DIGITAL PHOTOGRAPHY
DIGITALPHOTOGRAPHY

+ RAINBOWS ARE PRETTY THINGS. A DOUBLE RAINBOW EVEN MORE SO. THE IRISH MYTH THAT A POT OF GOLD COULD BE FOUND AT THE FOOT OF A RAINBOW MIGHT NOT HAVE CREATED THE MARATHON RACE BUT CERTAINLY WOULD HAVE PROVIDED GOOD TRAINING FOR IT.

: KELVIN AITKEN ©2008 www.marinethemes.com

When sunlight hits droplets of rain it is reflected back through the curved drops. In the process the sunlight is split into it's primary colours. When shooting digital images, this can happen within the camera's sensor chip, producing an annoying fringe of colour. Of course there are no raindrops, we hope, on your sensor chip but light can be split into different wave lengths by a number of conditions. A cheap lens with bad optics can cause this effect where some of the wavelengths are bent at a different angle, causing a halo of coloured light when all of the light waves do not hit the sensor at the same spot. This is particularly evident with wide angle lenses, as the light is being bent in a rather radical fashion in order to converge onto the sensor.

If you've ever taken a photograph through the thick perspex of an aquarium you'll often see this problem in your photos, especially if you shoot through the perspex at an angle, causing the light waves to be bent even more or to have them strike the sensor at an acute angle. In a previous article it was explained why lenses that are wider in view than normal increasingly demand a dome port to overcome this problem as the light reflecting from your underwater subject is bent at the air/water interface. The curve of the dome allows light to pass through the air/water interface without it bending or being broken up, allowing sharp images, and more importantly, images free from colour fringing.

Kelvin Aitken is a Melbourne-based professional photographer and diver passionate about the big blue and the big sea creatures to be found out there. He's dived from the Arctic to the extremes of the South Pacific and if there's a new marine dive adventure to be experienced or invented, he's always the first to put up his hand. He's also dived the southeastern Australian continental shelf and photographed shark species nobody knew would be found out there. Kelvin is a BBC Wildlife Photographer of the Year marine category winner and his unique work is on www.marinethemes.com

High contrast images, such as a black shape against a white background, can also cause colour fringing. Even with a high quality lens, the sensor's photodetectors are overloaded by the amount of light hitting them from the bright area while also trying to record the dark tone. The excess light will 'bleed' or spill over onto neighbouring detectors (remember, you may have 8, 10, 12 million or more photodetectors on your sensor chip) causing a halo or colour fringing. This can occur either in the light area, the dark area or both. The colour varies but in my experience it is usually a purple or, more accurately, magenta colour fringe in the light area.

This sort of colour 'blooming' is called Chromatic Aberration, the recording of light waves, or chroma, in a distorted manner and can also be referred to as Spherical Aberration when the same or similar effect is caused by your lens optics. At the end of the day, you'll get this far more often using a digital camera than a film camera, even when using high quality lenses. Part of this is due to the inability of digital sensors to cope with the contrast created by sunlight, something our eyes are well equipped to do, and the inherent nature of electronic capturing of visual information. The most obvious place to find Chromatic Aberration is on the edges of specular highlights. These are the brightest areas of any photograph, caused by the reflection of your light source off a shiny surface. Remember when Betty-May got married and thanks to a bottle of bubbly, her naturally oily skin and 40 degree temperatures in the shade, all the photos showed a bright specular spot on the end of her nose? Or the pure white mini explosions of light on her ubiquitous Dior sunglasses from your flash. And the flaring sun spots on the Limo's chrome bumper bar. Those are all regarded as specular highlights where, even on good quality film stock, there is zero information caused by the light overload (Figure 1).

So how do you deal with this problem? Besides buying the best lenses you can afford, keeping your camera and housing ports spotlessly clean and ensuring that your sensor doesn't have a nice coating from the last sneeze you emitted while changing lenses, the only solution is to fix the fringing when converting your RAW files or, even better, in Photoshop or any other decent photo editing software. Lets have a look at your options.

