Combined Drawn and Parametric Masks…my attempt to explain it

Bruce you probably have this all sorted by now so please ignore any of these ramblings but if not you can see if my explanation makes any sense.

It took me a couple of goes but following along with the logic in the manual I think I have it sorted out. Still not sure I could use them smoothly in practice but here goes.

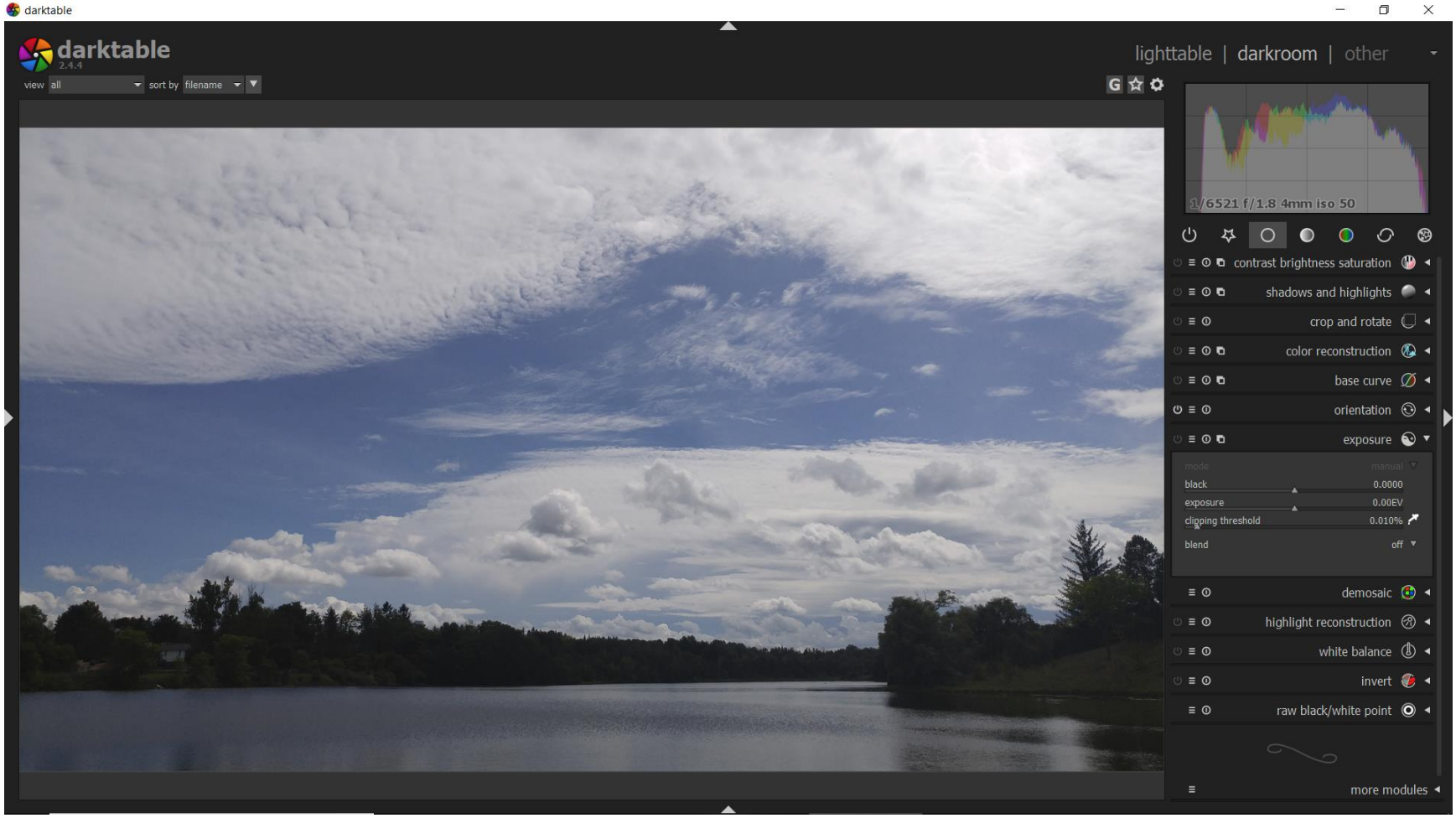
Based on the premise that **Exclusive** mode will set the mask to zero for any pixel if either the drawn mask pixel value or the parametric mask value is zero such that only sections of the image where both masks are not zero will be actively masked and for **Inclusive** if either of the masks are non-zero at a common pixel then the pixel will be still be masked the following should be true…...

