Basic Image Processing: Example Workflows – Glenn Pure

This is part 2 of my article in the December 2015 newsletter. Space did not permit publication of these example workflows for basic image processing. The techniques are based on a workflow kindly provided to me by BLP member Ian Wilson. I've found these techniques work very well and can enable good quality images to be produced even from my entry-level gear (Canon 700D and original series 100-400mm Canon lens).
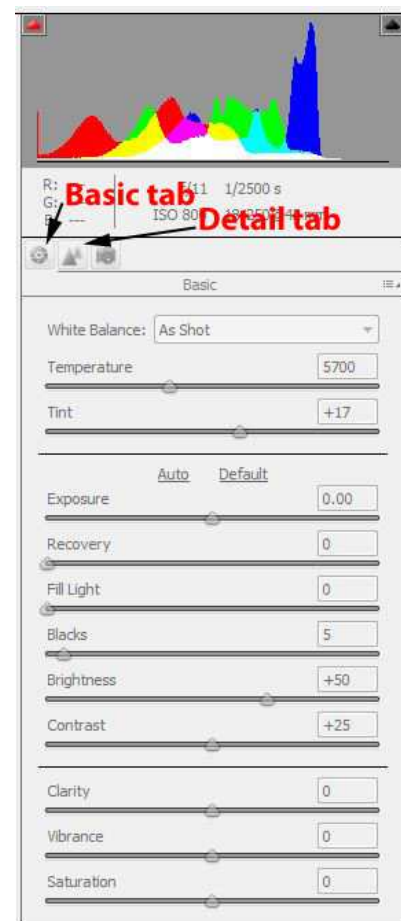
Which is the best workflow to use? If you have Canon gear, I'd strongly recommend the DPP/PSE/Photoshop workflow. DPP will produce the best possible RAW conversion from your camera image. Tests suggest that DPP produces a significantly less noisy image than the other processing options. It also has unique tools for maximising the sharpness and clarity of your final image, notably Digital Lens Optimiser.

Example Workflow: Photoshop Elements (PSE)/Photoshop

This workflow is based on my copy of Photoshop Elements (PSE, version 9). Differences with the current version (v14) are noted – with thanks again to Ian Wilson who is using this version. The functions are similar in Photoshop CC although there are additional tools and adjustments available in that software that are not used or referenced here.

1. **White balance.** Open the RAW file. The Camera RAW module will start. At the bottom of the screen, select '16 Bits/Channel' from the **Depth** drop down box. Make the **White Balance** adjustment using the dropdown box and select the lighting conditions at the time the photo was taken (for example, cloudy, flash etc). Fine tune if necessary with the colour temperature slider. The '**Tint**' slider can be used to make fine adjustments (more green or more magenta). That should only be necessary if there is an area of white or neutral grey in your image that has a residual colour cast to it.

The control section of PSE (v9)'s Camera Raw module

2. **Exposure adjustments.** The sliders in this part can be a bit confusing. The '**Exposure**' slider works the same way as changing exposure in your camera. Increasing it will brighten the image overall, blow out the highlights and bring out detail in otherwise black shadow areas and vice versa. Some earlier versions of PSE also have a 'Brightness' adjustment below 'Exposure'. This can be ignored. The '**Recovery**' slider (called 'Highlights' in version 14) is used to recover details from highlights that are blown and lacking any definition. The '**Fill Light**' slider (called 'Shadows' in version 14) lightens and recovers detail in the darker areas of an image. Exactly how much to adjust these sliders will vary from image to image. The aim is to ensure the highlights and shadows, especially in your main subject, have visible detail without making the overall image look unnatural, flat, or overly contrasty. The other sliders are beyond the scope of basic image processing.

3. **Initial sharpening**. The '**Details**' tab of the RAW module contains the sharpening and noise reduction controls. The first part contains the **Unsharp Mask** settings. To keep things simple, it's best just to move the 'Amount' slider while leaving the 'Radius' and 'Detail' at their default settings (1.0 pixel and 25 in my version). There's plenty of information online for those who want to tweak the unsharp mask settings further. Sharpening at this point is important, but be conservative as the image will be sharpened again later.

