

INTRODUCTION

Choosing the exposure for a photograph is both alarmingly simple and infinitely complex; in fact, it's one of photography's most absorbing paradoxes.

It is simple because there is ultimately only one dosage of light, controlled as it always has been, since the first view cameras carrying wet plates, by a shutter speed, an aperture, and a film speed. There are no qualifications or subsets, just a fraction of a second, an *f*-stop and an ISO sensitivity. However much agonizing and philosophizing anyone puts into the equation, choosing the exposure still comes back to the same three simple settings—nothing else.

It is also complex because it affects everything about the image and its effect on those who see it. It reaches deep into what the photographer intended and why the photograph was taken in the first place. There are endless subtleties in the brightness, readability, and mood of every part of every scene, as witnessed by the different exposure decisions that different photographers take.

Understanding how and why exposure works as it does is worth a lot of effort, not only because it helps you to get it “right” at will and with total confidence, but also because it helps you decide what “right” is—and that’s much more important in photography.

WEBLINK

Some of the pictures shown in this book are clearer on a computer screen, which show a higher dynamic range than the printed page can. For that reason, where it is beneficial, you can log onto the address below to see the images wherever you see this logo.

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CHAPTER 1: FAST-TRACK AND FOOLPROOF

When it comes to photography, you should beware of any self-proclaimed “system.” Systems tend to be invented and promoted either by photographers who have a very particular way of working that might suit themselves perfectly but is not necessarily adaptable, or by people who have little experience of the practicalities of shooting. I write this knowing full well that I’m presenting here what looks suspiciously like just such a creature. The difference is, and my justification also is, that this is a distillation of the ways in which many professionals take exposure decisions. Most professionals, of course, do not use what they would ever themselves call a system, but when you live, breathe, and shoot photography for

a living, day in and day out, you develop and hone ways of working that behave very much like a system. Well, I would say that, wouldn’t I?

As usual, my model for this book is the way in which professional photographers do things. “Professional” means someone who shoots on assignment regularly for a living, and I believe this is important. Not that professionals have any special dispensation to take better photographs. That kind of talent can rest innately with anyone, and be improved by anyone, though of course successful professionals are exploiting that skill. No, what makes the professional approach worth following is that we do photography all the time, and under pressure to deliver the goods every time.

In a slightly unusual departure from most of my books, I’ve carved out a short and succinct first chapter that is partly a summary of what follows, and partly a way of stressing the decision flow. After this I’ll go into much more detail about individual aspects of exposure, all of which will take much longer to read than to do. Here, for the next few pages, I want to be completely practical and acknowledge that when you are shooting there is usually not much time at all for anything. Exposure decisions normally have to be made very quickly indeed, often without consciously thinking them through. But the decision flow is still there, however short a time there is for it. This, then, is how it really is....

THE BASIC METHOD

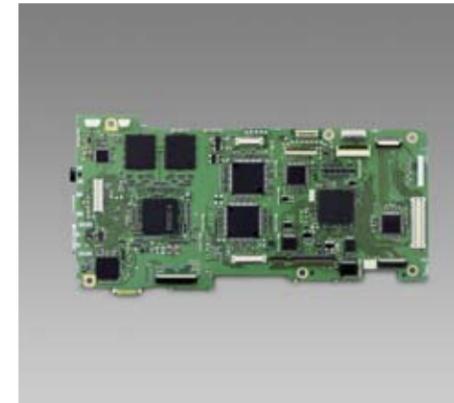
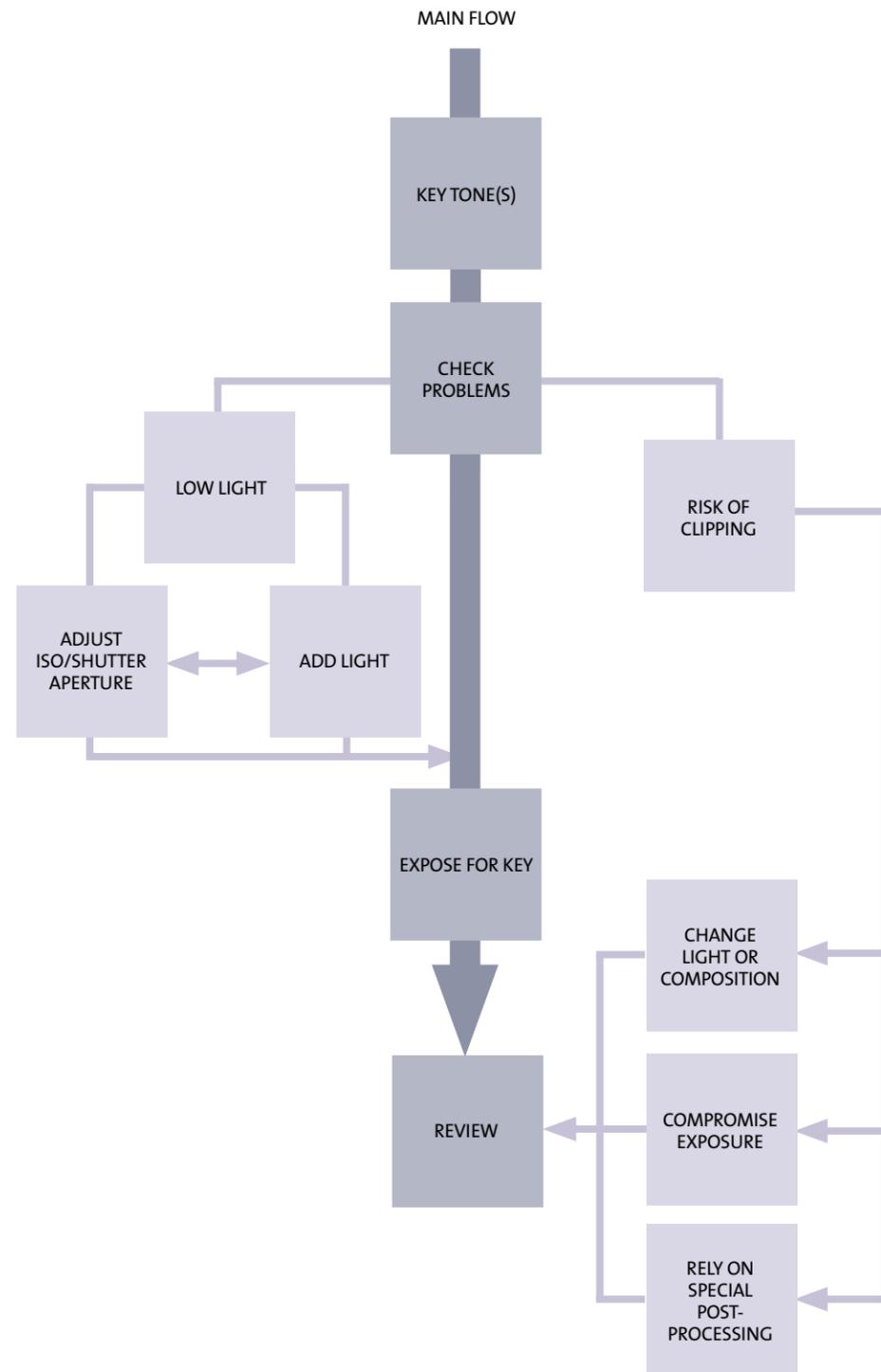
I'm taking a slightly different approach in this book by trying to explain everything right at the start and as concisely as possible. This may seem almost impossible, but in keeping with the subject—which is both simple and complex at the same time—there's a real need in photography to grasp the essentials in a single perception, followed by gradually absorbing all the implications. Photography is, in any case, always about the moment, and while there is much to learn at leisure there is also the entirely understandable, even necessary, impatience just to shoot.