Each mask type affects the whole image. So, the drawn mask is one collective mask and the parametric mask is a separate one operating on the entire image. The masked areas for each are non-zero and the unmasked ones are zero. When they overlap the result is determined by the mode…**inclusive** or **exclusive** and the math as noted above. The difficult part to follow is that each mask can be toggled independently in polarity to switch those values around ie invert the mask. Thus, you can affect the outcome of the combined mask and therefore the image by inverting the individual mask components but also altering what happens in areas where they overlap.

For a image with a single drawn mask (could be multiple objects involved) and a parametric mask based on one channel there would seem to be 4 masks that can be produced using either exclusive or inclusive and then each one of these 4 and be collectively inverted using the exclusive or inclusive + inverted option. Some of these end up producing the same results from what I can see.

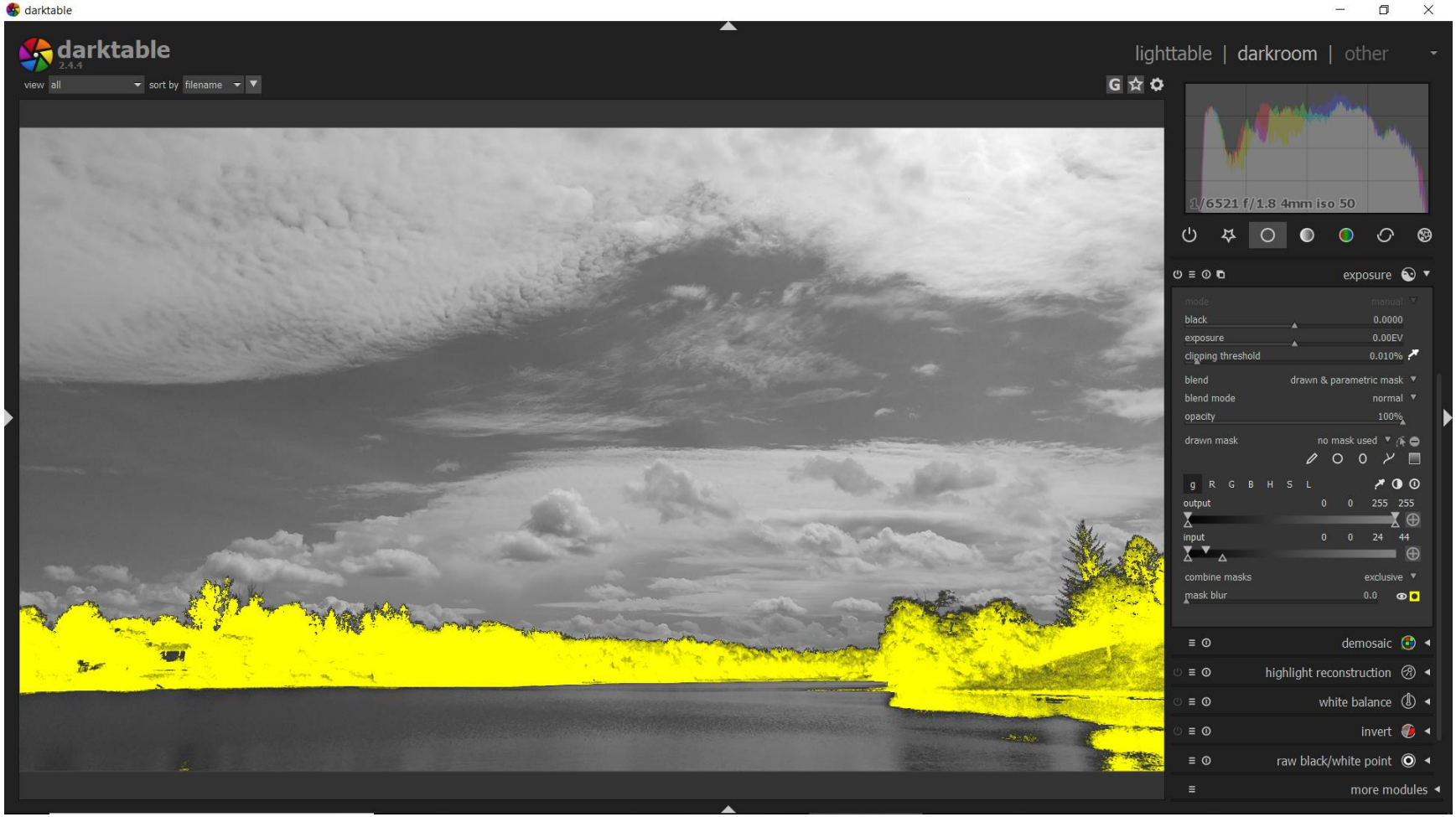
The best way to explain this would be to show a graphic representation of all these options keeping in mind the math again. So, parts of the image with a parametric mask have pixels >0 and those portions not masked are zero. The same for the drawn regions. Those values get reversed when you invert the polarity. If the drawn and parametric masks overlap they follow the rules defined above based on the selected combine mode. So, by altering the polarity of either the drawn mask, the parametric mask, or both you can produce a different overall combined mask. I will attempt show it for a one channel parametric mask using the L channel, but I suspect it could become insanely complicated if several channels and polarity combinations were employed with the parametric mask

