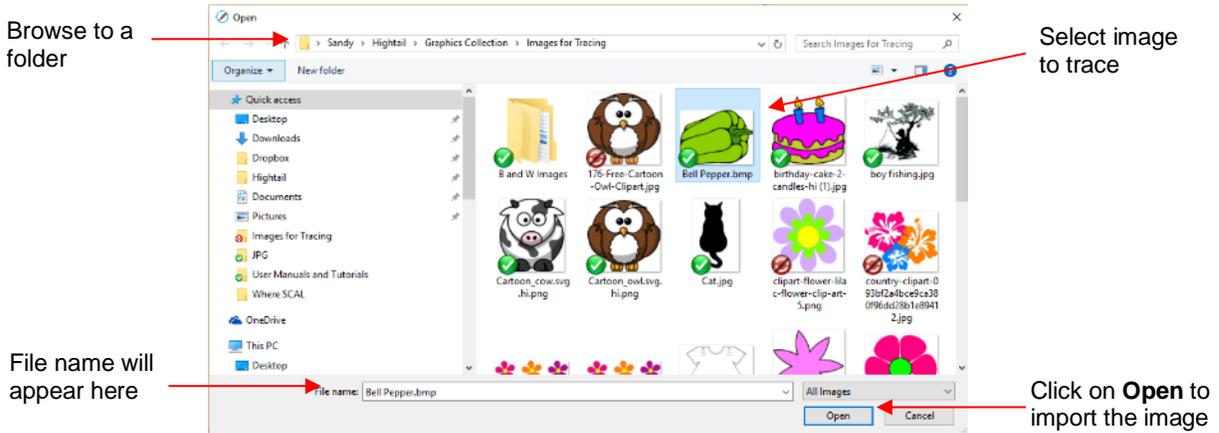


# SCAL6 Tracing Examples Expanded Tutorial

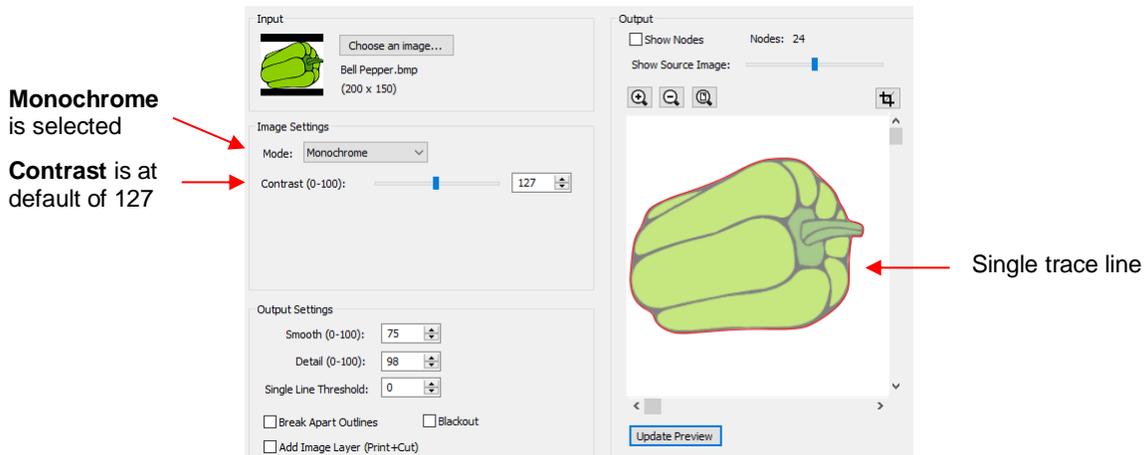
- This tutorial contains examples of the various trace options and settings presented in the SCAL6 User Manual.

## 5.03.2 Monochrome Trace of a Colored Image: Effects of Contrast

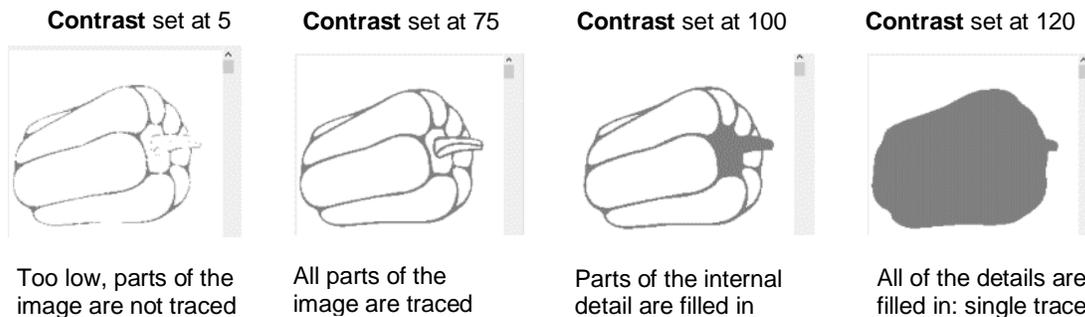
- Start by clicking on **Choose an image** in the **Input** section and then browse to locate the raster file you wish to trace:



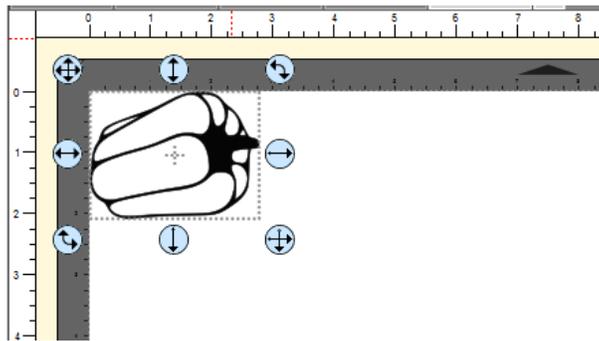
- In this example, a bell pepper image is imported for tracing and the **Preview** indicates a single trace path around the image:



- Let's experiment with the **Contrast** setting to fully understand how it works on an image of this type. Note that as you drag the **Contrast** scroll bar, the original image disappears so that you only see the trace lines:



- Thus, for any given image, scroll the **Contrast** setting to see the effects and determine which version best suits your project needs. Once satisfied, click on **OK** and the image will appear in the top left corner of the **Cutting Mat**, ready to be resized and cut out:



### 5.03.3 Monochrome Trace of a Silhouette Image: Effects of Smooth

- As mentioned at the end of *Section 5.02*, silhouette images typically offer an easy trace. In this next example, a silhouette cat image is imported into the **Trace Image** window. Because this is a silhouette image, **Monochrome** mode is chosen and the image appears to have traced very well. However, upon a closer look at the right side of the cat, it appears that the neck area is a bit sharp:

Use **Smooth** to change the sharpness of the trace lines

- To soften the outline of the cat, zoom in on that area and then increase the **Smooth** setting until a desired result is obtained. In the following screenshot, the **Smooth** setting is increased from 75 to 85. Remember to click on **Update Preview** after every adjustment to settings:

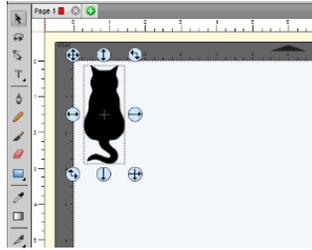
Click here to zoom in

Click here after changing **Smooth** setting

Too sharp

Smother

- After clicking on **OK**, the cat shape appears on the **Cutting Mat** and is ready to be sized and cut:

