compressed)

Typical sunset scene

May exceed 14 stops

SPEAKER NOTES: Dynamic range is simply the spread of tones a camera can record in one shot. Our eyes handle this brilliantly — they continuously adapt. Cameras cannot. A sunset with deep shadows and a brilliant sky may span 14 or more stops, yet a typical sensor captures only 12–15. A JPEG compresses this further to roughly 8. That gap is where highlight blow-out and blocked shadows come from.

Why Dynamic Range Matters

The two problems you will recognise from your own images:

BLOWN HIGHLIGHTS

When exposing for the shadows, bright areas exceed the sensor's capacity — resulting in featureless white patches with no recoverable detail.

Common in:
Sunsets, snow scenes, window interiors, white dresses.

BLOCKED SHADOWS

When exposing for the highlights, shadow areas fall below the sensor threshold — recording as pure black with no detail.

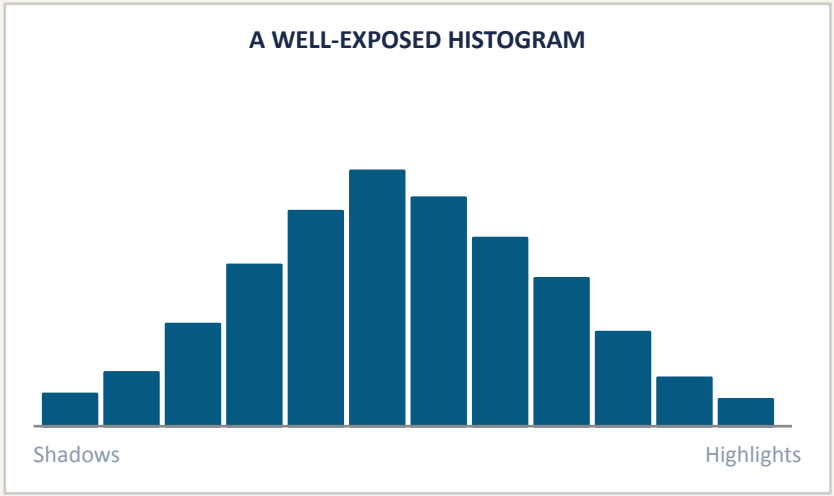
Common in:
Bright midday sun, backlit portraits, woodland edges.

Either problem destroys detail permanently — there is nothing to recover in post-processing.

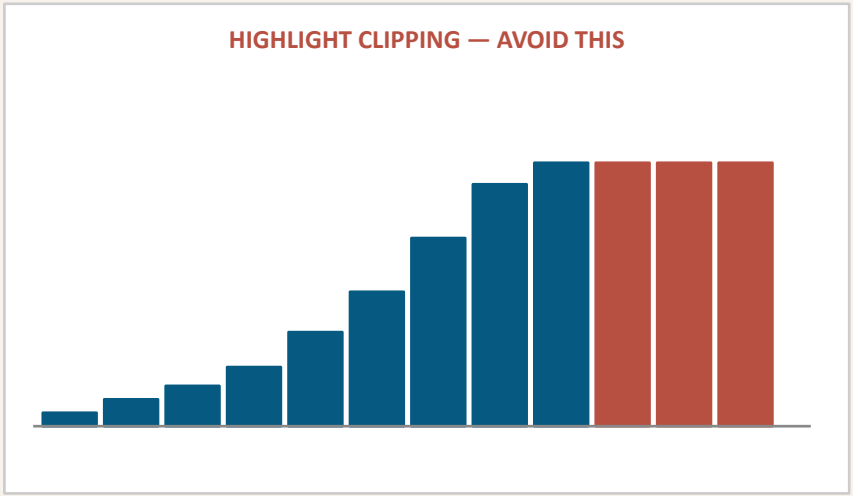
SPEAKER NOTES: Raise a show of hands — who has come home with a gorgeous sky only to find the foreground is black? Or a lovely portrait indoors where the window behind is pure white? These are the two classic dynamic range failures. Both destroy information permanently in a JPEG. With RAW files there is more leeway, but even that has limits — which is why getting it right in-camera matters so much.

Technique 1: Read the Histogram

Your camera's most reliable exposure tool — always available, completely objective.



Spread evenly, not touching either edge



Stack piling against right edge = blown highlights

1. Aim for an even spread — not touching either edge.
2. Enable Highlight Alert ('blinkies') on your camera so blown areas flash in the review.
3. Chimping — reviewing the histogram immediately after each shot — is a legitimate field technique.