Figure 1 Starting Image….



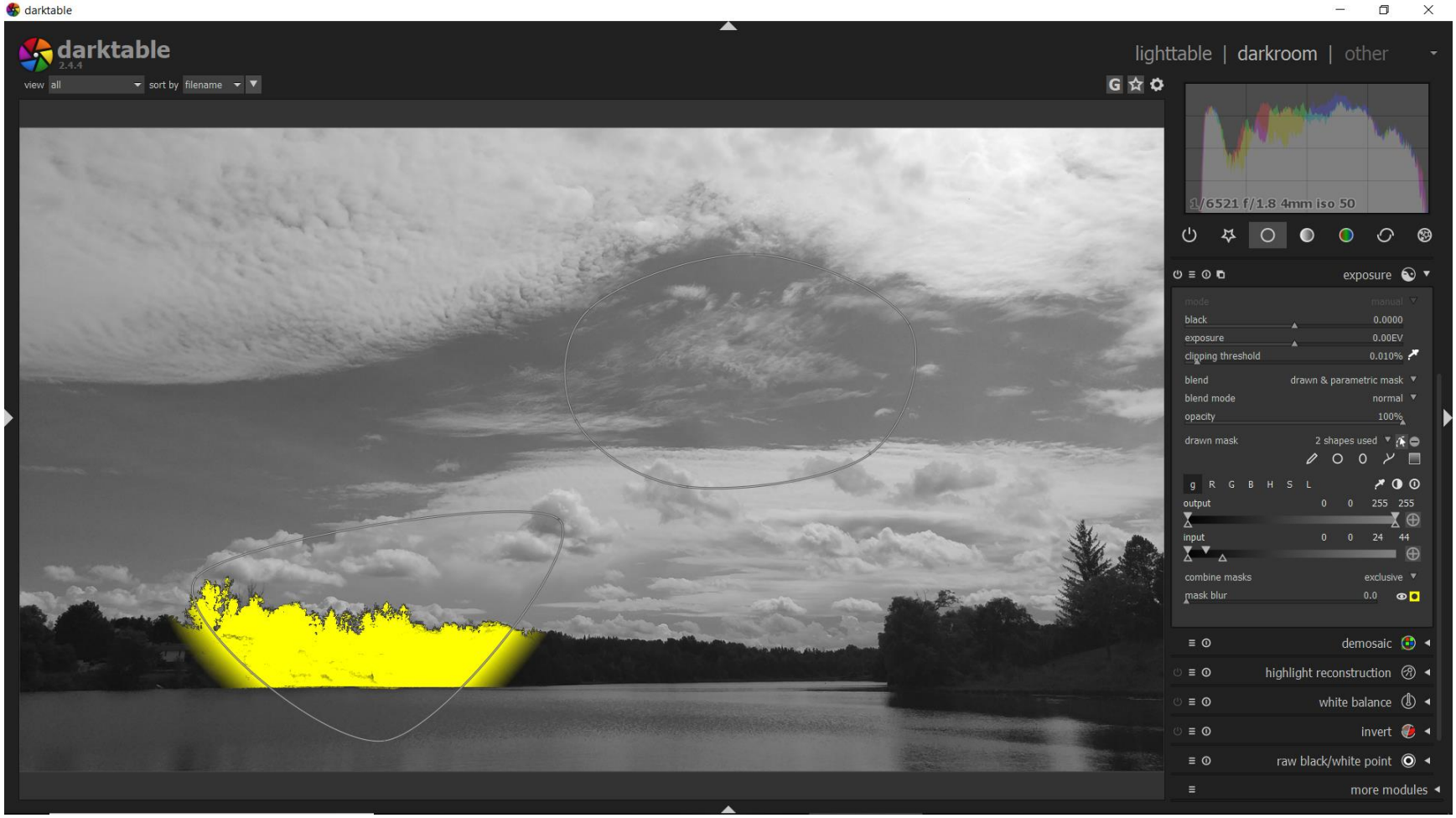
Original image…crappy just for demonstration purposes