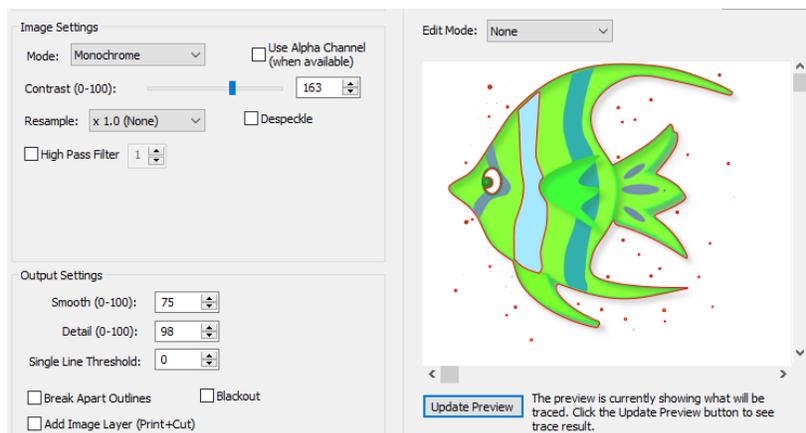


#### 5.03.4 Monochrome Trace of a Detailed Image: Effects of Despeckle and Detail

- Either the **Despeckle** option or the **Detail** setting can be used to filter out small shapes. Sometimes these shapes are just random pixels that show up from, say, a dirty scanner bed. Other times they are shapes that make up the design but will be too small to cut and are not needed.
- Before showing examples, note that there will be times when some small shapes might be needed but not all of them. In those situations, it's best to include them and then they can be edited out using other tools in SCAL.

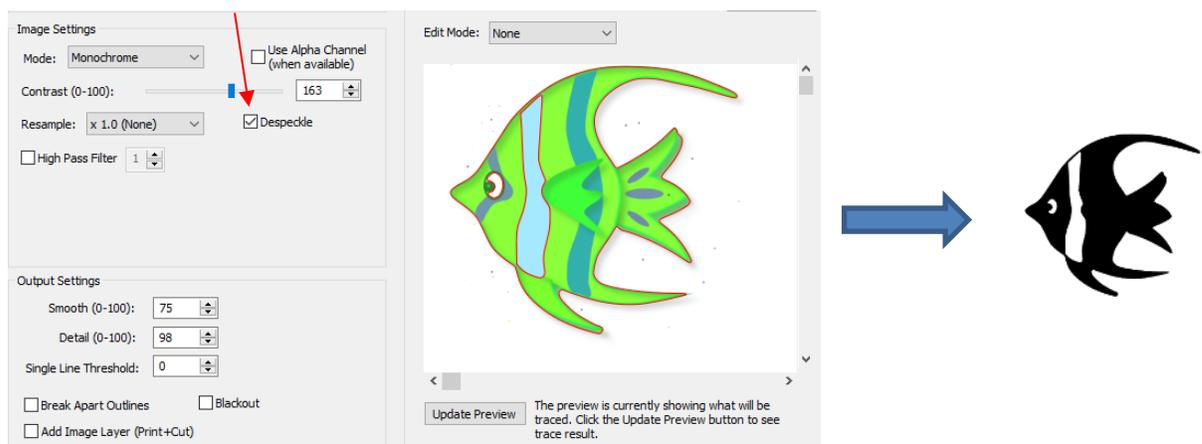
#### Despeckle

- Since **Despeckle** is simply an on/off option, it makes sense to try it first when you see a lot of tiny unwanted shapes being included in the trace. For example, with the following clipart image of an angel fish, tiny specks surround the image in the **Preview**:



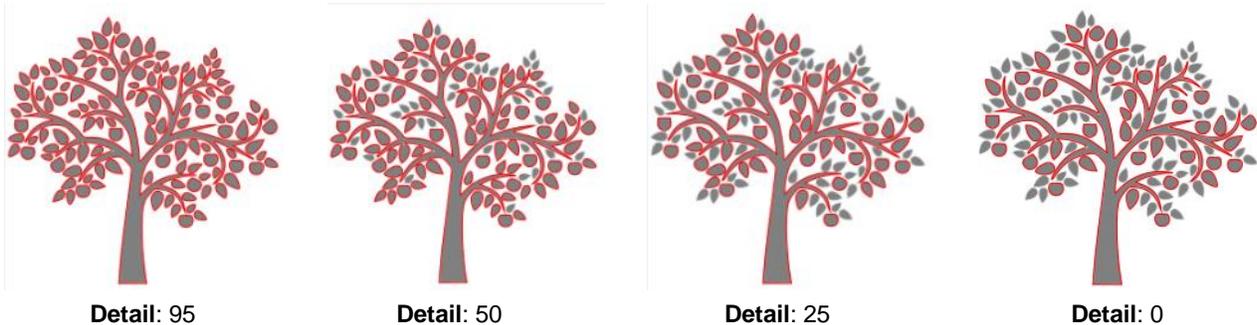
- ◊ Marking the option for **Despeckle** and clicking on **Update Preview**, removes the specks and the image is ready to import:

Check the **Despeckle** option

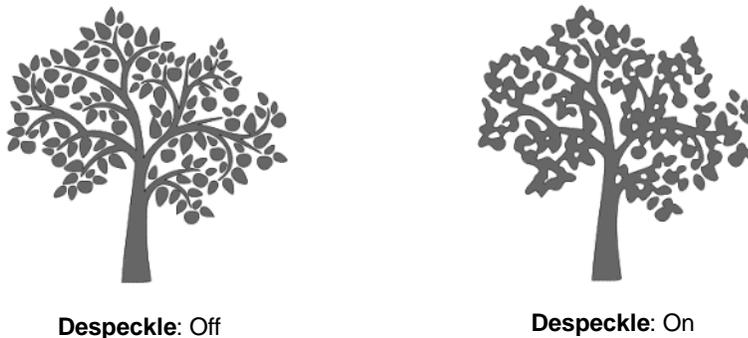


## Detail

- The **Detail** setting allows one to control the size of the small shapes that are eliminated.
  - ◇ The following tree image is imported into the **Trace Image** window. You have decided that not all of the leaves are needed. The **Detail** setting can be lowered to filter out some of the smaller ones:



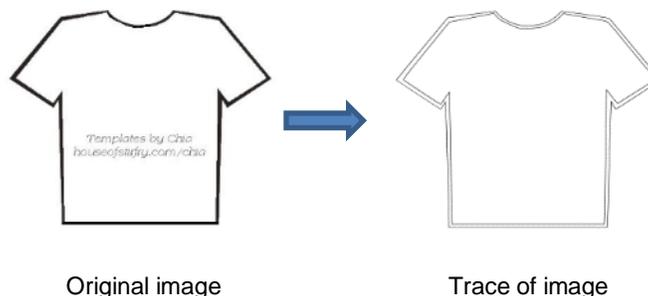
- ◇ Even with **Detail** set at 0, there are still shapes of a certain size in that particular image that will be included in the trace. Again, there are editing tools that can be used in case more of the small shapes need to be removed. Refer to *Section 6.06* on using the **Eraser** or *Section 3.12.1* on **Break Apart**.
- Note that if **Despeckle** had been applied to the tree image, instead of deleting the smaller shapes, it would have included them in the trace:



- ◇ This result indicates that when the small shapes are extremely close to a large shape, they will become part of that larger shape instead of being filtered out.