SPEAKER NOTES: The histogram is a graph of tonal values in your image, from pure black on the left to pure white on the right. The height shows how many pixels sit at each brightness. A good exposure has a spread that fits comfortably between both ends. If you see a spike piling up against the right edge, highlights are blown. Against the left — shadows are blocked. Enable the highlight alert on your camera; blown areas flash red or white in playback,

Technique 2: Shoot in RAW Format

RAW ADVANTAGES

- ✓ Records all sensor data — no compression
- ✓ Recovers 2–4 stops of blown highlights in editing
- ✓ Lifts blocked shadows with minimal noise penalty
- ✓ Enables the 'single RAW bracket' technique
- ✓ Preserves full colour depth for processing

SINGLE RAW BRACKET TECHNIQUE

A clever post-processing trick that simulates bracketing from one shot:

1. Export the RAW file at 0EV (correct exposure)
2. Export again at +2EV (lifted shadows version)
3. Export again at -2EV (recovered highlights version)
4. Blend the three in Lightroom or Photoshop

Only works because RAW preserves the full sensor data.

SPEAKER NOTES: JPEG files apply in-camera processing and discard data — what you lose, stays lost. RAW files keep everything the sensor captured. In Lightroom or similar software you can often recover two to four stops of blown highlights and lift blocked shadows substantially. The single RAW bracket technique — processing the same file at three different exposures and blending them — mimics traditional exposure bracketing and is especially useful if you

CAUTION: RAW files are larger and require post-processing software (Lightroom, Darktable, Capture One). JPEGs are simpler for sharing directly.

Technique 3: Choose Your Metering Mode

Your camera meters light to determine exposure. Understanding which mode to use is fundamental.

Evaluative / Matrix	Analyses the entire scene, comparing it to a database of millions of images. The camera's default. Excellent for most everyday situations where light is relatively even.	*Best for: General use, even light, travel photography.*
Centre-Weighted	Priorities the central 60–80% of the frame but factors in the edges. Predictable and favoured by portrait photographers for decades.	*Best for: Portraits, subjects centred in frame.*
Spot Metering	Reads only 1–5% of the frame at the focus point. Highly precise — ideal when the subject is much brighter or darker than the surroundings.	*Best for: Backlit subjects, stage lighting, wildlife against bright sky.*
Partial	A middle option between centre-weighted and spot — available on Canon cameras. Reads approximately 10–15% of the frame around the central point.	*Best for: When spot is too tight but evaluative too broad.*

SPEAKER NOTES: Most beginners leave their camera on Evaluative/Matrix metering indefinitely, which is reasonable — it is very good. However, the moment your scene has extreme contrast (a backlit subject, a performer under a spotlight), the camera can be fooled. Switching to spot metering and taking the reading from your subject's face or the critical part of the scene gives you back control. Practice switching modes before you need to do it in a hurry.

Techniques 4 & 5: Exposure Compensation and ETTR

EXPOSURE COMPENSATION

— Overrides the camera's metering by a set amount in stops.

— Dial in +1EV to brighten (shift histogram right); -1EV to darken (shift left).

— Useful when a bright background fools the meter into underexposing your subject.

— Does NOT add information — it adjusts where the exposure falls within the scene.

— Used alongside the histogram for best results.

EXPOSE TO THE RIGHT (ETTR)

A technique of deliberately exposing as brightly as possible without clipping any highlights.

Why?:

More data is recorded in the brighter tones. Lifting a dark image in post introduces noise; a bright-but-uncropped ETTR file has better shadow quality.

How?:

Adjust exposure until the histogram sits as far right as possible without the graph piling against the right edge.

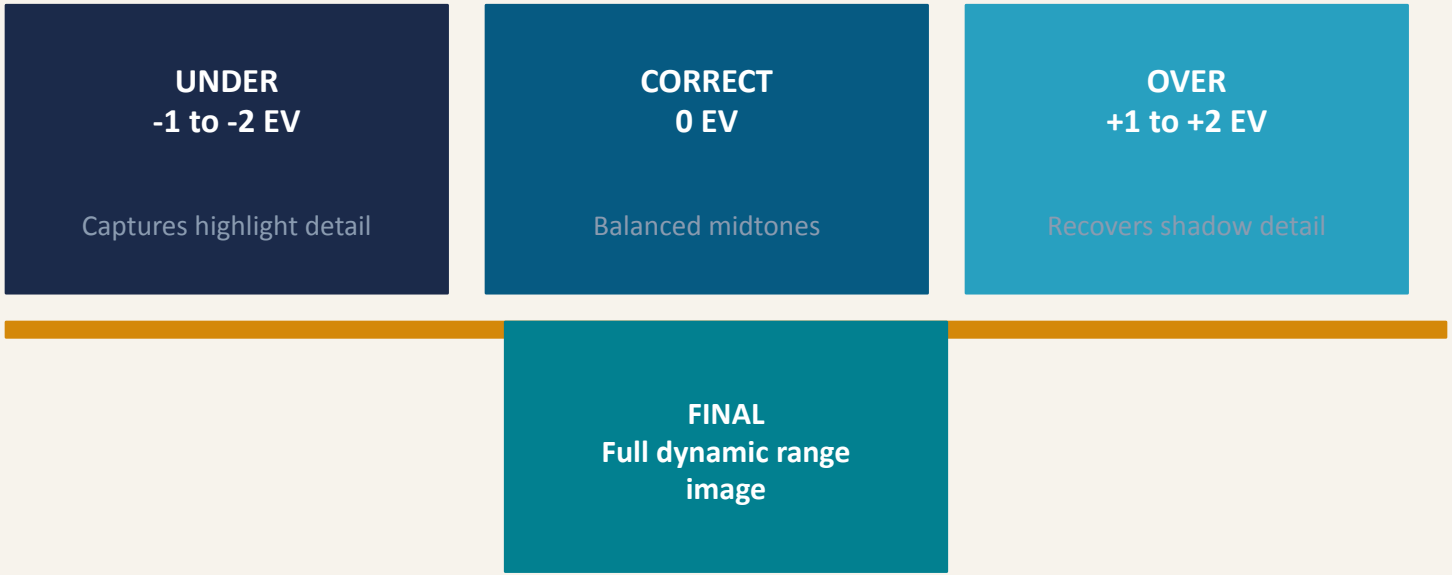
Caveat:

Requires RAW shooting and careful monitoring. Not a substitute for accurate exposure.

SPEAKER NOTES: Exposure compensation is available in almost every camera mode except fully manual. It is the quickest way to override a poor metering decision. ETTR is a more considered technique — by keeping the image as bright as possible without clipping, you maximise the usable tonal data recorded in the RAW file. Think of it as filling a bucket: it is better to have a nearly full bucket of data than a half-empty one, because trying to brighten a half-empty

Technique 6: Exposure Bracketing & HDR

When the scene's dynamic range exceeds what your sensor can capture in a single shot.



HDR NOTE

HDR blending requires 5–7 bracketed shots for extreme contrast scenes. Software: Lightroom, Photomatix, Aurora HDR. Restrain the processing — garish HDR is immediately obvious and rarely flattering.

- Use a tripod — any camera movement between frames creates alignment problems and ghosting.
- Enable Auto Exposure Bracketing (AEB) on your camera — it fires three or more exposures automatically.
- For moving subjects, consider the single RAW bracket approach instead.

SPEAKER NOTES: Exposure bracketing is the classic solution to high-contrast scenes. You take three, five, or seven shots at different exposures and blend them. Modern cameras have AEB (Auto Exposure Bracketing) which does this automatically in a single burst. In Lightroom, select the files, right-click and choose 'Merge to HDR'. The key warning: resist the urge to over-process — the hyper-saturated, glowing HDR images of the early 2010s are now a byword for

Technique 7: Manage Light In-Camera

GRADUATED ND FILTER

— Darkens the sky by 1–3 stops without affecting the foreground.

— Brings the contrast within a range the sensor can handle in one shot.

— Most effective when the horizon is straight (problematic with trees etc.).

— Available as screw-on or square filter systems (Lee, Cokin, NiSi).

TIMING THE LIGHT

The simplest solution to high dynamic range is often to wait for better light:

Golden Hour:

Roughly 1 hour after sunrise or before sunset. Low, warm light, long shadows, contrast within sensor range.

Blue Hour:

20–30 minutes before sunrise or after sunset. Soft, even, directionless light with very low contrast.

Overcast Days:

Cloud cover acts as a giant diffuser — dynamic range drops dramatically. Ideal for portraits and woodland.

Midday Sun:

Highest contrast of the day. Hardest for dynamic range. Best avoided for landscapes unless deliberate.

SPEAKER NOTES: Graduated ND filters are the landscape photographer's traditional answer — you physically reduce the brightness of the sky at the lens. They require a square filter system for best results and work most cleanly on flat horizons. The other approach requires no equipment at all: simply returning to the location at golden hour or overcast conditions reduces the contrast dramatically. Many photographers find that the enforced patience of waiting for good light transforms the quality of their images more than any technical trick.

Your Dynamic Range Toolkit

1. Read the histogram	Check every shot. Enable highlight alert. Aim for a spread that does not touch either edge.
2. Shoot RAW	Preserves full sensor data; enables shadow and highlight recovery in post-processing.
3. Choose metering wisely	Spot meter on your subject in high-contrast scenes; Evaluative for everyday shooting.
4. Use exposure compensation	Override the meter when a bright background fools the camera.
5. ETTR	Expose as brightly as possible without clipping — maximises data captured in the RAW file.
6. Bracket and blend	For extreme contrast: AEB plus HDR merge. Keep processing restrained.
7. Manage the light	Graduated ND filters for landscapes; shoot at golden or blue hour; embrace overcast.

The best photographers do not fight dynamic range — they plan around it.

SPEAKER NOTES: Summarise the seven techniques — invite questions on any that prompted interest. Suggest a practical exercise for the week: find a high-contrast scene (a window interior, or a sunset), and deliberately try all three approaches — expose for highlights, expose for shadows, and bracket. Review the histograms on each. Understanding the problem practically is worth a dozen explanations. The further reading resources from the Light