Figure 2-First apply parametric mask -exclusive mode



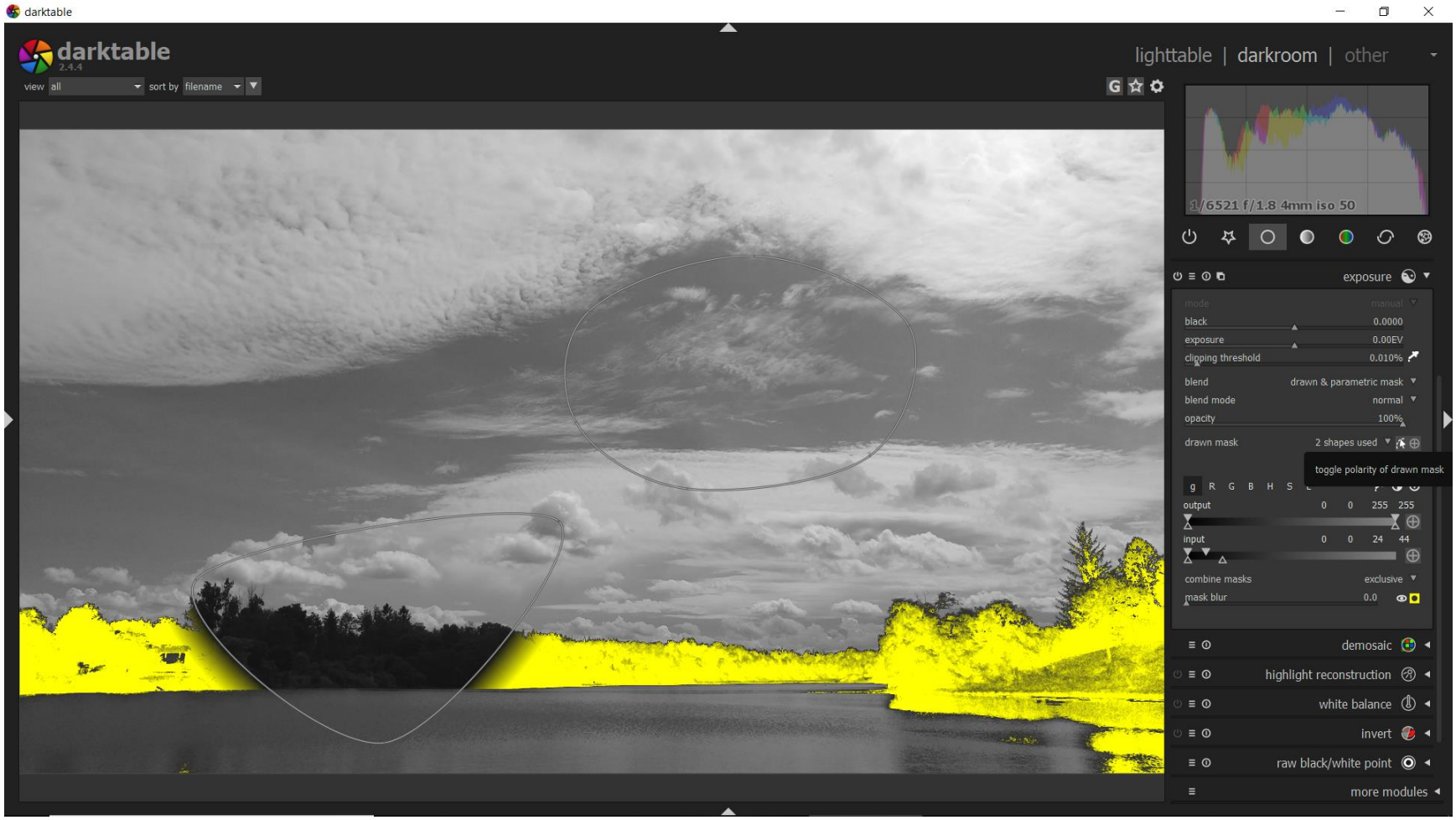
Parametric mask on the trees…yellow pixels are masked and non zero while the rest are zero