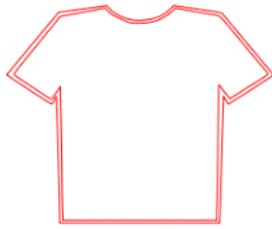
### 5.03.5 Monochrome Trace of a Coloring Book Image: Single Line Threshold and Blackout

- The **Single Line Threshold** setting is useful when the imported image had a black border around it and you do not want a double line trace. For example, if the following T-shirt image is traced using default settings, two trace lines result: one line is following the outside of the black border while the other line is following the inside of the black border:

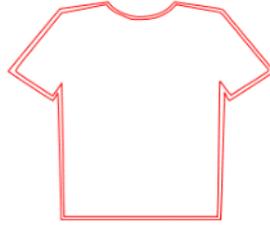


- To have only one trace line, increase the **Single Line Threshold** setting until there is only a single line

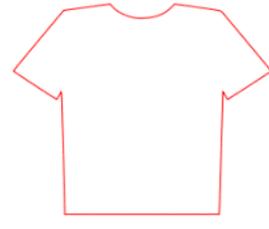
showing in the **Preview** window:



**Single Line Threshold = 0**  
double line

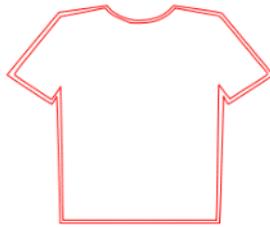


**Single Line Threshold = 5**  
double line

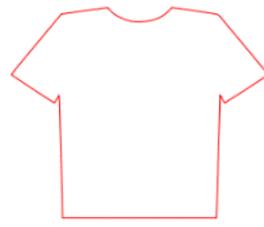


**Single Line Threshold = 10**  
single line

- ◇ Because the T-shirt image is a simple closed shape, the **Blackout** option could have been used instead of **Single Line Threshold**:

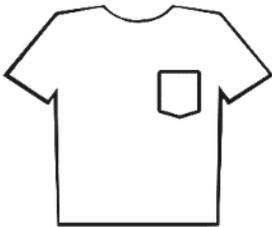


With **Blackout** unchecked

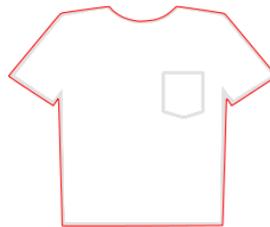


With **Blackout** checked

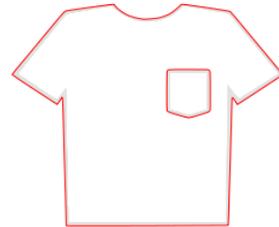
- ◇ However, if the T-shirt had internal details, such as a pocket, then **Blackout** could not be used as the entire pocket would have been ignored. In this situation, **Single Line Threshold** is the better choice:



Original image



Preview of trace with  
**Blackout** checked

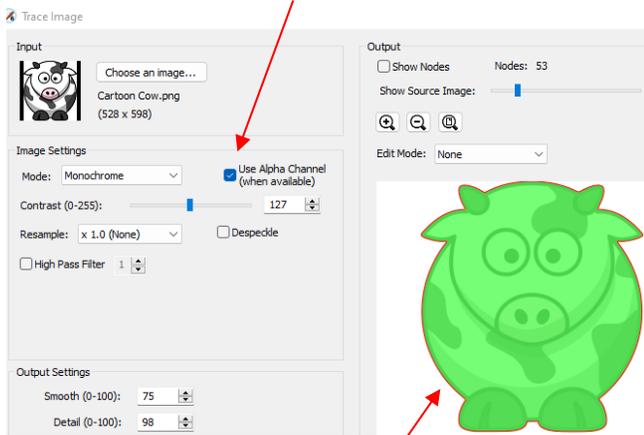


Preview of trace with  
**Single Line Threshold**  
increased

### **5.03.6 Monochrome Trace of a PNG File with a Transparent Background**

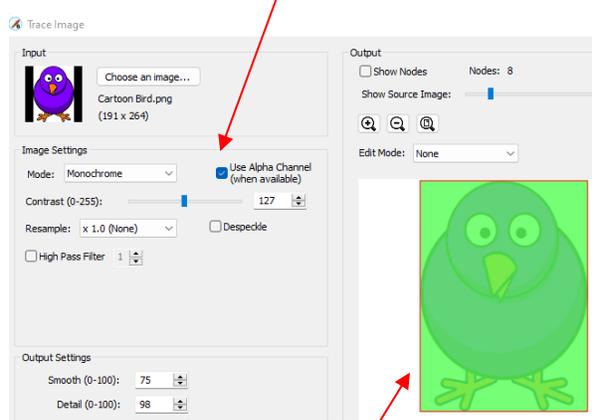
- PNG files with a transparent background are the easiest files to trace because the software can readily identify where the invisible background starts and ends. Also, if you know in advance that the PNG file has a transparent background, you can forgo the **Trace Image** window and use **File>Import** (or drag and drop) instead. You still have the option to trace the **Print** layer by selecting it only and going to the **Trace Image** window. Refer to *Section 5.03.2*.
- If, on the other hand, you wish to import the PNG file after opening the **Trace Image** window, then activating **Use Alpha Channel** will indicate if the PNG file's background is transparent or not:

### Enable Use Alpha Channel



Transparent background because **Trace** line follows printed image

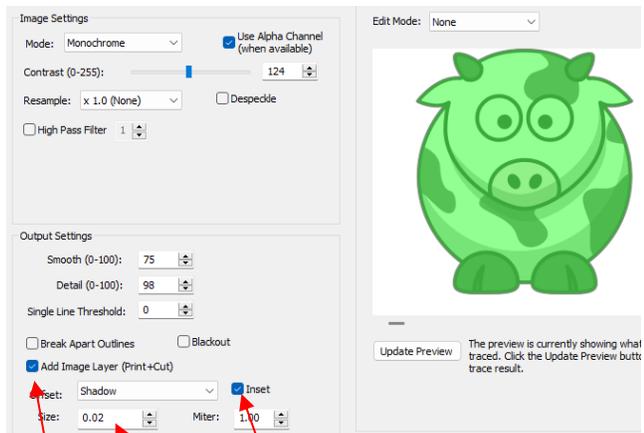
### Enable Use Alpha Channel



White background because **Trace** line follows outside box around the image

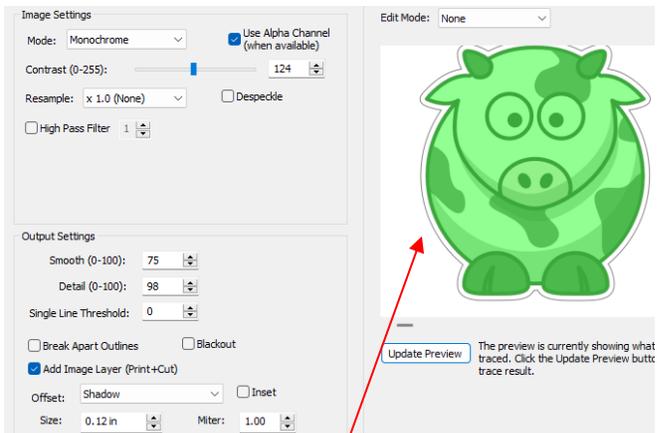
VERSUS

- If the image turns out to have a background color, such as with the bird above, then unmark the **Use Alpha Channel** option and proceed with the trace using the details from *Section 1* of this tutorial. Otherwise, as in the case of this cow image, the trace line is automatically set, thus adjusting **Contrast** will have no effect on the trace.
- Because this is a print-and-cut application, you might want to set an Inset so that the cut line will be inside the auto-generated cut line. This will help prevent any extra white showing around the cut. Or you might want a contour cut line added whereby you're deliberately cutting a white border around the image:



A small **Inset** cut is set

VERSUS



An **Offset** cut (aka contour cut) is set

- **IMPORTANT:** Don't forget to also enable **Add Image Layer (Print+Cut)** so that the imported PNG image will also be transferred to the **Page** once you click on **OK**. More on the results of this assigned are covered in the following *Section 6*.