There are many different aids to exposure, and as many preferences among photographers for choosing camera settings. Camera manufacturers are well aware that this is the crucial issue for most photographers, so they have developed a raft of technical solutions, with each trying to outperform the others. The result is a wonderful choice, but also a chaotic array of methods, many encumbered by jargon for no better reason than to make them seem superior to the competitors' versions.

I plan to cut through this nonsense, and my model is, as always, the way professionals like myself think and work. Being a professional photographer (which is to say, someone who earns their living by getting paid by clients to shoot, not by just teaching or writing about photography or by gaining expertise at messing around with photographs in Photoshop) does *not* mean that the work is any better than that of a dedicated amateur. Actually, often the opposite is the case. What it does mean, though, is constant, and realistic, attention to shooting on a daily basis.

A professional photographer has the advantage of doing this all the time, building up experience that counts for more than many techniques. Most professionals have little patience with complicated novelties and most choose exposure almost instinctively. I have many friends who will have no sympathy for what I'm about to do, which is to analyze the process and spell it

► DECISION FLOW (STREAMLINED)



CAMERA PROCESSOR

The camera's onboard electronics can make decisions for you, should you choose, but it will only ever be able to see the scene from the point of view of "averages" or "most people."

out, but that's because they do it as a matter of course. One thing I should warn you about is the unavoidable wordiness of the methods I describe here. Even the short summary that follows will take a minute or so to read and absorb, but putting it to use should take only a second or so. Reflexes in assessing a scene and choosing the exposure can always be improved, and they should be.

Let's start with the absolute summary, as concise as I can make it. Yes, there are all kinds of decisions embedded in each of the steps, but I will explain these later in the book. I've also had to allow for the many ways in which a modern digital camera allows the exposure to be set. An important point here is that it is usually less important *which* method you use than being thoroughly familiar with it. Believe it or not, a significant number of professional photographers set their exposure manually, using a simple, center-weighted averaging mode—and they get it right.

In time sequence, this looks like the Decision Flow chart (opposite), which is a streamlined version of the full flow shown on the following

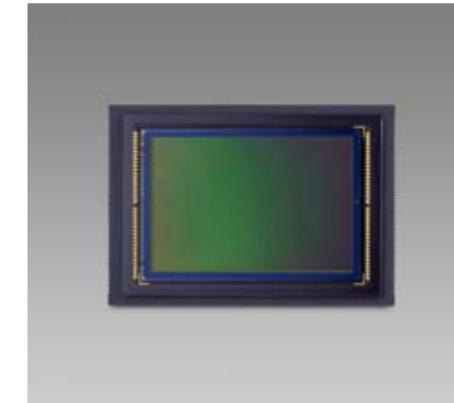


IMAGE SENSOR

A Canon 35 mm CMOS image sensor chip, the component of the camera which is ultimately exposed to the light.

pages. Follow the sequence and you will get the exposure as good as it possibly can be. The only qualifications are these: the first and last are mechanical, while all the rest require judgment and improve with experience... except number three which can take a lifetime.

SUMMARY

1. SETTINGS

Make sure all the relevant camera settings are as you require them.

2. METERING MODE

Set your preferred metering mode and know exactly how it will perform under the lighting conditions.

3. KNOW WHAT YOU WANT

Imagine in advance how you want the brightness distribution of the image to be.

4. SCAN FOR PROBLEMS

Quickly assess what the issues and likely problems will be, particularly the scene's dynamic range relative to the sensor's capability and if the light levels are low.

5. KEY TONES

Identify the areas of the scene that are the most important for brightness, and in order of importance.

6. RISK OF CLIPPING

If the scene's dynamic range exceeds the sensor's performance, decide whether to make changes, or to settle for a compromise exposure and/or rely on special post-processing.

7. METER & EXPOSE

Use the appropriate metering mode, adjusting up or down if necessary.

8. REVIEW

Review the result on the screen. If it needs improving, re-shoot if appropriate.

THE KEY DECISIONS

LET'S EXPAND ON THIS BARE-BONES SUMMARY FROM THE LAST PAGES.



1. SETTINGS

Before you shoot, have all the relevant camera settings exactly as you need them:

- Metering mode: Choose between auto or manual, depending on your preference.
- File format: Raw, TIFF, or JPEG, or a combination such as Raw + JPEG.
- Instant review turned on after each shot (this is just a recommendation).
- Highlight clipping warning: Some people find this distracting, but others value it as a rapid aid to controlling one of digital photography's special exposure problems.
- Histogram readily accessible: With some camera manufacturers this is overlaid on the review image, which is certainly distracting, but it is useful to have available at one click.