4. **Noise reduction of main subject**. Noise in the background will be done later. Use the minimum amount of '**Color**' (chrominance) and '**Luminance**' (brightness) noise reduction to get acceptable noise levels in the main subject. Luminance noise reduction will affect image detail so watch for this. Chrominance noise reduction will not impact detail but can introduce strange artefacts if turned up to much. Remember that some noise reduction will occur consequentially when the image is downsized later. Processing of the RAW image is now finished so select '**Open image**'. This converts your image for normal editing in PSE or Photoshop.

5. **Crop image**. Make a rectangular selection of the parts of the image you want to keep (use keyboard shortcut: **M** to select the rectangular **Marquee** tool). Once selected, go to '**Image: Crop**'. Alternatively, use the **Crop** tool (keyboard shortcut: **C**) to select the area, then click the green tick to complete the crop operation.

6. **Background noise reduction**. Use the **Quick Selection** tool (keyboard shortcut: **A** to access this tool) to select the main subject then tidy up the edges with the lasso selection tool (keyboard shortcut: **L**) with 'Feather' set to zero. The 'Feather' adjustment can be found under the tool-specific pop-up menu 'Refine Edge…'. Zooming in helps at this point. Include the bird's perch in the selection if it is in sharp focus. For space reasons, I'm not going into detail of the use of these tools but there's plenty of information available online. Save the selection ('**Select: Save Selection**' and enter a name for the selection; it's possible to save multiple selections) then invert it so the background is now selected ('Select: Inverse'). Apply the Median filter in PSE ('**Filter: Noise: Median**'). Try a radius of between 3 and 8 pixels. Before performing the noise reduction though, it's a good idea to save the image since the selection you have just made will also be saved. This means that if necessary, you can go back and re-process the image later but avoid the time-consuming process of selecting the main subject.

7. **Resizing and final sharpening**. Go to '**Image: Resize: Image Size**'. Enter the dimensions you require for the final uploaded image (BLP max 1400 x 1050 pixels). PSE will maintain the aspect ratio so you will only need to enter either the maximum width or the maximum height as the other value will be automatically determined. Once the image has resized, view the image 1:1 on your screen ('**View: Actual pixels**', or keyboard shortcut: **Ctrl-1**). Now select the main subject again using the earlier saved selection ('**Select: Load Selection**' and pick the selection you named earlier from the list) then sharpen ('**Enhance: Adjust Sharpness**'). A separate dialog box will appear with a preview window for this tool. There is a dropdown box around the middle of this dialog box that allows you to select the method used for sharpening: select '**Remove Gaussian Blur**'. For the other sharpening settings, try a radius between 0.3 to 0.7 pixels and an amount between 30 and 75. Photoshop CC is a little different. The tool there is called 'Smart Sharpen' and it is found under 'Filter: Sharpen: Smart Sharpen'. This tool also has some other functions including 'Reduce Noise'. Adobe says this reduces unwanted noise while keeping important edges unaffected. There is also a

sub-menu for shadows and highlights to differentially control noise in these parts of the image.

8. **Convert and save**. Go to '**Image: Mode: 8 Bits/Channel**'. Then go to '**File: Save as…**'. Select 'JPEG' as the file format. When setting the JPG save options, use the maximum 'Quality' setting to keep the image below 1 megabyte (maximum allowed for upload to the BLP website).

Note: Use of clone and other image manipulation tools is beyond the scope of basic image processing. Many Adobe tools, including the clone stamp tool, will not work on 16 bits files and will be shown as unavailable. To access these tools, first convert your image to 8 bits ('Image: Mode: 8 bits/channel'). However, *please do as much processing as possible before converting to 8 bits to maximise the final quality*.