### 5.03.7 Monochrome Trace for a Print and Cut Application: Effect of Resample

- In many print and cut applications, a raster image is imported with the intention of printing that image and then cutting precisely along the edges of that image. For this reason, it's very important to get as accurate of a trace as possible.
- The **Resample** setting multiplies the number of pixels in the image allowing a more precise scan of the border between the image and the background color. The following image is imported and traced with the default of **x 1.0** left as the **Resample** setting.

Select **Monochrome**

**Resample** is left at **x 1.0**

**Preview**

- Before clicking on **OK**, note two settings that have also been marked:
  - ◇ **Blackout**: apply if there are internal cut lines that are not needed. In this example, only the outside of the penguin needs to be traced. Thus, applying **Blackout** will remove the internal cut lines showing in the **Preview**:



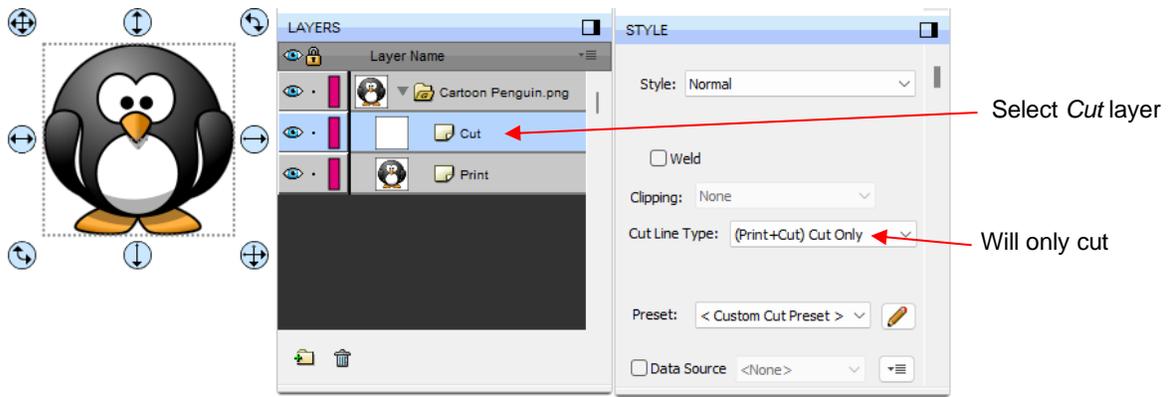
Preview of trace with **Blackout** not checked. Note the internal red lines that would be cut.



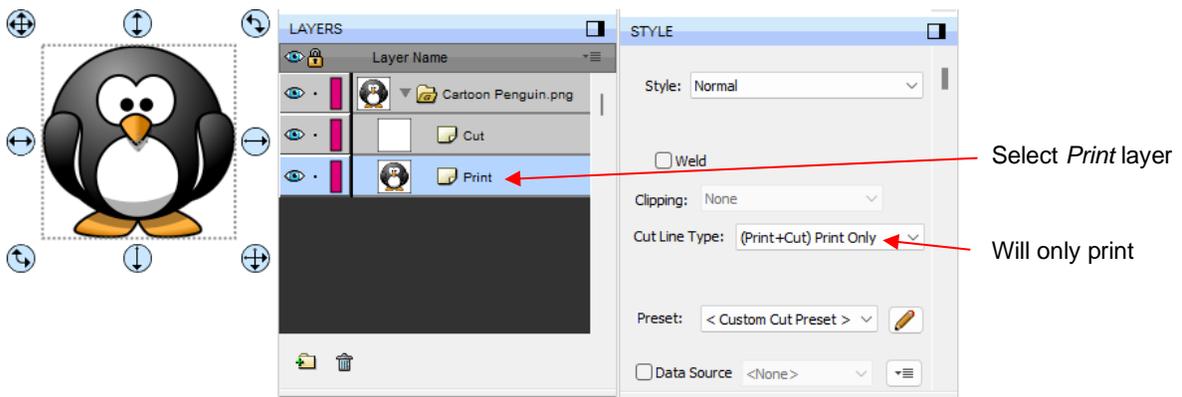
Preview of trace after **Blackout** is checked. The internal red cut lines are removed.

- ◇ **Add Image Layer (Print+Cut)**: Mark this box so that the original image is also imported onto the **Cutting Mat**. Note that if you check the **Style Panel** settings on each layer, one will be assigned as **(Print+Cut) Cut Only** (layer can only be cut, not printed) and the other will be assigned as **(Print+Cut) Print Only** (layer can only be printed, not cut). Click on **OK** and the following layers appear:

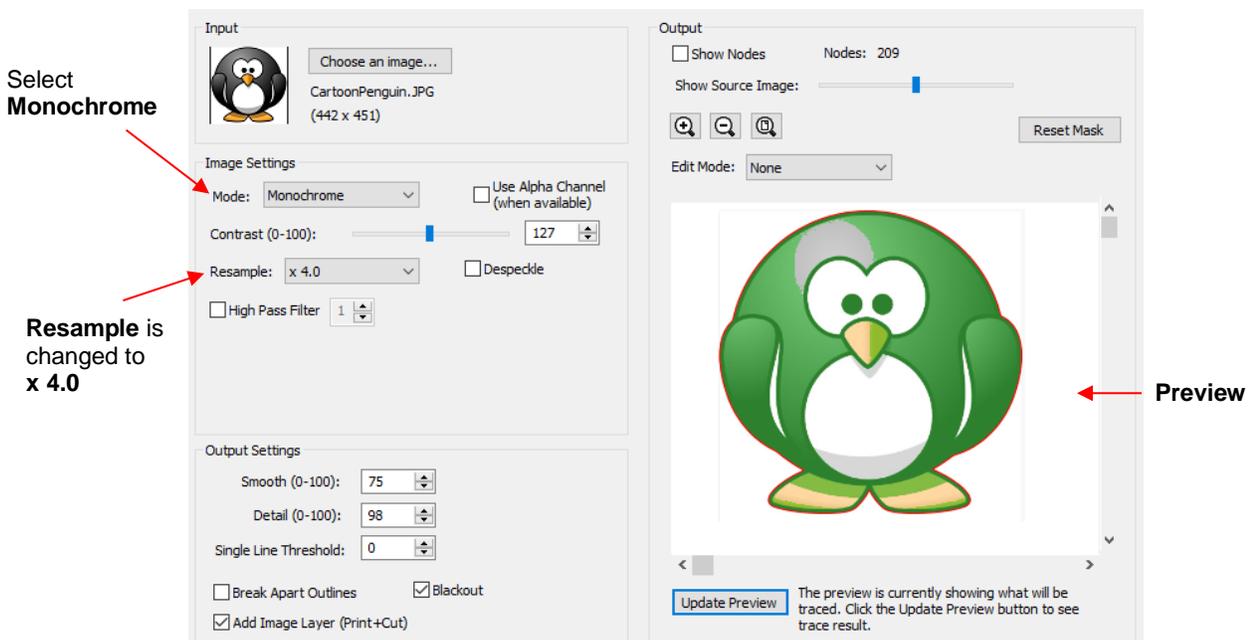
Cut Layer Assignment



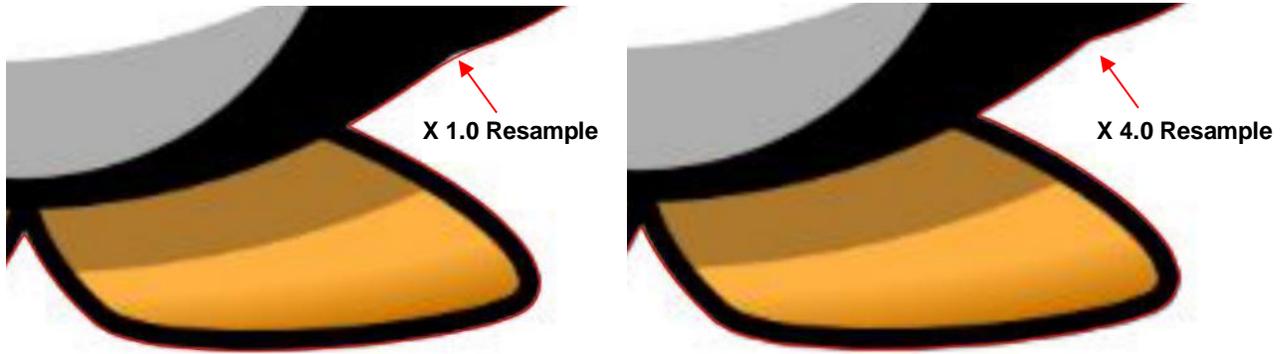
### Print Layer Assignment



- Returning to the **Resample** setting, the same image is traced again, but the **Resample** will be set at a maximum value of **x4**:



- If you compare the **Preview** in both cases, there doesn't appear to be a difference in the trace. However, if you select the **Print + Cut** layer on the **Layer Panel** and change the **Stroke** to a bright color and then zoom in closely, you can clearly see places where the **x 4.0 Resample** resulted in a tighter fit:



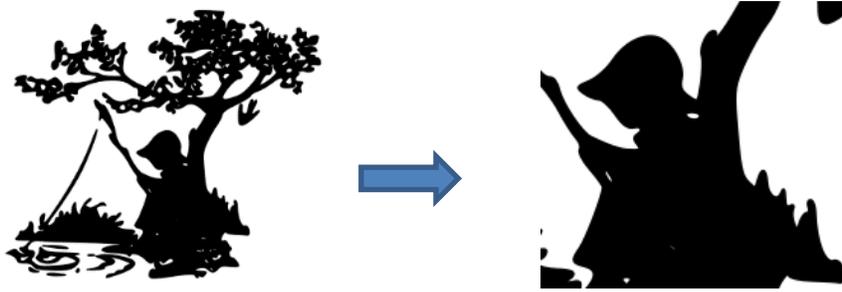
- In *Section 2*, it was shown how the **Smooth** setting affects the trace line. This setting can also be tested on PNC tracings as a way of getting a better fit, by decreasing the value. Alternatively, you can also create an **Inset** after the trace, if needed, to create a path that will cut just inside the image. Refer to the **Inset Offset** option covered at the end of the previous *Section 5*.

### **5.03.8 Resample Versus Smooth and the High Pass Filter**

- In many respects, the **Resample** setting appears to have the same effect as the **Smooth** setting. However, the **Resample** is applied to the imported raster image ahead of tracing, while the **Smooth** setting is applied to the actual trace lines.
- While there is no definite way of knowing which setting to use in any given tracing, keep in mind the following:
  - ◇ The purpose of **Resample** is to help the tracing algorithm “see” more pixels and provide a tighter, more precise trace.
  - ◇ The purpose of the **Smooth** setting is to make the trace less angular or more angular. Thus, the **Smooth** setting would probably be set high when tracing something like a stuffed toy but set very low when tracing something like a box pattern with lots of right angles.
- In general, you’ll just need to test them to see which one is better or if applying both is the best option.
- In the example below, it will be shown that **Resample** improves the accuracy of the trace over **Smooth**.



- ◇ Using a **Resample** of **x 1.0** and other settings set (which will again be used when **Smooth** is tested), the trace results in the following. Since an important focal point would be on the boy’s face and hat, note that the resulting trace isn’t as sharp as one might want:



- ◇ By increasing the **Resample** to **x 2.0**, the shape of the hat and the face become closer to the original image:



X 1.0 (None) Resample



X 2.0 Resample

- ◇ On the other hand, if one leaves the **Resample** at **x 1.0** and, instead, decreases **Smooth** from 75 to 70, the hat becomes too pointed/angular without improving the shape of the face:



Smooth = 75



Smooth = 70

- ◇ Thus, in this particular example, increasing the **Resample** had a more desirable outcome than decreasing **Smooth**.
- ◇ Another setting, called the **High Pass Filter**, can even further sharpen a tracing. When it was applied in this same example, note the remarkable improvement in detail:



- ◇ Based on my initial experience, there are two downsides to using this setting:

- Getting the optimum setting in combination with the **Resample** and **Contrast** settings, is tricky
- After applying and getting the trace onto the **Cutting Mat**, you'll need to apply **Object>Break Apart** and eliminate some unwanted paths. Alternatively, you can use the **Draw Mask** option to edit while still in the **Trace Image** window. Refer to *Section 10*.
- ◇ For more details on the **High Pass Filter**, refer to *Section 11*.

### 5.03.9 Color Layers Trace

- As mentioned in *Section 5.03.1*, **Color Layers** might be a good mode to choose for a paper piecing or layered vinyl project if you want under-layers present. In this section, a flower that has two shades of pink and two shades of green is chosen:



- After loading the image and then selecting **Color layers**, the window will update to show new settings:

Select **Color layers**

Scroll to select number of colors to identify

Colors identified

Scroll to the left to better see the cut lines in the **Preview**

**Preview**

Click here after every change

- The **Max Colors** setting shows the current number of identified colors. Below that are icons of these colors. Note that white (or whatever has been used for the background color of the graphic, will also be included in the count. If you do not see those color samples, click on **Color layers** a second time.
- Depending on the image and what you want in your final trace, the **Max Colors** can be increased or decreased. Because this image has two shades of pink and two shades of green, those can be added to the count:

**Max Colors** increased to 6

- After accepting **OK** in both cases, the layers are ungrouped and compared:

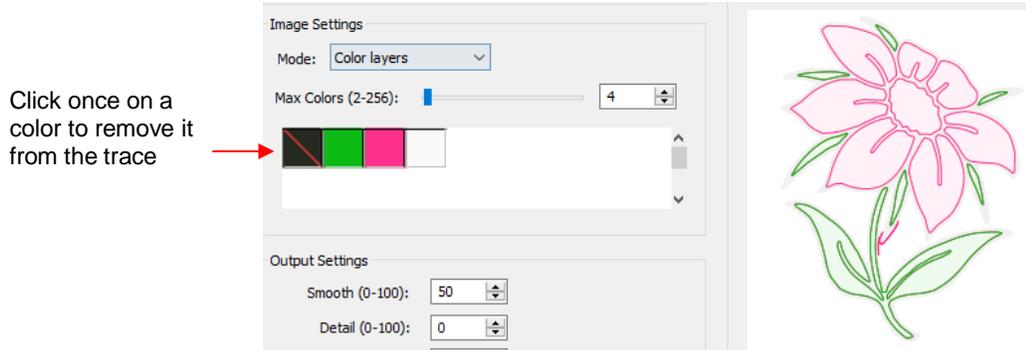


**Max Colors = 4** produces 3 layers

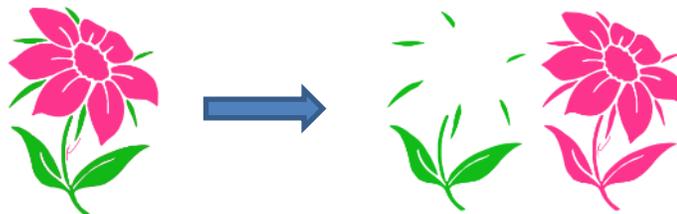


**Max Colors = 6** produces 5 layers

- You can also turn off colors by clicking on them. For example, if you do now want the black background traced:



- The result is this:



- A useful application for the **Color Layers** trace option is converting a photo (or another image) into a contoured cut project. Thanks to Leslie Merriett for sharing this project:



Original Photo



**Color Layers Trace**  
**Max Colors: 7**



After darkest layer  
expanded to fill  
background



After cutting and assembling

### 5.03.10 Single Color Trace

- With the **Single Color** option, each desired color is selected and traced individually. The advantage is that only the visible part of each color is traced. The disadvantage is that it takes a bit more effort.
- Again, the same flower image that was used in the prior section will be opened into the **Trace Image** window. When **Single Color** is selected from the drop-down menu, the window will update to show new settings:

Current color

Select **Single Color**

Increase **Contrast** to add similar colors to selection

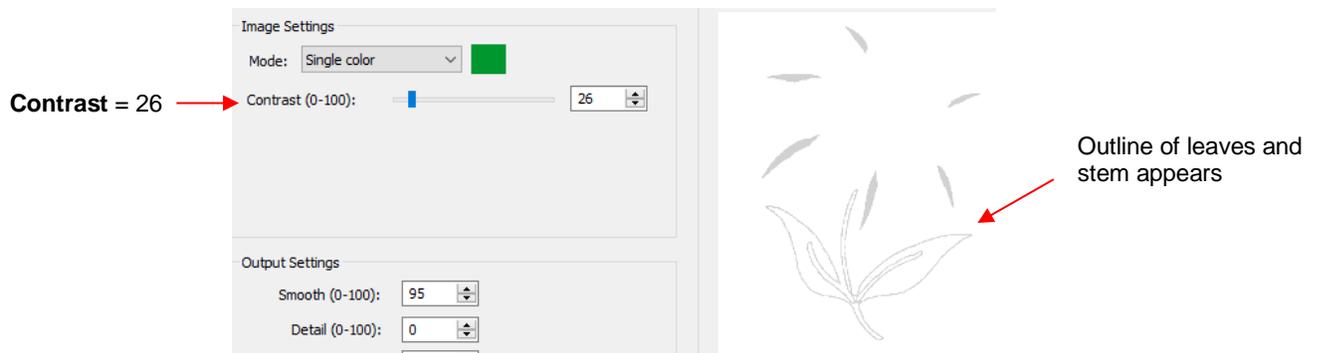
Mark this box

Scroll to the left to better see the cut lines in the **Preview**

**Preview**

Click here after every change

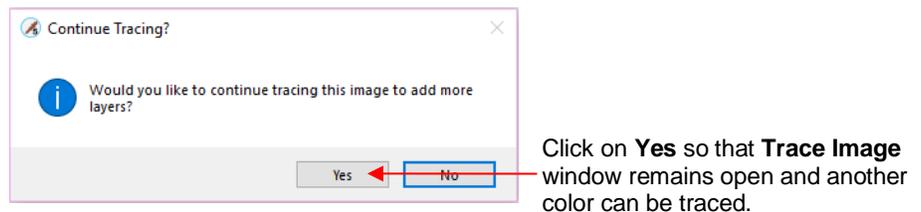
- Mark the option for **Prompt to continue tracing**. After you import each color to the **Cutting Mat**, the **Trace Image** window can be kept open to trace the next color.
  - In the screenshot, the initial color identified was a shade of green. In the **Preview**, you can see how many parts of the flower were included as being in the range of that shade.
  - If you want to add more of the green parts of the flower, then increase the **Contrast**. As you hold down the left mouse button and scroll, the image will turn gray so that you can more clearly see what is being added.
- ◇ With a **Contrast** of 26, the outline of the flower stem and leaf appear:



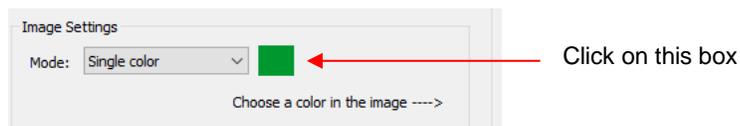
◇ With a **Contrast** of 41, the leaves and stem fill:



- Once you are satisfied, click on **OK** and you will be asked if you wish to continue tracing. Answer **Yes**:



- Click on the color box next to **Single Color**. A message will pop up indicating you are to click on another color on the **Preview**:



- One of the petals is clicked and the color box turns to that color. The **Preview** shows how much of the image is now included at the current **Contrast** of 5:



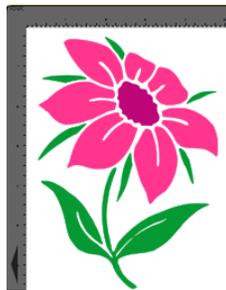
- The process is then repeated whereby the **Contrast** is increased. At a value of 30 more of the same petals are filled out, thus it is recommended to always tweak the **Contrast** some:



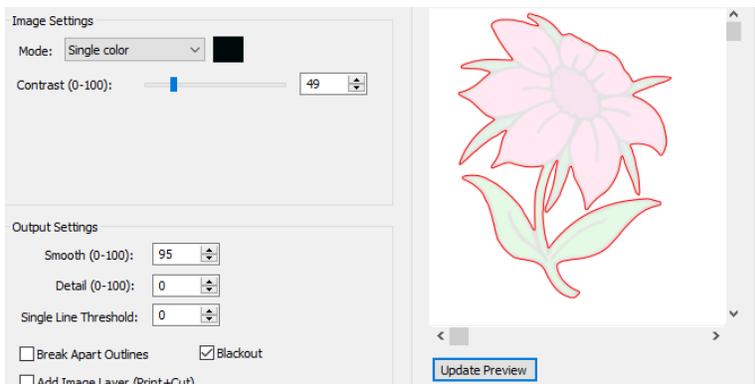
- If the **Contrast** is increased even higher, the center part of the flower gets added. Just as in the case of using **Color Layers**, this is optional.



