

How to scan for the Web

by Lidka Schuch

Tips and Techniques for

The major difference between scans for print and scans for the Web is, of course, file size. Scans for print are most often bitmaps of considerable size, while scans for the Internet seem shockingly tiny in comparison. A 60K web page image is already pushing the upper limit for fast loading and availability to all users.

Finding the right balance between file size and image quality isn't easy. There is always a trade-off, and many factors have to be taken into consideration before decisions are made. So here are a few essential tips and techniques for producing good quality, fast-loading images for the Internet.

IMAGE RESOLUTION

Output for images scanned for Internet use is limited to one kind of device: a monitor. Everything would be simple if there was something called "standard monitor resolution"—but unfortunately there isn't.

All Macintosh monitors have default settings standardized to 72 ppi (which makes calculations easy: there are also 72 points in an inch, so 1 pixel = 1 point)—but this is only true as long as the user doesn't change the options (Figures 1 and 2).

Windows users, on the other hand, may have their monitor defaults set to anything between 72 to 96 ppi.

Since HTML code specifies the width and height of images in pixels, not every user will see an image with the same dimensions, and there is nothing you can do about that, other than finding a middle ground by scanning (or re-sizing) images at a resolution of about 85 ppi. However, if you really need to get your files down to the bare minimum (such as when creating a catalogue with many images per page), stick with 72 ppi.

When you are in doubt as to what size an image will display on a monitor with 96 ppi resolution, for example, try switching your monitor's resolution settings to simulate 96 ppi. And don't

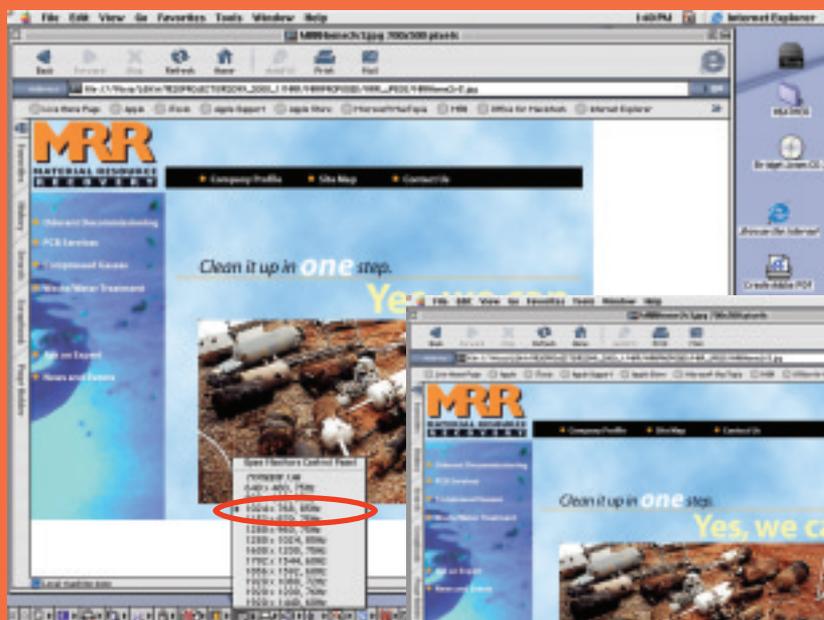


Figure 1
19" monitor set at 72 ppi resolution, always expressed in an absolute number of pixels, called pixel dimensions.

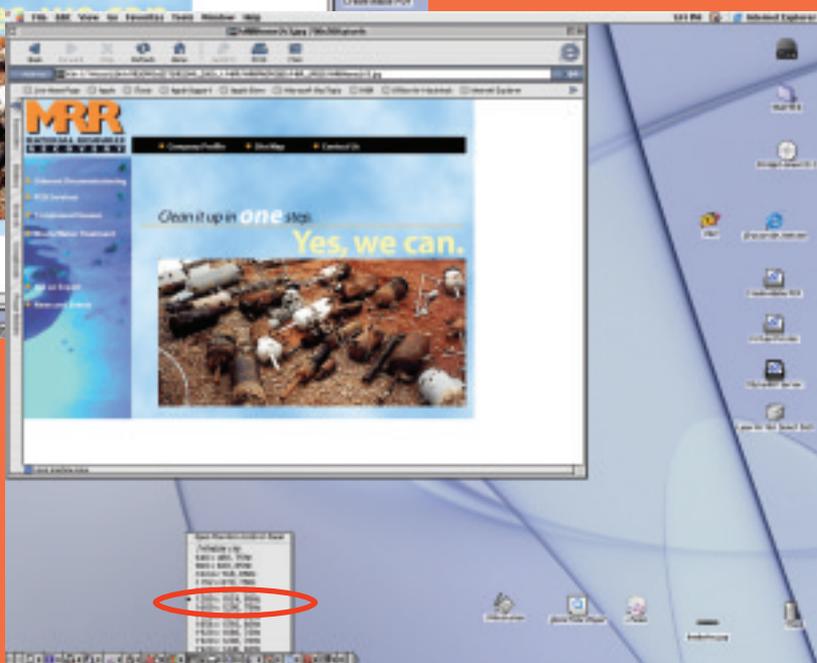


Figure 2
19" monitor set at 96 ppi resolution — the higher the resolution, the smaller the image will appear.

Scanning Lean and Mean

use an image with a resolution higher than that or it will overflow the area of some screens. For example, a 6" x 4" 144 ppi image displayed on a 72 ppi monitor would be 12" wide and 8" high!

