

Single-source operators in Photoshop, like hue, saturation, brightness, and contrast, operate on the entire image unless you have a **selection** defined before you use these operators

Mathematically, you can think of a selection as a value between 0 and 1 defined for every pixel of the image. Where the selection value is 1, the operation occurs normally and the pixel is modified. Where the selection value is 0, the operation doesn't occur at all and the pixel remains unchanged.

If the selection value lies between 0 and 1, the final pixel value will be a blend of the original pixel and the modified pixel.

The process of **making a selection** is the process of defining these selection values for the entire image. The easiest way to do this in Photoshop is to use a tool called the **rectangular marquee**.

The rectangular marquee icon is in the upper left of the Photoshop toolbar (see right). Choose this tool, then sweep out a region on the image with an arbitrary rectangular shape. When you have finished sweeping, you will see a dashed line surrounding the selection you have made. This border is colloquially known as **marching ants**. It is the boundary between the selected region and the unselected region.



If you perform an operation on an image once you have a selection, you will change only the region inside of the marching ants. The region outside will be unchanged, so you will see a distinct border between the area you modified and the area you didn't.

RULE 1: No matter what tool you use to make a selection, the marching ants will be the way Photoshop shows you the selection you have made.

What if you want to change more than one rectangular region on your image at the same time, with the same operator? The answer is that Photoshop lets you easily add to an existing selection by using the modifier key **Shift**. If you hold down Shift and make another selection with any selection tool, the new selection will be merged with the existing one.

RULE 2: You can add to any selection by holding down Shift while making a new selection, using ANY selection tool.

Similarly, you can subtract a region from a current selection by holding down **option** while selecting the area you want to remove.

RULE 3: You can remove from any selection by holding down option while making a new selection, using ANY selection tool.

In general, you won't want a hard-edged border between a selected area and an unselected area. This is because you want your modifications to blend in smoothly with the original image.

In Photoshop, **feathering** is the term for taking an existing selection and blurring or softening the edges between what is selected and what is not selected. Mathematically, feathering creates selection values between 0 and 1.

The units of feathering are in **pixels**. If you feather a selection by one pixel, it means that one pixel worth of the selection – on each side of the marching ant border – will get a selection value between 0 and 1.

RULE 4: Any existing selection can be feathered. You do this by using the Select->Feather menu option.

The marching ants generally delineate the border between fully selected and not selected. However, it's clear that feathering a selection introduces values between 0 and 1. Where does the marching ant border lie when there's a feathered selection?

RULE 5: The marching ant border attempts to show you where the selection values are equal to 0.5.

Other common tools for making selections are:

The elliptical marquee – good for selecting elliptical regions (click and hold on the rectangular marquee icon)

The lasso – draw out a region freehand (second icon down on the left).

The polygonal lasso – draw out a closed region with a polygonal shaped boundary (click and hold on the lasso icon)

The magic wand – select a contiguous region of pixels using a value threshold to determine which ones should be selected. Good for selecting strangely-shaped regions with similar colors (second icon down on the right – the threshold value is visible in the Info window when the magic wand is the current tool)

The selection menu – when you create a difficult selection, use the Select->Save Selection menu option to save it along with your image (Photoshop file format only). Then, you can use Select->Load Selection just like any other selection tool to re-select the region you saved. It works with the Shift and option key modifiers, too!