Figure 3-Two objects added to serve as the drawn mask - one overlaps one does not



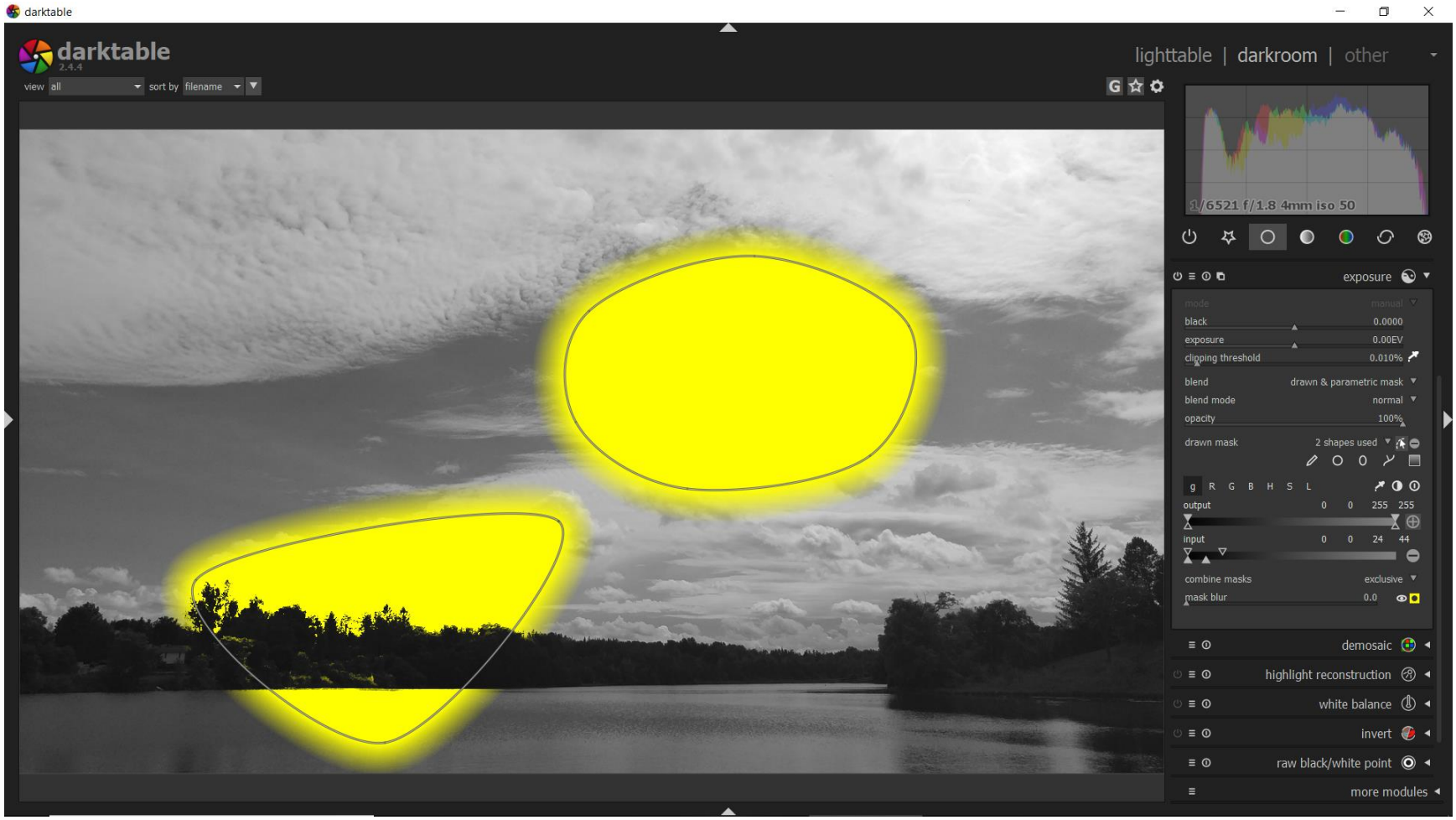
Two objects added as a drawn mask. One overlaps on to the parametric mask. The drawn objects are non zero inside the shape and zero outside and remember the parametric mask is non-zero in the area of the trees but zero for the rest of the image. This is exclusive mode so the mask is only active where both masks are non-zero as shown in the yellow pixels because the mask is the product of the pixel values of the two mask so any zero value will zero the mask and so that is why the upper shape is not masked and portions of the overlapping one as those regions have a zero value for the parametric mask.

