

# Understanding Sharpening.

## Are your pictures sharp as a tack.

By Brian Clarke. Revised version 2009

Sitting quietly in the back row at a recent club photographic competition, it soon became apparent by the judges comments that a lot of prints were over sharpened. He pointed out that a lot of good prints are being spoilt by sharpening artefacts, such as black lines becoming visible around the image, and also pixelation starting to be visible.

Sharpening any digital image is one of the most important steps in the digital workflow, and one of the least understood.

If our intention is to produce sharp, clear images that will look their best in print at various sizes, and then getting to grip with sharpening is a critical part of the process. We need to have an understanding of why sharpening is necessary and when it should be applied and how to apply the optimal amount in your imaging software such as Photoshop.

### What is Sharpening.

Sharpening is an increase in contrast between adjacent areas of pixels. The pixels near the edge are slightly darkened on the edges dark side and lightened on its light side. As a result the image appears sharper and more focused.

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### How to Sharpen.

Now we know why to sharpen and when to sharpen we need to know how to actually do it. The key is to do as little as we need to, but first let's talk about how to go about the sharpening process.

It is normally reported in the photographic press that the benchmark for sharpening is the **Unsharp Mask filter (USM)** for short). I will dispute this by saying that by using the **High Pass filter** option, actually allows more control over the sharpening process. We will look at this method later but for now will discuss the normal Unsharp Mask route.

#### The Unsharp Mask Dialogue Box

To access go to **Filter > Sharpen > Unsharp Mask**

### When to Sharpen.

Digital images have inherent softness problems, mostly generated from the cameras Low Pass Filter. This filter improves image quality in many ways, but in the process blurs the image slightly.

This softness can and should be compensated for.

Image detail, can also be softened by the output process, when the image is being printed due to the softening effect of the ink-on-paper printing process and must be compensated for.

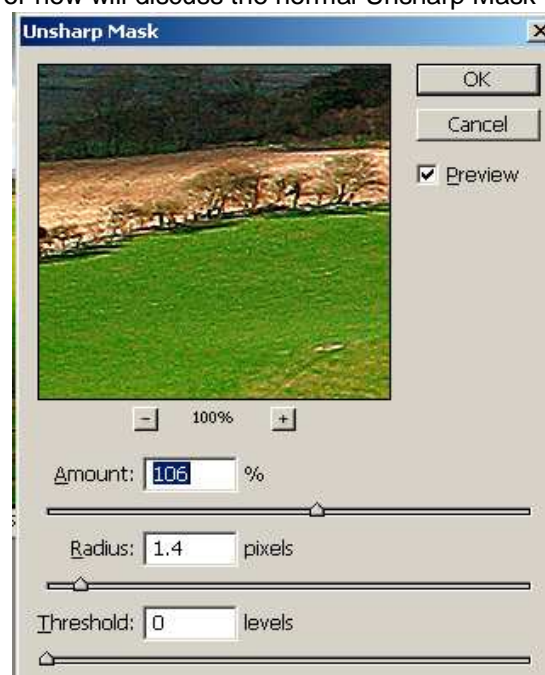
To compensate for the blurring effect of the **Low Pass Filter, sharpening must be applied before** the image is resized for printing.

To compensate for the softening effect of the output process (printing). Sharpening should be applied **after the image has been resized or resampled.**

### Capture Sharpening.

How much sharpening does an image need? One solution is to apply an initial corrective sharpening to each image before you start any retouching work. The aim here is to compensate for the loss of sharpness that occurs naturally during normal digital capture.

To give you an example the Canon Eos 1D has a reputation for producing soft images and definitely benefits from some capture sharpening. If I use the **USM** with the following settings, **Amount 106%, Radius 1.4** and **Threshold set to zero**, any original softness is now totally eliminated with the result the image looks sharp like you would expect it to.



## Unsharp Mask Filter (USM)

The only sharpening filters you will use the most are the USM. Do not use Sharpen and Sharpen More filters, which will sharpen edges but will have none of the flexibility of the USM.

Unsharp masking can make an image look sharper, but may introduce artefacts into the image that will permanently degrade the picture.

If you **oversharp**en the image before any colour adjustments and any retouching, the sharpening artefacts can become even more present.

The aim of using the USM is to increase the apparent sharpness and minimize any artifacting.

Lets begin by looking at the three controls in the USM dialogue and what they do.

**Amount** :- Determines the sharpening amount in % values.

Move the slider to just give a perceptible lift to the image sharpness.

**Radius** :- Controls how much the USM looks for an edge. So how to determine a starting value to enter Into this box.

A good start point is to divide the output file resolution by 200

Value to enter =  $\frac{\text{Print file output resolution}}{200}$

EG \*300/200 = 1.5                      Enter 1.4 ~ 1.5 for starters (see USM dialogue above for average settings)

**Threshold** :- Can be used to make USM ignore detail such as grain. Leave at zero unless you have detail you do not want to sharpen.

If you set to high a setting, the effect will be to cancel out the entire sharpening effect.

\* 300 = 300 pixels/inch the magic 240~300 file resolution figure used in resizing the print prior to printing.