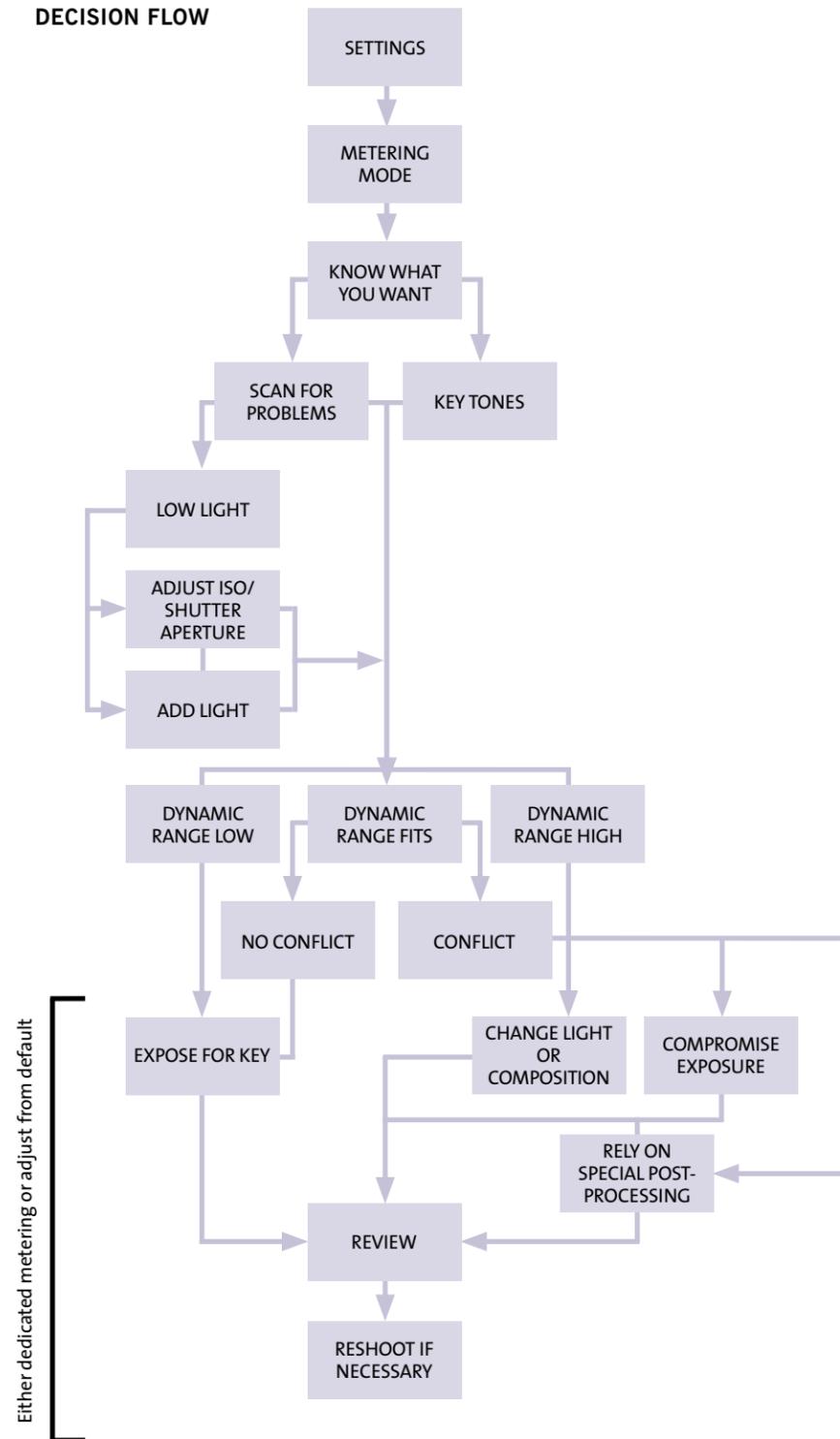


2. METERING METHOD

Know exactly how your chosen metering mode behaves. Most

cameras offer a choice between, say, average center-weighted, smart predictive, and spot. Some camera models use very smart methods, such as comparing the distribution of tones with a large bank of previously analyzed images. If you choose to rely on an advanced system, make sure that you know how consistently it behaves *for you*. If it over- or under-exposes for certain kinds of composition and lighting that you favor, simply be aware, so that you can adjust with confidence. If you use a simple method, still know how it behaves in different situations. You may need to make adjustments at any time, which is why this is returned to at point 7, below.

DECISION FLOW



Either dedicated metering or adjust from default



3. WHAT DO YOU WANT?

Know clearly what the photograph is about—what caught

your eye, what attracts you about the shot, and what you want to convey. Have in your mind's eye how bright it should be overall, and how the distribution of brightness should look. Naturally, this is the million-dollar question.



4. LIKELY PROBLEMS

Scan the scene for exposure issues. Think about what is in front of the camera before letting the metering system loose on it. For example, is there a major hotspot likely to blow out? Does it matter if it does? Most problems occur because the dynamic range of the scene is greater than the sensor can capture in one exposure.



5. KEY TONES

Decide on the important subject (or subjects) and how bright it (or they)

should be. In a portrait, this is likely to be the face, but it ultimately depends on your creative judgment. If it is a face, is it Caucasian, East Asian (which needs to be lighter than mid-tone) or black, (which needs to be darker than mid-tone)? The key tone may be only a part of the key subject, or in some circumstances it may be another part of the scene, such as a background.



6. IS CLIPPING LIKELY? IS THERE A CONFLICT?

If there's a conflict between points 4

and 5, work out how to resolve it. The choice is between changing the light or the composition, or accepting either a compromise in the exposure, relying on special post-processing, or both. For example, if a portrait is backlit and the background has to be heavily clipped for the exposure to be right for the face, you might want to add foreground shadow fill, just accept a clipped background or change the composition. As another example, if there is a small bright hotspot doing nothing special for a shot, you might re-frame to crop it out. A compromise exposure means accepting either shadows that are too dark or over-exposed highlights, which may be perfectly acceptable, depending on the effect you want (see point 3). The third alternative, which can sometimes be combined with a compromise exposure, is to rely on special post-processing techniques, such as exposure blending or even HDR (High Dynamic Range), which might in turn call for multiple exposures that can be digitally blended.



7. APPLY METERING

This depends on your preferred way of working with the

camera settings. One method is to use a dedicated metering technique to measure and set the key tones, such as spot-metering, to measure an area precisely. Another is to decide from experience how much more or less exposure from the default is needed and set accordingly, typically by using an exposure compensation button.



8. REVIEW, RESHOOT

Review on the camera screen, adjust and re-shoot if necessary—

and if there's time. This is all about the kind of shooting you are doing and the situation you are in. If the action is fast and either continuous or unpredictable, it would be a very bad idea to check the camera screen after each shot. If you are shooting a landscape as the sun slowly sinks and you have plenty of time, you can afford to check everything thoroughly and shoot variations.

DECISION FLOW

In digital photography there are three areas involved in exposure. These are your shooting technique, your personal style and post-processing, and the main chapters of this book follow this breakdown. The last area, post-processing, may at first seem a little odd, given that the whole subject revolves around the moment of exposure. Yet this very digital stage is linked intimately to the moment of shooting in two important ways. One is the practice of shooting in Raw format, which is always recommended and allows, among other things, for the exposure to be revisited. The second is that many of the newer, more advanced processing techniques affect the immediate exposure decisions, allowing you to shoot at a setting that otherwise you might not think worthwhile.