Example Workflow: Lightroom

I'm not a Lightroom user so have only learnt some basic features after looking at Adobe's online tutorials and using it for a month on a trial licence.
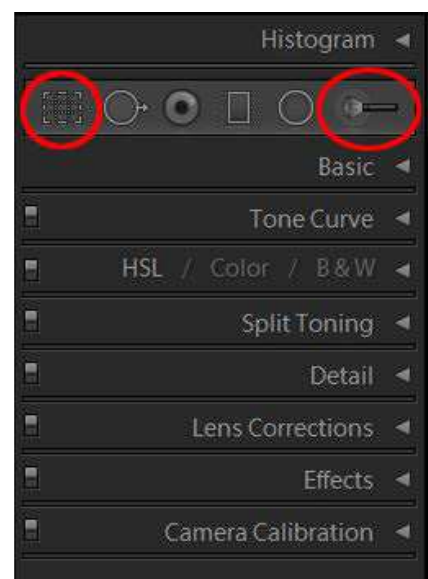
After your image is imported it should be opened in the Develop module:

1. **Crop.** Open the RAW file and use the Crop Overlay tool (keyboard shortcut: **R**) to crop your image.

2. **White balance.** This is found under the '**Basic**' tab/heading. In the dropdown box '**WB:**', select the lighting conditions at the time the photo was taken, eg Daylight, Cloudy etc. Fine tuning can be achieved with the '**Temperature**' and '**Tint**' sliders. Use the former for more radical adjustments. Unless your monitor is calibrated though, the results you get may not be what others see.

3. **Exposure.** Adjust the '**Exposure**' slider to achieve suitable overall brightness then set the '**Highlights**' and '**Shadows**' sliders to recover any missing detail in the highlights and shadows or dark areas of the image. The '**Whites**' and '**Blacks**' perform a similar role but affect the white and black points as well (hint: hold the Alt or Option (for Mac) key down to watch when clipping occurs – generally, move the sliders until clipping no longer occurs). The ultimate aim is to ensure the highlights and shadows, especially in your main subject, have visible detail without making the overall image look unnatural, flat, or overly contrasty. The other sliders are beyond the scope of basic image processing.

The control section of Lightroom's Develop module. The Crop Overlay and Adjustment Brush tools are shown circled.

4. **Sharpening.** This is under the '**Detail**' tab/heading. The '**Amount**' and '**Masking**' are the key adjustments. Increasing masking will reduce the areas to which sharpening is applied to those edges with greater tonal differences. Holding down the Alt key while changing 'Masking' will show where the sharpening is being applied. Sharpening at this point is important, but be conservative as the image will be sharpened again later.

5. **Noise reduction of main subject.** Noise reduction is also found under the 'Detail' tab. The '**Luminance**' and '**Color**' sliders are the main controls. The other sliders provide finer control of the characteristics of the noise reduction. Keep your attention on noise in the main subject and remember there will be some incidental noise reduction when your image is downsized later so be conservative. Luminance noise reduction will affect image detail so watch for this when using it. Chrominance noise reduction will not impact detail but can introduce strange artefacts if turned up to much, so watch for any odd effects.

6. **Noise reduction of background.** This is done by selectively painting the areas that need more noise reduction with the **Adjustment Brush** (keyboard shortcut: **K**). Note, however, that the general noise reduction sliders described in the preceding step cannot be applied selectively like this. Instead, Lightroom provides a separate set of adjustment options under the Adjustment Brush. This includes a single noise reduction slider (that affects luminance noise only). Once the area you wish to noise reduce has been painted with the Adjustment Brush (hint: check the Show Selected Mask Overlay box under the image to see exactly where the adjustment brush has been applied), simply move the noise slider back and forth to achieve the desired result.

7. **Convert and save.** Go to '**File: Export…**'. Set JPG size and quality and maximum height OR width of the image; Lightroom will automatically set the other dimension. Output sharpening will also be needed. You can try setting this in the Export options to fix loss of detail from downscaling. A better option would be to export the file as a JPG without any output sharpening, then apply sharpening specifically to the main subject (you should be able to use Lightroom or another application like Photoshop to do this). Sharpening is applied only to the bird – sharpening the whole image will increase noise in the background. To sharpen the bird you will have to select these areas with the Adjustment Brush then use the sharpness mask sliders to apply sharpening. Don't be tempted to skip this step; it is critical to achieve a satisfactory final result.