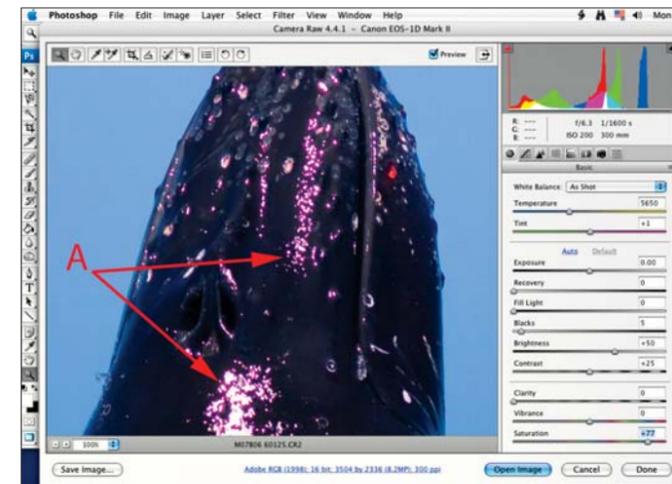Since all of your images are in RAW format (they are, aren't

Figure 1: Specular highlights are areas with zero information. They are caused by a bright or reflective surface reflecting a point light source, such as your strobe or, in this example of a breaching whale, the sun. The specular highlights have a magenta fringe (A) caused by the extreme contrast of the dark whale's skin and the specular highlight.

they? If not, go sit in the corner and come back when we discuss the next step) we can use either your camera's software that was provided when you bought your camera, a third party software program designed to convert RAW image files or the Photoshop RAW file converter. For various reasons, I tend to use Photoshop to do all my digital work flow. While you may get a slightly better result from the software provided by the camera manufacturers, the difference in quality is marginal and the software is often clunky and awkward to use.

Open the RAW file with your chosen software. You can tell your computer to use your particular file conversion program to open your RAW files by accessing the file properties. By right-clicking or Control-clicking a RAW file and choosing Properties or, on the Mac, Get Info, you can select the program or change the default application that opens your particular type of RAW file. You should only have to do this once. When set, every time you double-click on a RAW file your preferred program will attempt

to open the file. I usually employ Bridge, the file browser and viewer packaged with Photoshop, to view and open my RAW files. You can set Bridge preferences to use a particular version of Photoshop or any other software you like to open the RAW files.

Once your file is open in your RAW conversion window you want to find the Lens or Lens Corrections options (Figure 2). In Photoshop 10 this can be found in the Raw File converter on the right hand side of the window (Figure 2). Usually the problem is a magenta fringe, although it can also be another colour. Adjust the sliders until you get rid of the problem. If the result isn't perfect or you are getting zero results or if you are having problems with other parts of your image caused by your adjustments, just reset the settings (on the Mac, hold down the Option key and the Cancel button will change to Reset; on Windows use the Alt key or just enter the number '0' in the boxes next to the adjustment sliders), make any exposure and
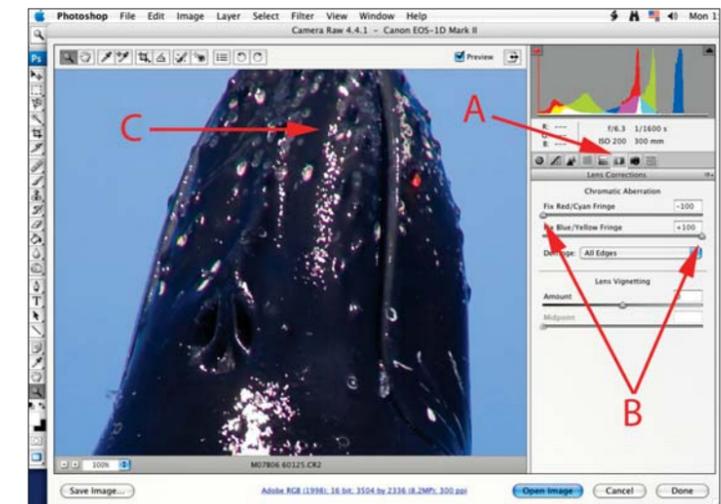