Nevertheless, the straightforward technique, style, then post-processing route is not necessarily the order in which exposure decisions are made. On the previous pages we looked at all the important exposure decisions you need to make, some of them at leisure earlier and some just a fraction of a second before shooting. Here, I've put together the full Decision Flow in what is usually the most logical sequence. If it looks daunting, that's only because I have broken down the process of making an exposure into steps that, in reality, are close to instantaneous.

It begins with having all the camera settings and the metering mode as you need them, and this may vary according to the overall lighting situation. For instance, if I know that I'm likely to encounter low lighting and I'm shooting handheld, I'll switch the camera's auto ISO on, with an upper-limit shutter speed based on the lens I think I'm going to need. However, if it's a tripod situation, I'll switch it off.

Then comes the all-important decision of knowing what you want from the scene, which is always personal and could be considered an underlying condition as much as a decision.

Next we have the twin scene-critical decisions that establish everything to follow. I've put them side by side because they are of equal importance,

and even if one precedes the other by a fraction they are right next to each other in time sequence. One involves deciding on the most important area of tone (or tones) in the scene, the one that should be a certain brightness. The other is damage control, scanning the scene and situation rapidly for likely problems. A neatly separated issue, at least as far as exposure is concerned, is the quantity of light. Once that is dealt with, the other major issues are to do with dynamic range and the danger of clipping.

In the next chapter we'll look at dynamic range, and the three conditions that determine whether there is likely to be a problem. With a low scene dynamic range, there never is a problem; if the scene dynamic range just fits that of the sensor then there may be no issues, but that depends on where you locate the key tone; if the dynamic range is high, there certainly will be a clipping issue.

So, if there's no conflict between choosing the key tone and clipping, you simply expose for the key. If there is a conflict, there are three kinds of solution. One is to accept a compromise in the exposure and settle for the best that's possible. Another is to make changes, which usually means to the light or to the composition. A third, newly digital, is to anticipate special post-processing techniques, many of which lead to a recovery of tones that would ordinarily suffer.

Finally, review the shot if you have time, and if it's less than perfect, adjust and shoot another frame—again, if you have time.

► DECISION MAKER'S CONTROLS

Exposure control largely come down to three core settings—shutter, aperture, and ISO—all easily accessible on modern digital SLRs like this Canon EOS-5D MkII.



THINK BRIGHTNESS, EXPOSURE

I added this at the last minute, when, after talking at length to a number of readers, I realised that not everyone is completely comfortable switching between brightness, exposure, and *f*-stops. This is really to do with working method, and yes, it does vary. Photographers have their own idiosyncrasies, their own ways of thinking about light and exposure, and this applies especially to professionals, who have had to work out foolproof methods and have honed these with constant experience. However, whichever way you package the decision-making process, it ultimately rests on knowing what camera settings will get you what results. The simplest, most universally intelligible unit is the stop. The *f*-stop. You can make life more complicated by talking about EV (Exposure Value) or, worse still in my opinion, Zones. But *f*-stops are very, very simple. One step up or down on the aperture or the shutter speed.

Nor is it complicated to relate stops to brightness, and in most circumstances it is not necessary to be obsessively accurate. The chart

here is the basic translation, and it does not pretend to be precise. But it is sufficient for most purposes. We are, after all, taking photographs at this point, not tweaking them in Photoshop. The simplest way, it seems to me, to think about brightness is as a percentage. 0% is black, 100% total white, and 50% is in the middle. Mid-tone, average. Later, we'll look at gray cards and why they are 18% reflectance, but all very interesting though this may be if you have the time to think about it, 50% is a lot more intuitive. And it is also how a mid-tone measures on the computer in Photoshop's HSB, or whichever processing software you use.

At its absolute crudest, you could say that a little bit lighter is half a stop, quite a bit lighter is one stop, significantly lighter two stops, and so on. If it seems that I'm promoting sloppy measurement here, yet being almost compulsive in other sections of the book, it's because somewhere here I need to stress the importance of getting things in proportion. If you have the time and the camera is on a tripod, you can

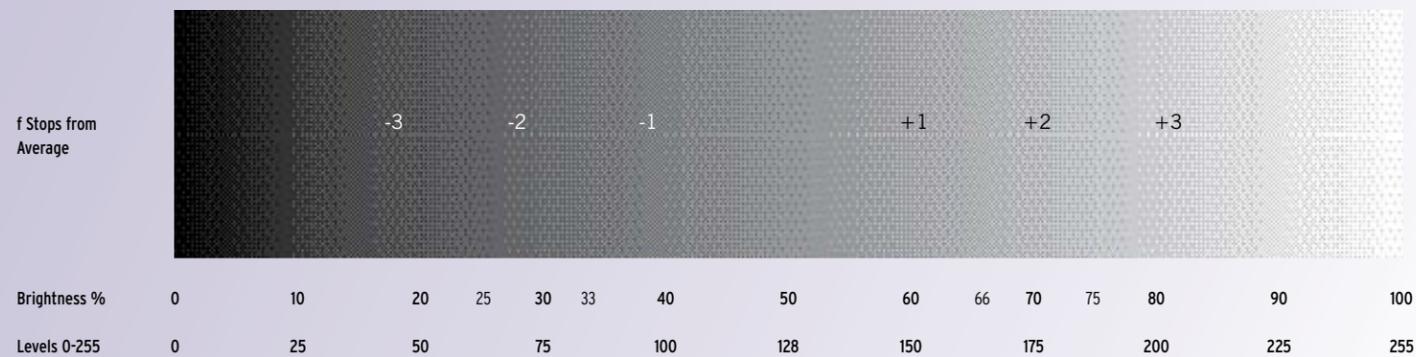
measure away to your heart's content, get the readings down to 1/3 of a stop, and have the plan mapped out with total precision. But most photography is not like that, and if you are in the street and have seconds to work it out, then what's clearly needed is a fast and basically accurate decision.

I cannot recommend too strongly the simple ability to look at a scene, see blocks of roughly similar brightness, know intuitively what that brightness is, and how that translates into *f*-stops. With practice, it's easy, and maybe you do this already. If not, time to start!

MEASURING BRIGHTNESS

Here and throughout the book, I use brightness as the basic measurement of the amount of light (see page 28, *Exposure terms*). The way of measuring it is the same as in Photoshop's HSB. Total black is 0%, mid-brightness is 50% and total white 100%. This is worth mentioning because there are several light measurements, and it's easy to get bogged down in the

minutiae—when the real business at hand is practical photography. The diagram here shows approximately how it relates to *f*-stops. Most exposure decisions do not need a high degree of precision, but it helps, at least to my mind, to be able to think simultaneously in terms of relative brightness and in the stops needed to achieve it.