LINE ART AND CONTINUOUS TONE IMAGES

There are two kinds of artwork in any printed or electronic publication:

- line art images, composed of defined shapes and few solid colors, such as logos or technical drawings; and,
- continuous tone images, composed of random coverage and changes in color, such as that found in photographs, wash drawings and paintings.

Usually we would create and save line art in vector programs with a vector file format (such as EPS for printing) to preserve the option of resizing while retaining quality. But at present there is no standard vector file format which can be understood by all

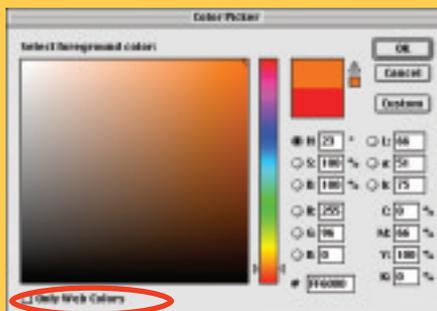
browsers (the compatibility of SVG [Scalable Vector Graphics, the file format championed by Adobe] is still just a possibility for future implementation). So, although some elements and graphics may originate in a vector-based program such as *Adobe Illustrator* or Macromedia's *FreeHand* and *Fireworks*, all images wind up as bitmaps in a normal site created in HTML.

Just look at the Save for Web command in any Adobe program and see what file formats are available. You will find GIF, JPEG and PNG (which is only useful for taking an image with a transparent background from *Adobe Illustrator* and *Photoshop* to programs like *Macromedia Flash* or *Fireworks*—in truth, only PNG-24 [bits per pixel] works well).

RGB AND INDEXED COLOR

There are two color systems which are supported by the Internet: RGB and indexed. Let's compare them.

Figure 3
RGB color is built from 16.7 million colors



Figures 5 and 6
Everything looks good on a monitor displaying millions of colors, but a GIF saved with Web Palette colors (even if only 14) and 0% dithering will look the same on all screens, and flat colors will not dither, even on a monitor which displays only 256 colors.

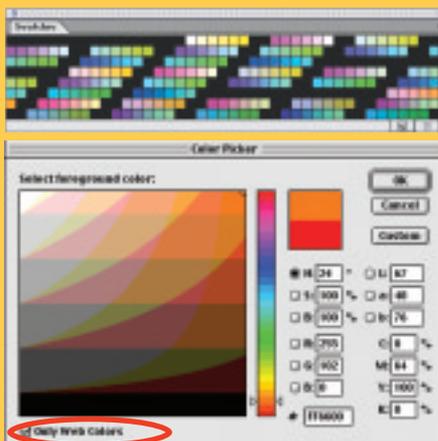


Figure 4
Indexed color is built from 256 colors. Only 216 of them are the same in every computer environment.



JPEG

Art category

Continuous tone art: photographs, paintings, wash drawings, generally composed of random coverage and changes in color.

Color space

RGB

No. of colors available

256 (R) x 256 (G) x 256 (B)
= 16.7 million

Color depth

24 bits per pixel

Compression

Lossy

Transparent Background

Not supported

Animation

Not supported

TIP

Blur non-critical image areas for smaller file size.

GIF

Art category

Line art images composed of definite shapes and few solid colors, such as logos, and technical drawings.

Color space

Indexed

No. of colors available

256 or fewer

Color depth

8 or fewer bits per pixel

Compression

Lossy

Transparent Background

1 bit transparency supported

Animation

Supported

TIP

For flat, consistent color, use the Web Safe Palette. For photographic images, use Perceptual or Adaptive Palettes and experiment with dithering settings.

RGB is created from 256 tones of red, 256 tones of green and 256 tones of blue. All of them together gives us $256 \times 256 \times 256 = 16.7$ million colors, or 24 bits per pixel color depth (Figure 3). The JPEG file format supports RGB color.

Indexed color consists of only 256 colors (or greys) in total (Figure 4). As a matter of fact, you can choose to save an image with even fewer colors than that. Only 216 colors out of the 256 display the same on every computer. This is a limited color gamut, but what's good about using indexed color is that using a Web Palette option with 100% Web Snap settings will keep flat colors consistent and solid no matter what monitor they end up on (Figure 5 and 6). GIF format supports indexed color.

When you save for the web, switch the color mode of your monitor to 256 colors every so often to see the worst possible scenario in which your website might be viewed.

GIF AND JPEG

Knowing that there are two kinds of artwork, and two color spaces, and two primary bitmap file formats used for the Internet, it should be easy to understand that line art graphics such as logos and technical drawings should be saved as GIFs, and continuous tone images, such as photographs, paintings and wash drawings should be saved as JPEGs.

GIF is not suitable for soft shadows and/or color graduations, but if you use it with the Web Palette and Web Snap features, you can achieve consistency of solid colors in any computer environment. So again, it's time to ask the question: since you can't have

everything, what's more important for this particular image on this particular website—colors which look good only on your display but which will likely dither on many other computer systems? Or flat color, which may be off slightly, but will display the same way on every monitor?

You can animate GIFs, and you can even have transparent backgrounds, but the restrictions of limited color gamut and only 1-bit transparency (producing jagged edges) always have to be taken into consideration.

JPEG, on the other hand, doesn't support transparent backgrounds and you cannot animate it, but you *do* have all the colors (all 16.7 million) available in RGB at your disposal.

JPEG files are smaller when they are not sharpened. Sometimes blurring unimportant areas of an image will get the file size down to just what you need it to be.

Of course JPEG compression also entails another trade-off in quality. But it is helpful to know that for displaying images on the Internet, you may reduce the quality factor to a low setting; a JPEG quality setting between 2 and 4 is usually more than enough to preserve an image's good appearance. 🌟

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