Figure 2: In my RAW file converter I have chosen the Lens Corrections tab (A) and used the less than perfect sliders (B) to get an imperfect result. Even with the sliders at maximum extension, there are still traces of the magenta fringes (C). However you may find that a less extreme example of chromatic aberration may be fixed quite adequately.
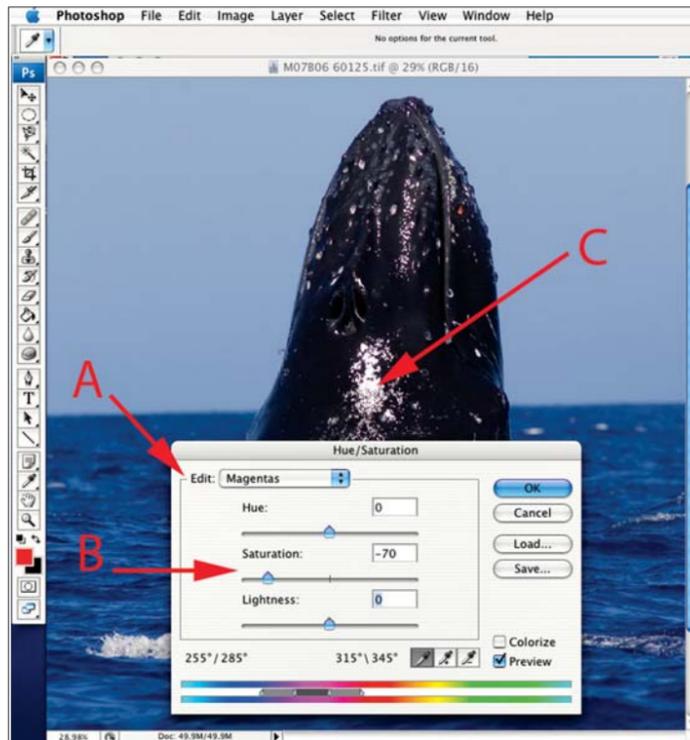
Figure 3: The Hue/Saturation dialogue box allows you to edit one colour channel, in this case we want to work on Magenta (A). Use the Saturation slider to reduce saturation of magenta in your image (B). This won't affect other colours in your image but will eliminate that magenta fringe (C)

colour balance adjustments that you'd usually make and click Open or OK to open the converted file in Photoshop or your preferred image editing software.

Mostly I use only the RAW converter to open the image without too many adjustments, rather than mucking about with the myriad sliders and adjusters thought up by some particularly divisive and maniacal committee. Making only basic exposure adjustments to my image, sometimes using the White Balance tool to make a rough colour adjustment or the irritatingly restrictive Temperature and Tint sliders to tweak any major colour caste, I can then move to my real image machinery. All other fine adjustments I make in Photoshop as that's what your photo editing software is for and what it does best, including resizing images which is another story.

Now, compared to the RAW converter window, this next step is amazingly simple and idiot-proof. Or maybe just foolproof. At worst, it's very easy, always is quicker, and gives better results than the RAW converter (Figure 3). Zoom into your image until you have a clear view of the offending specular highlight or other area with chromatic aberration. Open the Hue/Saturation dialogue box. In Photoshop it's under Image>Adjustments>Hue/Saturation, (keyboard shortcut is Command-U). With my old version of Elements (version 2) it's under Enhance>Adjust Color>Hue/Saturation with the same keyboard shortcut. At the top of the dialogue box it has a drop down list next to the word Edit. Master will be showing. Click on it and select the colour you want to get rid of. In my example of a

breaching whale it's a magenta fringe (A). Next, click on the Saturation slider and rip it across to the left (B). Move it around to the point where the nasty colour fringe disappears (C). Click OK and you're done. If you fudge it up just put '0' into the box next to the slider to zero it back to where it was, or do the old Option or Alt key shortcut to get the Reset button showing.

All done. You may find that the colour fringe is made up of two colours, maybe both red and magenta, but usually it's just one. Do not over do it. Viewing your image at 100% magnification will help you get it just right.

But what if other areas of your image are adversely affected by your ham-fisted slider dragging? There are two ways to get around this: using selections and using a special little tool that's often used.

Lets say you have lots of pink/magenta soft coral in your shot and a bare white patch of coral which has a magenta fringe of chromatic aberration that you want to get rid of. Desaturating the entire image kills your soft corals, turning them into a lush forest of overcooked broccoli. Isolate the area you want to work
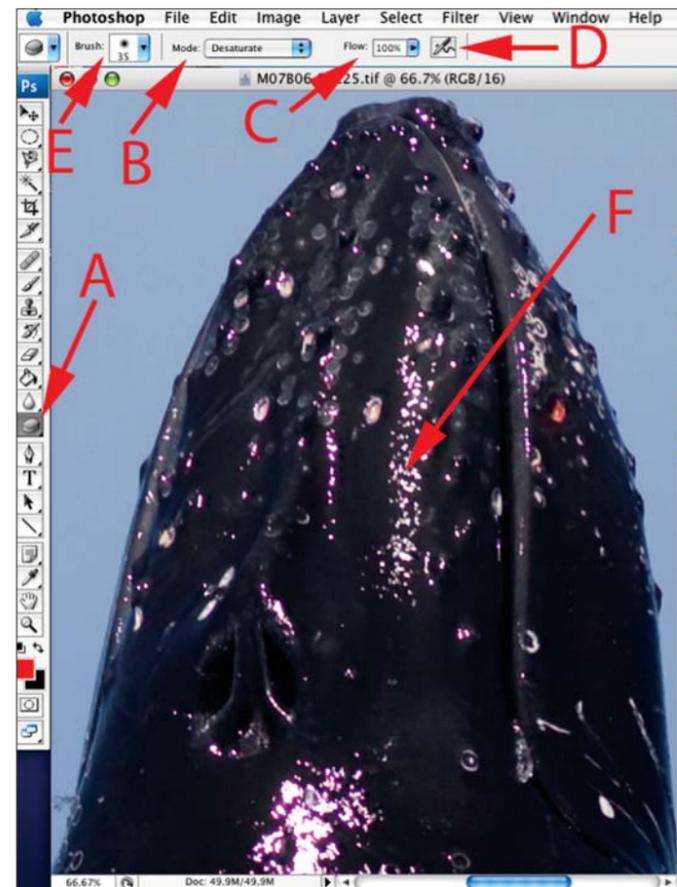