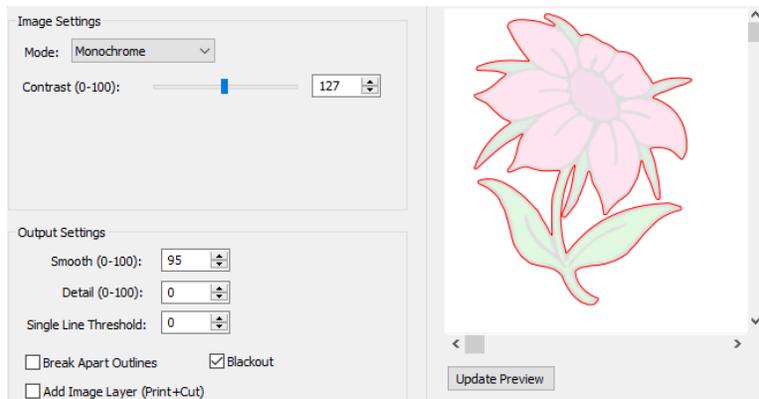
- After deciding on the **Contrast** for pink, click on **OK**. Now, let's assume that you did the petals and center in two parts and you are now at this point:



- You now have several options for completing the trace which involves adding a final outline/shadow layer to the flower:
  - ◇ Continue to use **Single Color**, click on the part of the image that is black, mark the **Blackout** option:



- ◇ Switch to **Monochrome** mode, mark the **Blackout** option:



◇ Forgo using the **Trace** window. Select the layers traced so far and use the **Shadow Layer** function to add a black outline. Details of this procedure are covered in *Section 7.23*.

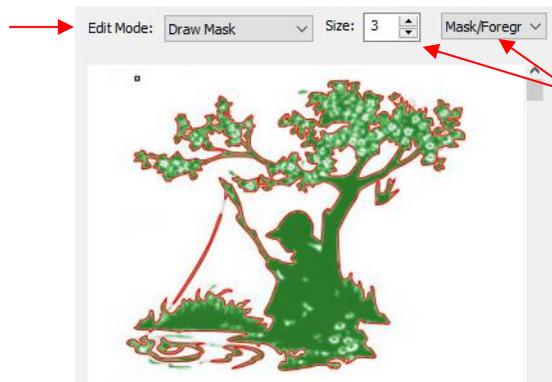
- The final results, using the three options, are virtually identical:



### 5.03.11 Draw Mask Function

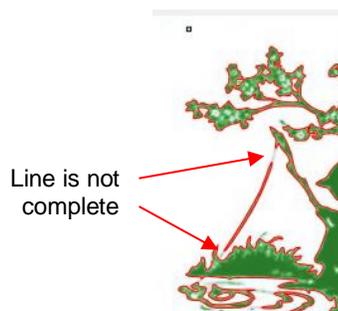
- In the **Output** section of the **Trace Image** window, under **Edit Mode** is a **Draw Mask** option which can be used to erase or add to a trace. With some images, finding the trace optimum settings can be tricky. You'll end up with some parts not quite traced and, perhaps, other parts not needed. This function allows you to "complete the task."
- When **Draw Mask** is selected, another option menu appears:

Select **Draw Mask**

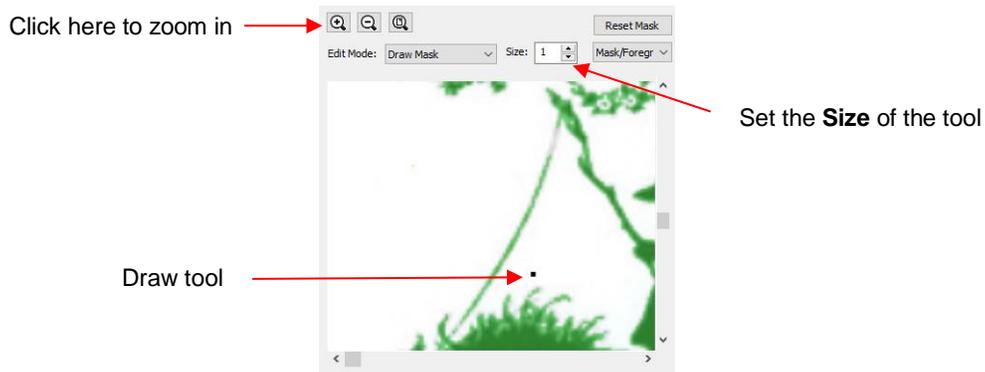


A **Size** setting and options for either **Mask/Foreground** or **Mask/Background** appear

**Mask/Foreground:** This option allows you to freely draw shapes to be added to the trace. For example, in the prior screenshot, you'll observe that the fishing pole line is not completely traced:



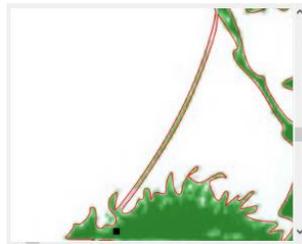
- ◇ Zoom in using the **Zoom In** icon and change the **Size** setting until the circle ~ matches the size of the fishing line. In this instance, the minimum of 1 will work best because the fishing line is so thin:



- ◇ Drag the mouse along the image where the fishing line wasn't trace. A pale green path appears:

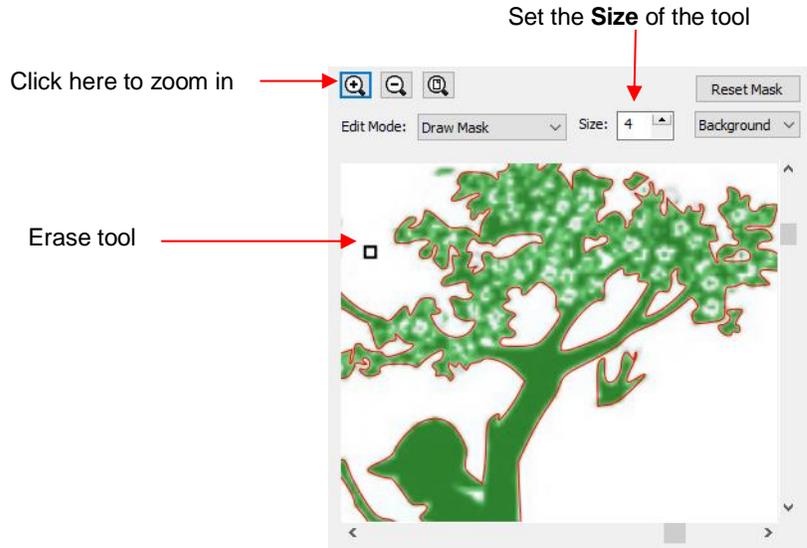


- ◇ Click on **Update Preview**. The added paths will be automatically welded to the part of the fishing line that was traced:

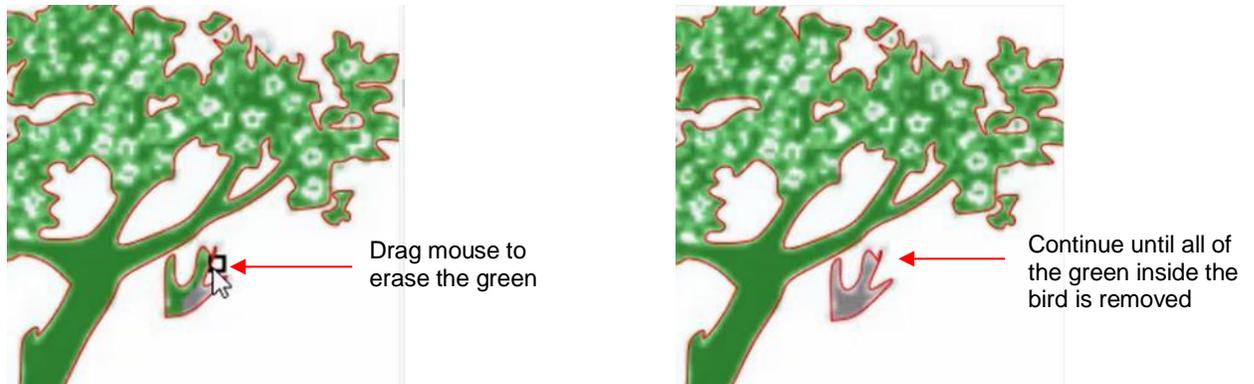


- **Background:** This option allows you to erase anything that's not wanted in the current tracing. For example, the bird just to the right of the tree, can be removed.