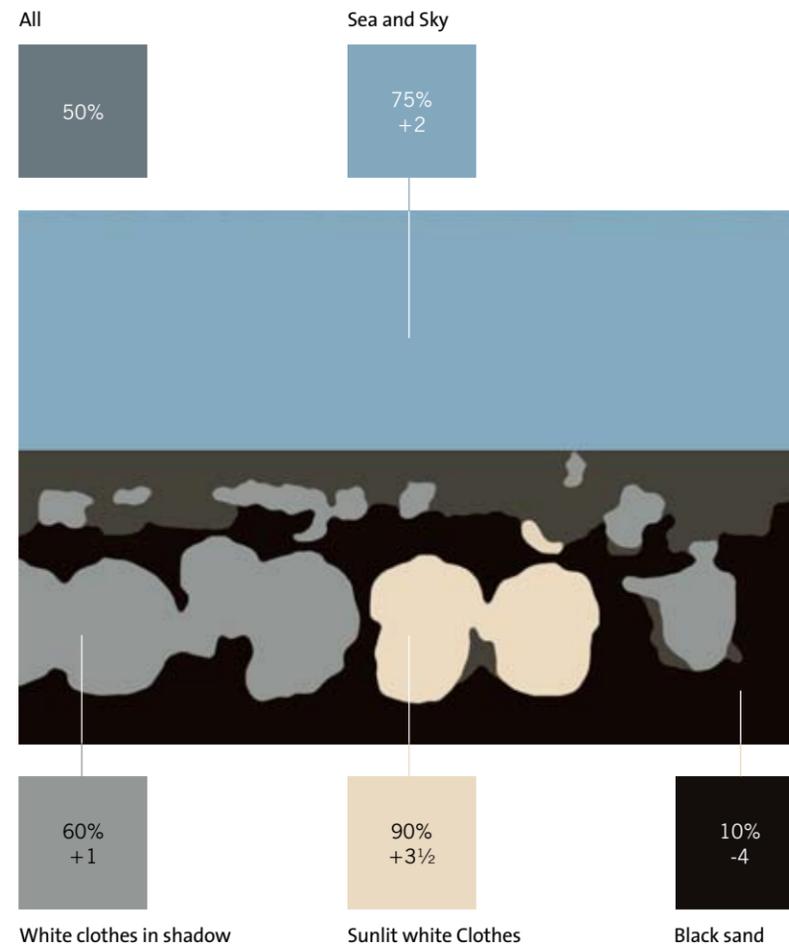
QUICK DECISIONS

Here is an image that I chose at random, but remembering how I saw it and thought, briefly, about the exposure. Reduced to the essentials, I see the sea and sky as one tone block, the white shirts of the men that are in shadow as another, the two sunlit white shirts as another, and lastly the black sand. To put this in perspective, I probably spent a couple of seconds thinking about the exposure. The schematic shows these tonal blocks and their brightness (in percentages) and the equivalent *f*stops' difference from average.

The quick decision process went as follows:-

1. Watch out for clipping on the bright white shirts; keep bright as possible
2. Sea and sky all more or less the same, need fairly bright
3. Shadowed white shirts not so important; let fall wherever on the brightness scale
4. Black sand not important; will in any event be very dark

I also knew at a glance that the entire mixture of tones should come close to average, and that, using the camera's smart metering mode and with the two bright shirts close to the centre of the frame, it would protect them from clipping. This bit was simply familiarity with my camera.