Figure 4: Select the Sponge Tool (A). Set the mode to Desaturate (B). Reduce the Flow if you wish, for this use I set it at 100% (C). Don't touch the airbrush tool (D) though I know that you now will. Use the Brush Preset Picker to select a brush, I just use the sliders that are revealed to change hardness and size settings (E). Use the tool to work on small areas of the image to reduce the overall saturation (F).

on with the Lasso selection tools which we discussed in a previous issue. You can use any of the selection tools to select the white patch of coral. I'd tend to use the standard lasso tool with a feather setting of about 5-10 pixels. This will give you a smooth transition between the white patch of coral and the normal coloured reef. It will also ensure you get the entire colour fringe, something that the Magnetic Lasso tool is not best suited for in this instance, neither the Polygonal Lasso tool which is best suited to man-made objects with straight sides. Apply your Desaturating trick to the selected area and all should be well.

To give you even more control, use the Sponge Tool (Figure 4). This is hidden away with the Burn and Dodge tools in the main toolbar (A). Click and hold the Dodge Tool, or the Burn Tool if that's what is showing, and when the selection list appears pick the bottom one, the Sponge Tool. At the top of your screen you'll see that it has a couple of options. You can choose to make it either Saturate or Desaturate your image (B). Obviously, we want the latter. Next to that is the Flow option (C). Again, the Photoshop committee decided on a name for this function that has nothing to do with it's operation. You can leave it at 100% or set it at any lower amount. This will control the amount of desaturation applied. For a finer touch, use 20-50%. I like to use a sledge hammer now and then on my images so I would set it to the full 100%.

Leave the little airbrush icon alone (D). You don't need to fiddle with that. You could put someone's eye out so don't touch. Select the brush size and set the edge hardness with the Brush Picker (E) or use the square bracket keys as a shortcut to go up or down in size then go back to the Brush Picker to change the edge hardness. Don't fuss about brush shape or any other options found there or in the more advanced Brushes Palette. Keep it simple, Simon.

The one problem with this little marvel of a tool is that it does not discriminate between colours. It applies its effects equally across the colour spectrum, so you may need to use a small brush with a soft edge and just poke away, like a modern day Van Google.

The Sponge Tool has other uses as well. Sometimes the skin tone of a person can be too saturated while everything else in

the image looks just fine. This is more the case with images taken abovewater when adding saturation to an image, but a tight shot of a diver's face, particularly the lips, can look a bit bizarre, like the Joker in a Batman movie. The Sponge Tool can let you desaturate those problem areas back to a more realistic saturation while leaving the rest of the image alone. In situations such as this, dropping the Flow back to 10-30% will help you control the amount of desaturation you apply. You can use the selection tool as well, but with the right brush size it will usually be quicker just to skip that step.

Sometimes just reducing the saturation of the fringe can remove the colour but leave a slightly denser tone where that colour used to be. This can be cleaned up with the delicate use of the Clone Tool. Remember that while the Healing Brush can do some amazing things, sudden dark to light toned areas will not work well, bleeding the opposite tones from the other side and generally getting you into more trouble and work. For areas with hard edges or rapid transitions from dark to light, use the Clone Tool, choosing a source for the tool from a similar toned area. Setting the brush options to a soft edge will help here.

While some may say that "prevention is better than cure", the fact that digital sensors are prone to Chromatic Aberration, even with the best lenses and shooting techniques, would mean that you should just shoot away and accept the fact that we live in a less than perfect world. With a bit of practice using the above techniques and choosing the appropriate one to suit your circumstances, fixing the coloured fringes that appear occasionally will be a quick and painless process.

KELVIN AITKEN ©2008 www.marinethemes.com