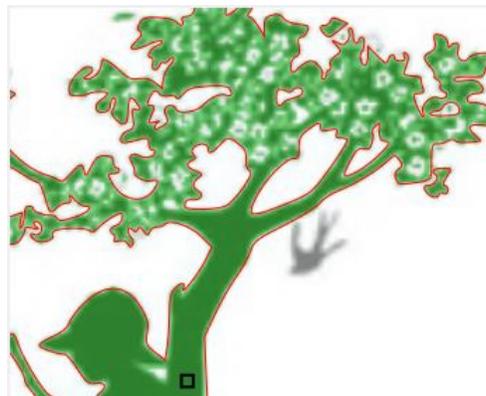
- ◇ As before, zoom in and set a **Size** for the tool:



- ◇ Drag the mouse across the image of the bird and the green shading indicating a traced image will begin to be erased. Continue until there's no longer any green:



- ◇ Click on **Update Preview** and the red outline and green fill of the bird is now gone:



- Click on **OK** and the resulting changes from both masks have been applied:

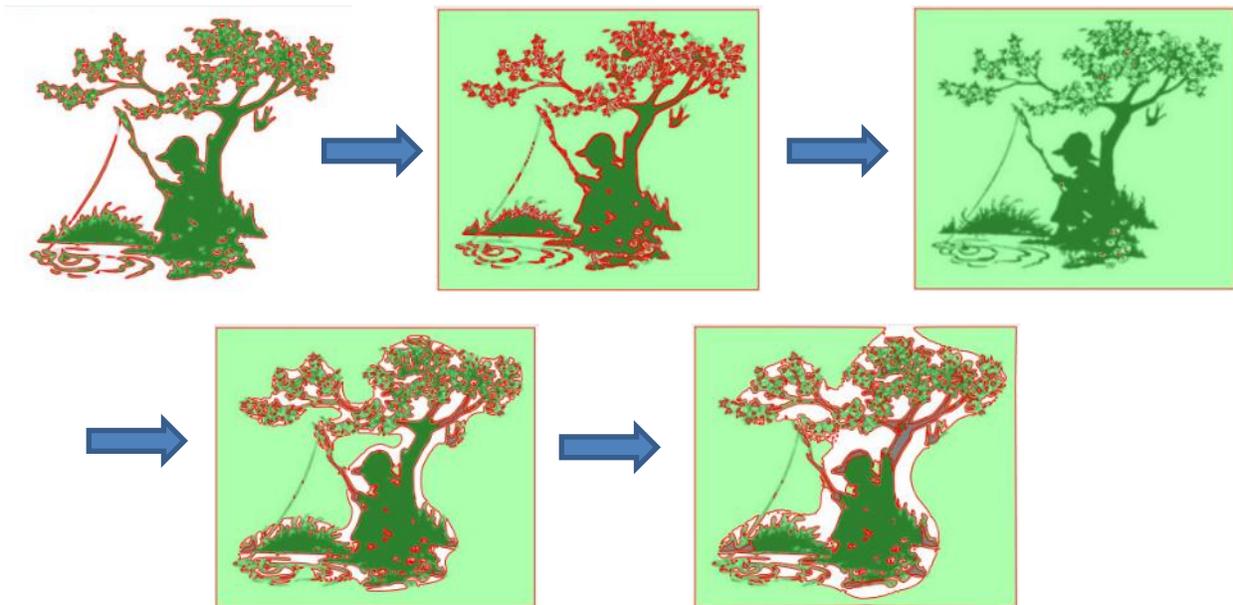


### 5.03.12 High Pass Filter Application

- The **High Pass Filter** setting is used to improve the tracing of photographs and other challenging images. The setting ranges from 0 to 20.

#### Improved Detail

- In the following example, the first image is with **High Pass Filter** turned off. The subsequent images show what happens as the **High Pass Filter** is set a 0, 1, 10, and 20. Obviously, none of these appear to be what you would want:



- The first step is to lower the **Contrast** back to the default setting of 127. The **High Pass Filter** setting is then set at 1 and a double trace line appears. As **High Pass Filter** is increased, the internal lines start to diminish:



- However, with too high of a setting, new tracings may also begin to appear:



- At this point, you can try adjusting the **Contrast**. However, if you are satisfied with most of the trace lines, you can then use the **Draw Mask** function, covered in *Section 10*, to erase these extra unwanted lines and to fill in any areas within the image. The final result:



### Converting a Photo to a Digital Stamp

- The **High Pass Filter** setting will allow a much better conversion of a photo to a black and white image. The following photo of a rose will be used as the example:

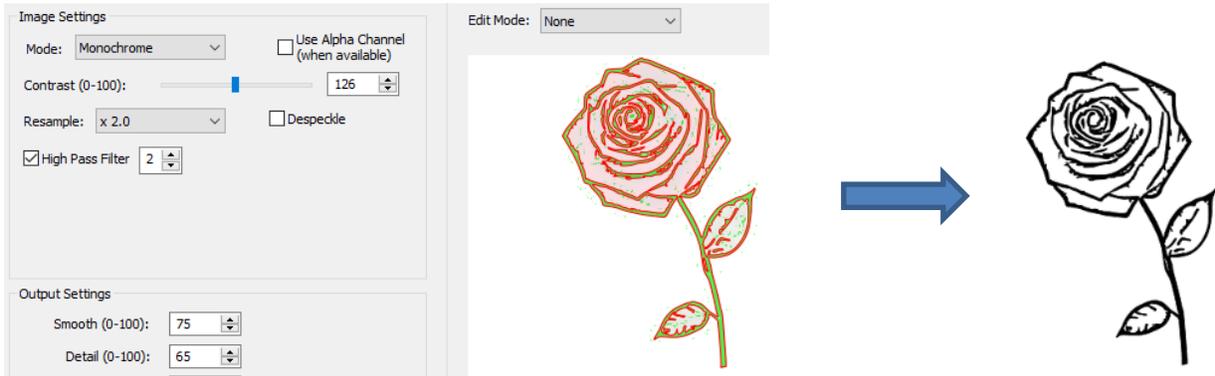


- The best monochrome tracing without using the **High Pass Filter** required tracing in stages: one to get an overall outline, another to get the internal details of the rose, and a third to get the internal details of the leaves.

- **Object>Merge** was then applied and the resulting traced image looked like this:



- Instead of using three separate traces, the **High Pass Filter** could have been set instead:



- Obviously, it was not only quicker to simply apply the **High Pass Filter**, but the results turned out much better.