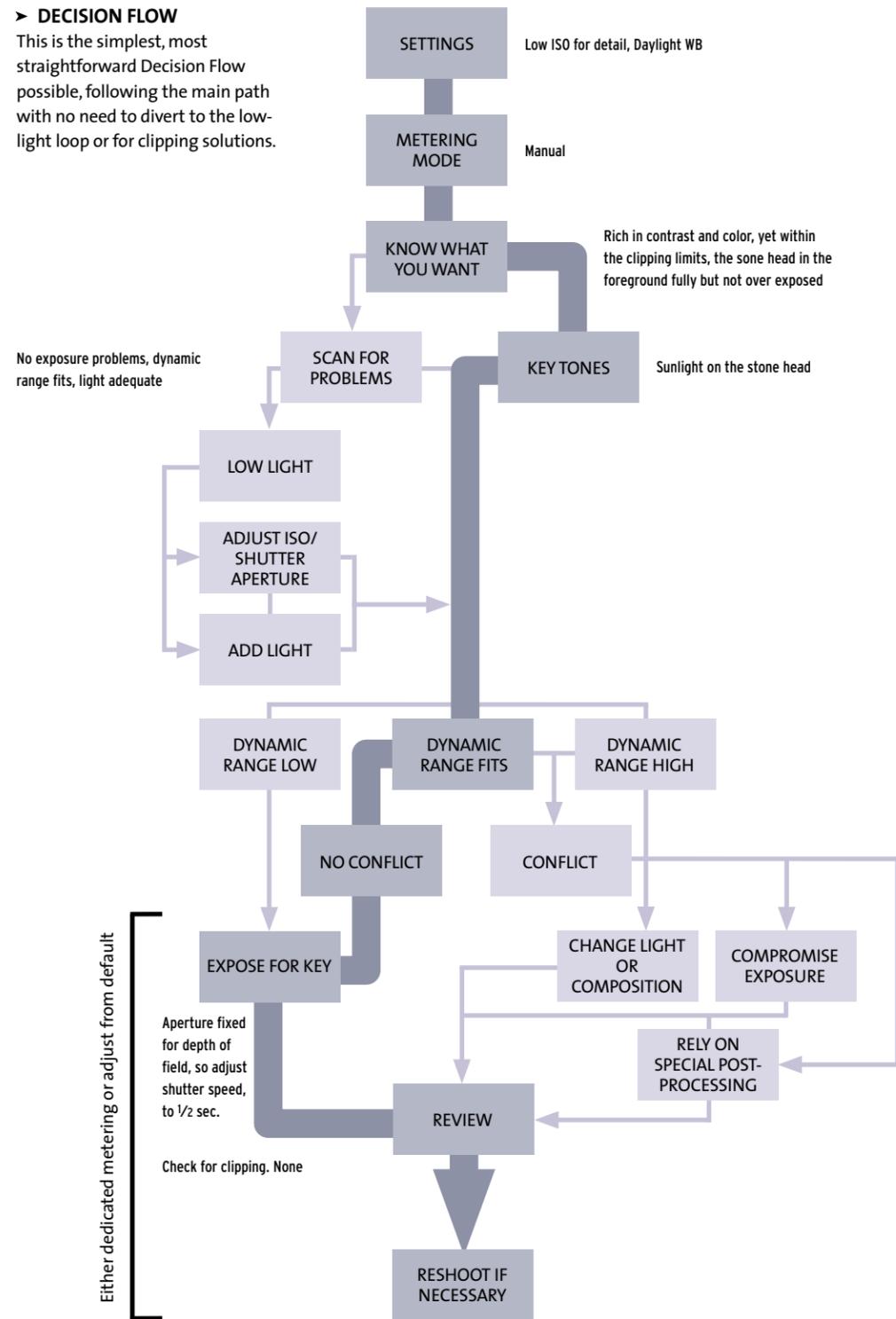
CASE STUDY 1

This is the first of three case studies to show how the Decision Flow works. There are many more examples throughout the book, each focused on a different aspect of exposure. I've chosen this photograph as the first example for simplicity—the dynamic range of the scene is within the capacity of the camera and sensor (in other words, range fits), and there is one clear area of interest that chose itself as the key tone. Nothing complicated, then, and the situation allowed plenty of time to set up the camera, anticipate the right moment, and think in advance about everything, including the exposure.

If you allow yourself the opportunity to think in some detail about the exposure, there is always something of interest in the process. In this case, it was a ruined area of temples in Ayutthaya, Thailand. What caught my eye was the head of a Buddha statue lying in the grass, and having reced the site earlier, I could see that the final rays of the sun might be interesting. The composition and camera viewpoint made the most of the depth in the scene, from the blades of grass surrounding the stone head to the leaning brick stupas beyond. Technically this meant a wide-angle lens stopped well down for good depth of field (20 mm efl and $f32$).

By this time, in the late afternoon, the contrast in the scene was good, meaning it was strong, but still the dynamic range was perfectly manageable. This was pretty obvious at a glance, but I had time to measure the scene with a handheld meter, and this confirmed it. This meant that so long as I chose a moderately average tone for the key and intended to give it an average exposure, it would all be straightforward. And it was.

The main issue was timing, as the shadows were creeping quite quickly. With trees and more ruins behind the camera, the shadows falling on this patch of ground were not so easy to predict. I chose the moment when the shadow from a distant branch darkened the grass on this side of the head, and there was only a minute or so



for shooting before that particular shadow crept up the stone head. The key tone is the lit part of the stone head, and the shutter speed was set to render it just a fraction less than average (maybe a $\frac{1}{4}$ f -stop), which was $\frac{1}{2}$ sec.

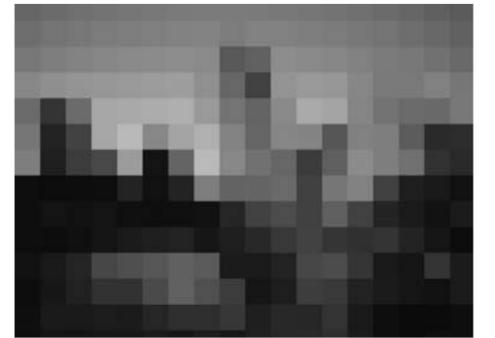
One technique I'll use throughout the book to demonstrate this is to convert the image into a grayscale pixelated matrix. At this scale of pixelation the important tones stand out, but without a proper sense of the content. I find this makes it easier to consider these exposure issues—after the event, obviously. There was time during this shot to look over the scene and find other areas of the same tone as the head. Reassuringly, there were several, including most of the left brick stupa, and the corners of the sky (the “corners” stem from the vignetting of the wide-angle lens). For interest, I've also included a shot taken with a second camera and a slightly longer focal length of lens, several minutes later. The sun is lower and the shadow of the branch has crept up the head and cleared it. A patch of sunlight strikes the upright head in the middle distance, which works well, but the light on the foreground head is nowhere near as interesting as in the earlier shot. The photograph really did need that soft shadow on the immediate foreground grass!



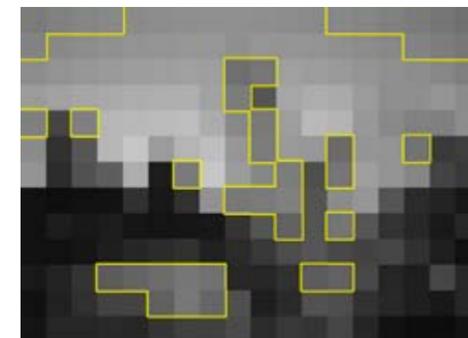
◀ RESULTING IMAGE
This picture is the final result of the case study described here. The schematic diagrams below show how, once the head was chosen as the focal point, the other midtones were identified.



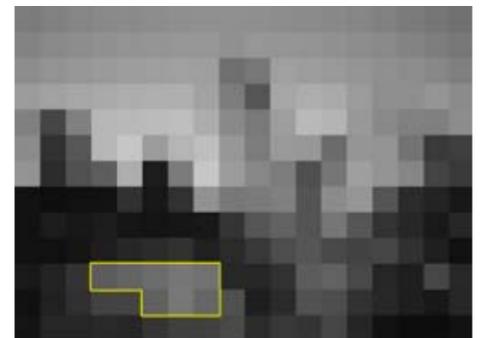
▲ FOCAL POINT
The focal point of the picture outlined in white



▲ GRID ANALYSIS
This schematic shows regional brightness.