### Some suggested figures for the USM to get you started.

#### Basic Sharpening

Amount	125%
Radius	1.0 Pixels
Threshold	3 Levels

#### Sharpening Soft Objects

Amount	150%
Radius	1.0 Pixels
Threshold	10 Levels

#### Sharpening Portraits

Amount	75%
Radius	2.0 Pixels
Threshold	3 Levels

**All Purpose Sharpening** (Subtle enough to apply twice if image is not sharp the first time)

Amount	85%
Radius	1.0 Pixels
Threshold	4 Levels

**View your image at 100% when sharpening.**

**Above are techniques for sharpening the entire image.**

## Advance Sharpening Techniques.

### The High Pass Filter Method. Edge Sharpening

Perhaps the most subtle and effective sharpening effect is to use the high pass filter. This works very much like a genuine photographic unsharp mask and is simple to use. It has the potential to produce quite aggressive sharpening without producing any white halos around the image and is a suitable technique to be used when sharpening images for print output.

Outline below are the basic steps that you need to follow to add a High Pass sharpening layer.

Select the background layer of the image.

Press control **Ctrl J** to duplicate the background onto another layer. Then rename it sharpen.

Apply the **Filter>Other>High Pass** to this duplicate layer. Set the radius so that the edges you want to sharpen are visible in the filter preview (5 ~ 10) seems to be ok, then ok the filter.

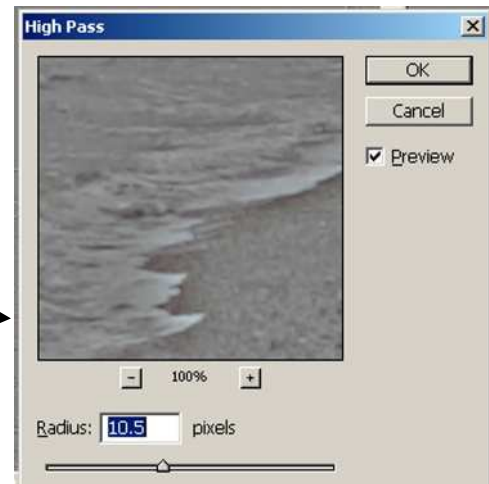
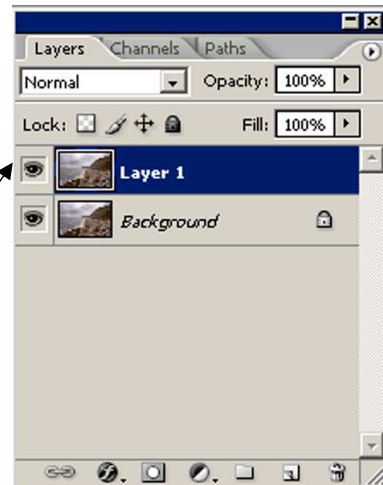
Do not be alarmed if the image disappears at this stage, this is normal.

Set the layer, blending mode to **Soft Light**, which reveals the image below.

Clicking **on/off** the eye symbol next to the duplicate layer will show the sharpening effect

Use the duplicate layers opacity slider to fine tune the amount of sharpening applied, this is useful if you over sharpen the image, it will blend the sharpened image with the original soft background layer.

You can also try **Hard Light** or **Vivid Light** to sharpen very soft images.



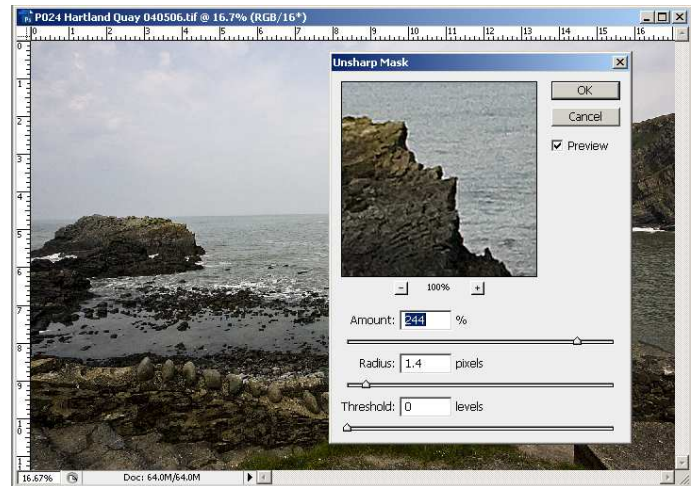
## Luminosity Sharpening.

This is another method popular with professionals.

### Step 1.

Open an **RGB** image that needs some moderate sharpening. Go to **Filter>Sharpen>Unsharp Mask**. Apply the filter directly to your **RGB** image. I used **Amount 244%**, **Radius 1.4 Pixels** and **Threshold 0**.

When you have the image looking the way you want it, click ok to apply the Unsharp Mask filter.



### Step 2.

Go to **Edit>Fade Unsharp Mask**, when the fade dialogue appears, change the Mode pop-up menu from **Normal** to **Luminosity**. When you click ok, the sharpening is applied only to the luminosity of the image and not to the colour data. You can apply a higher amount of sharpening without getting unwanted halos that so often appear.