Example Workflow: DPP and PSE/Photoshop (Canon users only)

There are multiple advantages to starting with Digital Photo Professional software (DPP). First, it contains the best possible converter for your Canon RAW files and is likely to give considerably lower noise images. A key feature of DPP is the Digital Lens Optimiser tool that de-blurs images using Canon proprietary lens and camera data. It will recover details in ways that normal third party sharpening simply can't. Digital Lens Optimiser is also the best possible way of removing any chromatic aberration present.

This workflow is for DPP version 4. Earlier versions are quite different and some of the adjustments available in version 4 are not present in earlier versions. The Tool Palette, which becomes visible when an image is opened, contains all the adjustment tools. They are laid out in the order in which they should be used, starting at the top left 'Lens' tab and finishing on the bottom right tab. Having said that, only 4 tabs out of the 8 in total will need your attention. The final couple of steps need to be finished in Photoshop, PSE or similar.
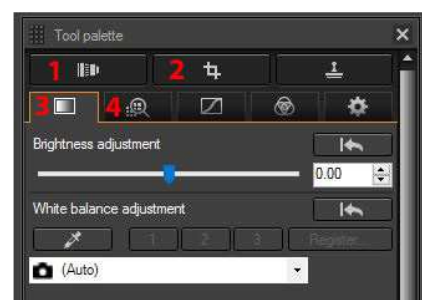
The tabs on DPP's Tool Pallete: 1 – Lens; 2 – Crop; 3 – Basic adjustments; 4 – Image detail.

DPP steps

1. **Digital Lens Optimiser.** Open the image then go to the '**Lens**' tab (top left of the Tool palette – if for some reason the Tool palette isn't visible, go to 'View: Tool Palette'). If you are using this for the first time, you will need to download data for your lens. Just above Digital Lens Optimiser is the button for downloading lens data from Canon ('Lens Data'). Before clicking the check box next to 'Digital Lens Optimiser', scroll down the tab and turn the sharpening off. The default slider setting (50) is usually a good starting point for 'Digital Lens Optimiser'. It may take some time for your computer to process the changes. Do not change the 'Shooting distance' slider. It's worth clicking the 'Peripheral Illumination' checkbox to fix any vignetting and 'Color blur' (but I often forget to – the effects are quite subtle). Do not correct 'Distortion' as this entails resampling and may introduce some blur.
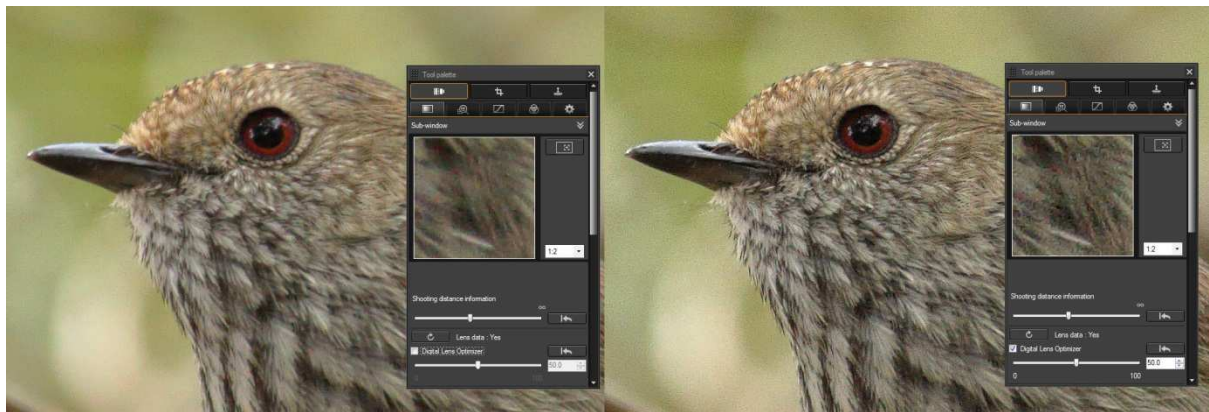
The impact of digital lens optimiser (DLO) in Canon DPP 4 software. The image is a 1:1 view of the original RAW file. The left panel is without DLO. Note, the 'sharpness' setting (not visible) for both with and without DLO was '3'. Turning DLO on does increase image noise visibly.