▲ OTHER MIDTONES
Other areas of the picture share the same midtones



▲ FOCAL POINT
The focal point is exposed to be a midtone

CASE STUDY 2

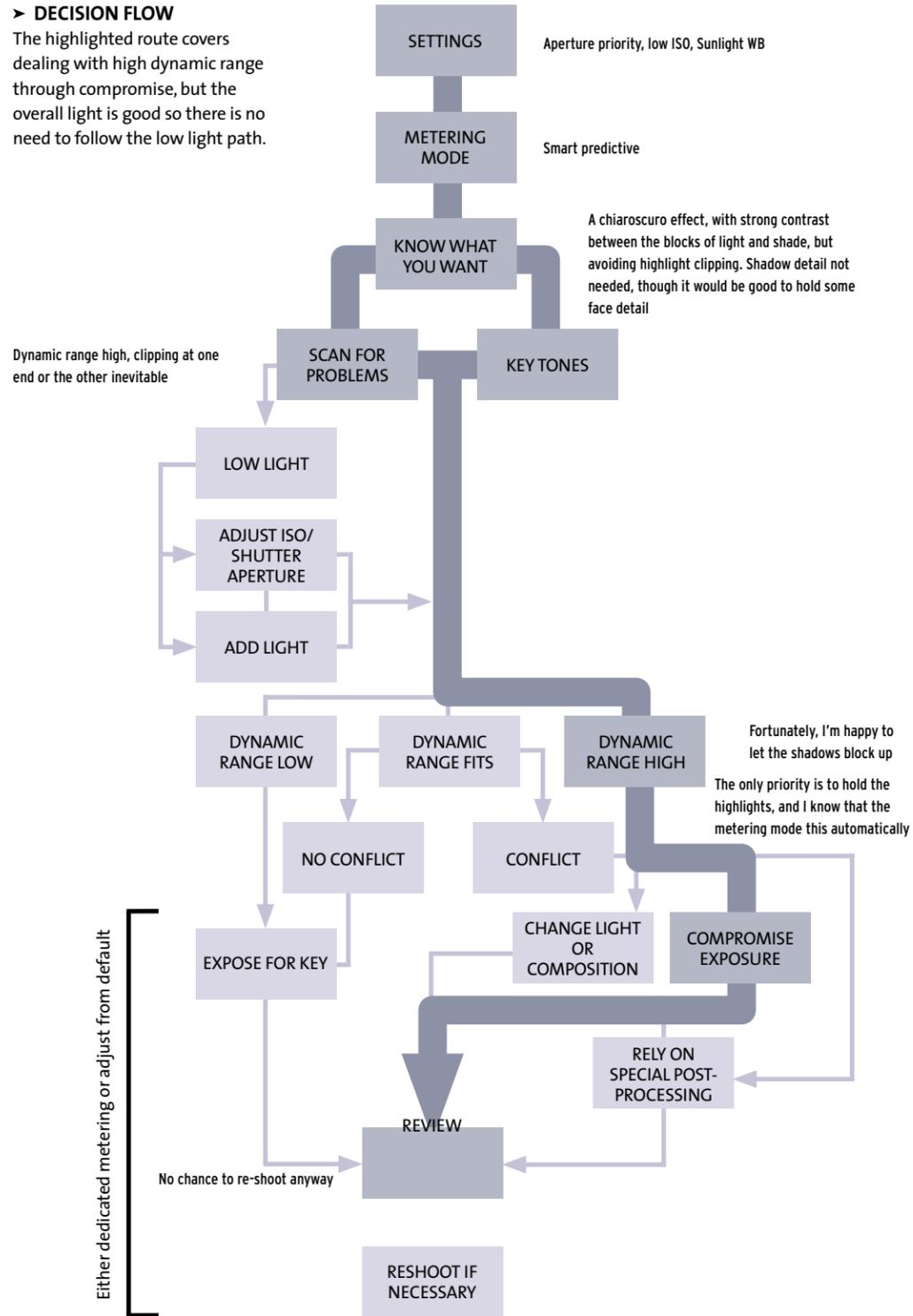


I've chosen this as the second example because there was almost no time at all to make an exposure decision. A lot depended on the camera settings that were already chosen, and being completely familiar and confident with them—which is exactly the point. Also, I want to show that *almost* no time is still *enough* time to get it right.

The strong chiaroscuro (the high contrast pattern in cast shadow) on this side of the sunlit street caught my eye, and what I was after was a person walking through the scattered pools of sunlight. The lens was a long 300 mm, which gave me some choice to track anyone walking for a short distance without changing the viewpoint. After about a minute of waiting, I saw this woman coming out of a doorway further along the street. Timing was foremost in my mind, and I had about five seconds to anticipate this and the exposure. While waiting, I had already assessed the exposure conditions—dynamic range high, but not important to me so long as I held the highlights, as I wanted contrast. The camera metering mode was what I call smart predictive and what Nikon calls 3D Color Matrix, and I knew from experience that this would almost certainly expose without clipping highlights. In reserve, I also had the fact that I was shooting Raw, which would give me some leeway, perhaps 1/2 to 2/3 stop in case of error.

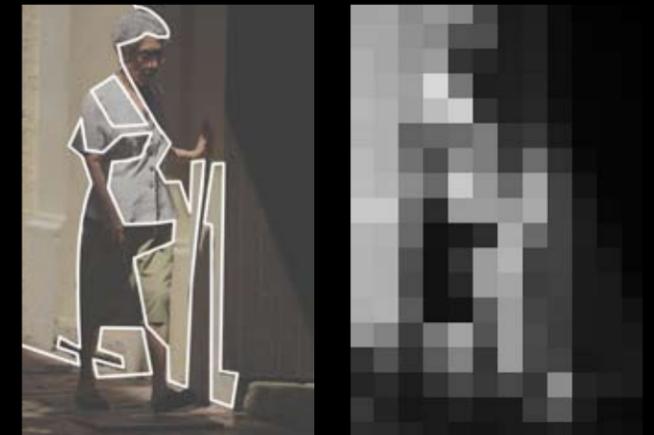
► DECISION FLOW

The highlighted route covers dealing with high dynamic range through compromise, but the overall light is good so there is no need to follow the low light path.



► CONTRAST COMPARISON

These are two alternative versions, but both are valid. For the purposes of this demonstration, they were prepared in ACR (Adobe Camera Raw), using the Exposure slider only. On the left is an exposure half a stop darker, which is the result of making the key tone not the entire sunlit area but instead the more strongly lit upper part of the woman's blouse. This exposure valuably shows the texture of the fabric, but the cost is even denser shadows and a less-readable face. On the right is a fuller exposure, by 2/3 stop, in an attempt to keep some of the shadows open. Here, the cost is clipping in the brighter highlights, especially the blouse.



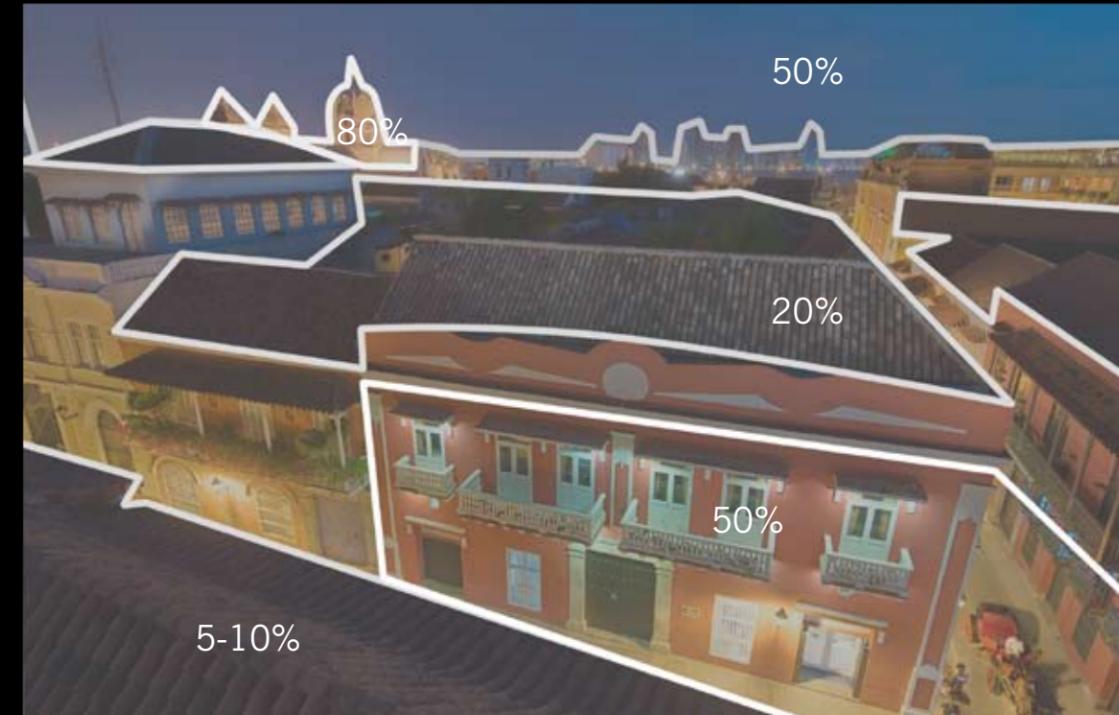
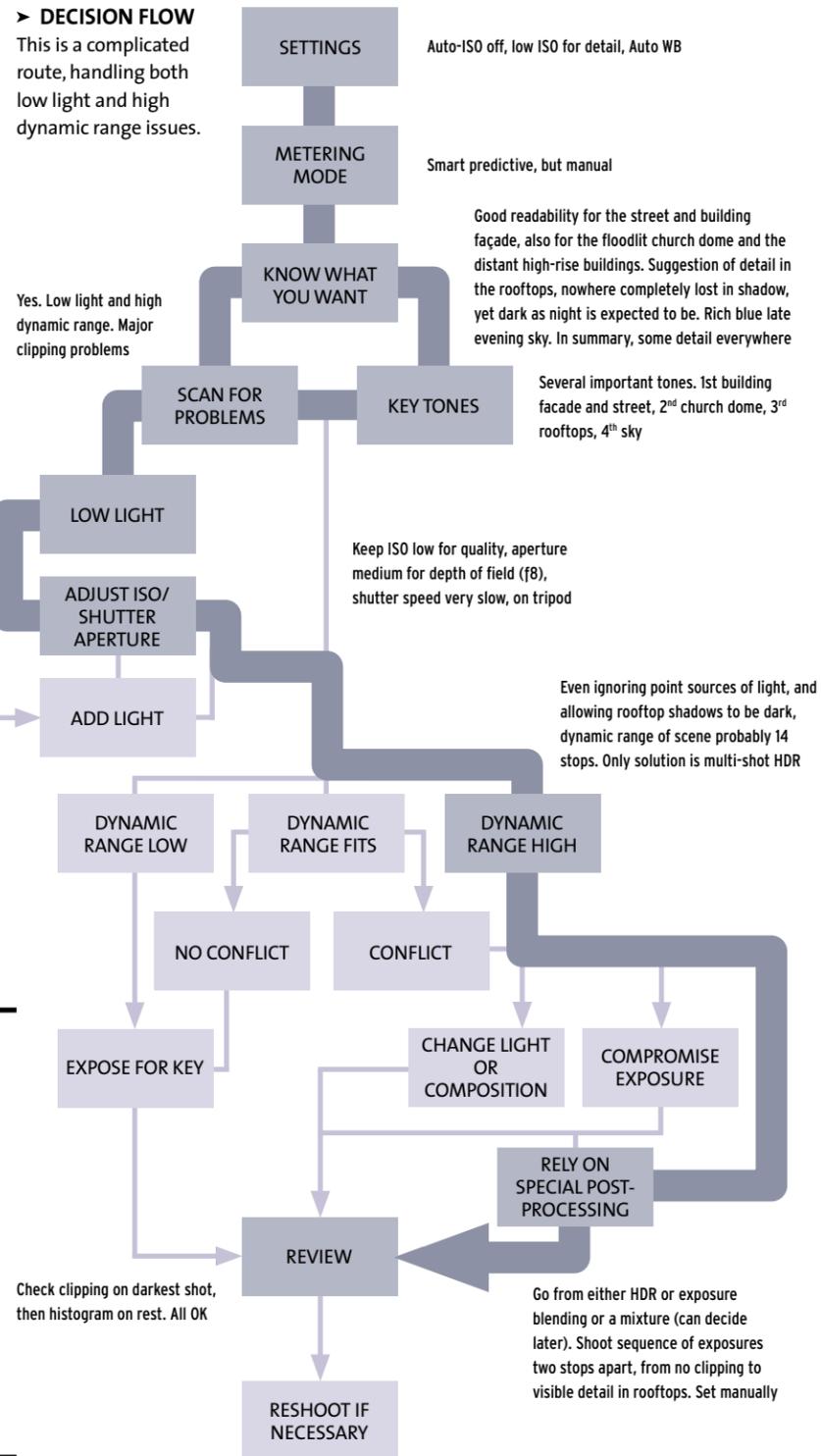
CASE STUDY 3



UNPROCESSED SCENE

This is a very different situation from the previous two. As with any planned evening or night overview, it was reced in advance. The camera was set up on a tripod even before sunset, so there was plenty of time to think ahead. Also, as darkness fell (relatively quickly, as this is the city of Cartagena, Colombia, in the tropics) and the streetlights and floodlights were switched on, there was time to anticipate the final pattern of brightness. Experience told me that the dynamic range would increase greatly as light left the sky, but it was a foregone conclusion that I would shoot multiple frames for later exposure blending or HDR. I wanted a full night-time distribution of city lights, but the precise timing would be determined by the sky—I wanted rich blue, so this would probably be about quarter of an hour before total black.

The workflow comments explain all. Note that there were priorities of key tone, with four to consider, which is something quite manageable with the multi-shot technique that I chose. The type of scene lighting or exposure situation, by the way, was type 7: dynamic range high but no single tone dominating.



◀ KEY AREAS
The four key tonal areas, with a rough approximation of the brightness I wanted from each. The main key tone was the lit façade of the red building, plus the street. I wanted this to be a mid-tone overall, thus 50%, accepting a moderate range of local contrast. Lamps could clip throughout the image—it was not important to hold them.