2. **Initial sharpening.** Continue scrolling down the same tab. Use '**Sharpness**' and set it to 3 or 4; do not use 'Unsharp Mask' as it introduces more artefacts. To see the impact, view your image at 100% (right click over the image area and select '100%').

3. **Crop image.** Move to the next tab (Crop). Use your mouse to draw a selection over the image.

4. **White balance and exposure.** Jump ahead to the leftmost tab on the bottom row of tabs ('**Perform basic image adjustment**'). First adjust '**Brightness**' so the image doesn't look too glary or dull. Set the **white balance** using the dropdown box; fine tune with associated sliders if necessary. Unless your monitor is calibrated though, the results you get may not be what others see. Also, be aware that if you perform this and the next step in a room that is overly dark or brightly lit, it will affect how you perceive the image on your screen.

5. **Lighting adjustments.** These items are the next ones down on the same tab. Uncheck the 'Auto Lighting Optimiser' box. For the '**Picture style**' dropdown box, select either 'Standard' or 'Fine detail' – try both and see which you like best. Under '**Gamma adjustment**', click the 'Move midpoint to match' and then click the 'Auto' button, which will provide a rough starting point that will almost certainly needs further tweaking. Before you do such tweaking though, set up the **shadow and highlight warnings**: go to 'Tools: Highlight/Shadow warning display settings…'. Set 'Shadows' to 5 and 'Highlights' to 245, then go to 'Preview: Highlight/Shadow warning' and click on this. Areas where detail is missing will show warning colours. Now move the left vertical line on the gamma curve (this

is the black point) back and forth until the warning colour for shadows just disappears (focusing attention on the main subject, not the background). Then do the same for the right vertical line on the gamma curve (this is the white point; again focus on the main subject). Finally, adjust the middle line (the mid grey point) back and forth to bring out the midtones in your image – before doing this though, set the 'Shadows' and 'Highlights' sliders to their midpoints. Once the mid grey point is set, the 'Shadows' and 'Highlights' sliders can be adjusted to bring out detail in these areas, again paying attention to the main subject. You may need to iterate back and forth between the shadows/highlight sliders and black/white point adjustment to get an acceptable result. If there are still problems, try starting again by first further adjusting the 'Brightness' slider.

6.   **Noise reduction of main subject.** Go to the '**Adjust image detail**' tab (next right from the Basic image adjustment tab) and view the image at 100% view. The default noise reduction settings are a good starting point. These are set automatically based on your camera model and ISO used. If you need to change the 'Luminance' noise slider, this will affect sharpness. Conveniently, the 'Sharpness' adjustment is also repeated just below the noise slider for further fine-tuning if necessary.

7.   **Convert and save.** Go to '**File: Convert and save**'. Select '**16 bit TIFF**' as the output file type. This file type will ensure the best quality results during the subsequent processing steps.

Photoshop Elements or Photoshop steps

8.   **Optional: Exposure fine tuning**. This step shouldn't be necessary if the exposure and lighting adjustments have been done correctly in DPP. If you think you need more, open the TIFF file you have just saved. Go to '**Enhance: Adjust Lighting: Shadows/Highlights**'. Adjust the sliders to improve the visibility of detail in the highlights and dark areas of the image.

9.   Perform steps 6 to 8 in the example workflow for PSE, Photoshop, given earlier in this article.

More information and acknowledgements

If you want more information, further coverage of many of the subjects here can be found in Ian Wilson's 2-part article '*Seven Deadly Sins*' that appeared in the June and August 2015 newsletters, and in my December 2015 article on basic image processing.