Figure 4-Invert the drawn mask only



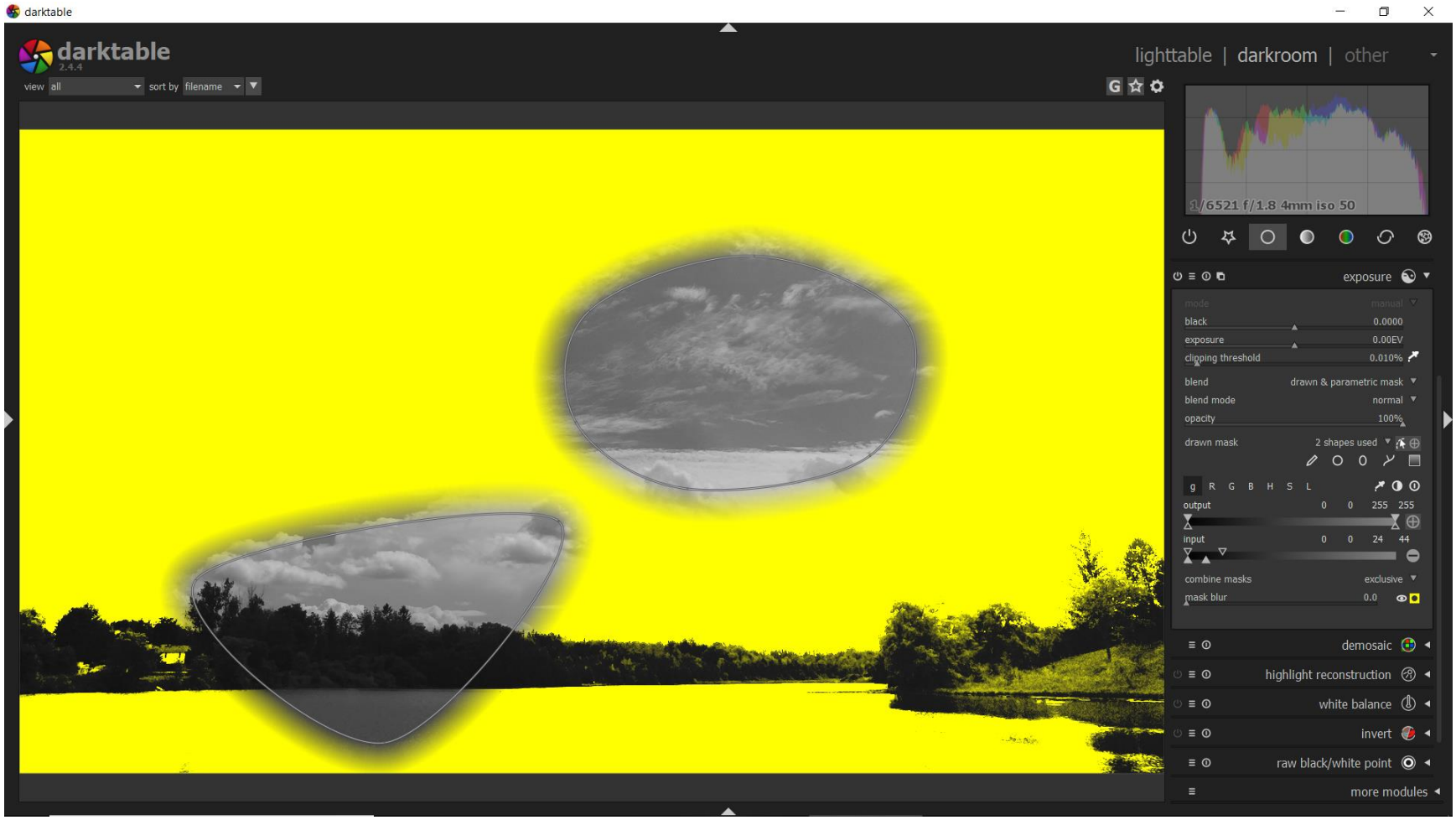
Now keeping the combine mode as exclusive and using the same logic you can selectively invert components of the combined mask. For example if you invert the drawn mask only now its zero inside the drawn shape and non-zero for the rest of the image so the upper shape has no mask and where it overlaps the parametric mask the pixel product will also = zero so no mask but the parametric mask and the non-object portion of the drawn mask are both non zero where they overlap and so that part again shown in yellow will be masked.

Figure 5-Invert the parametric mask only



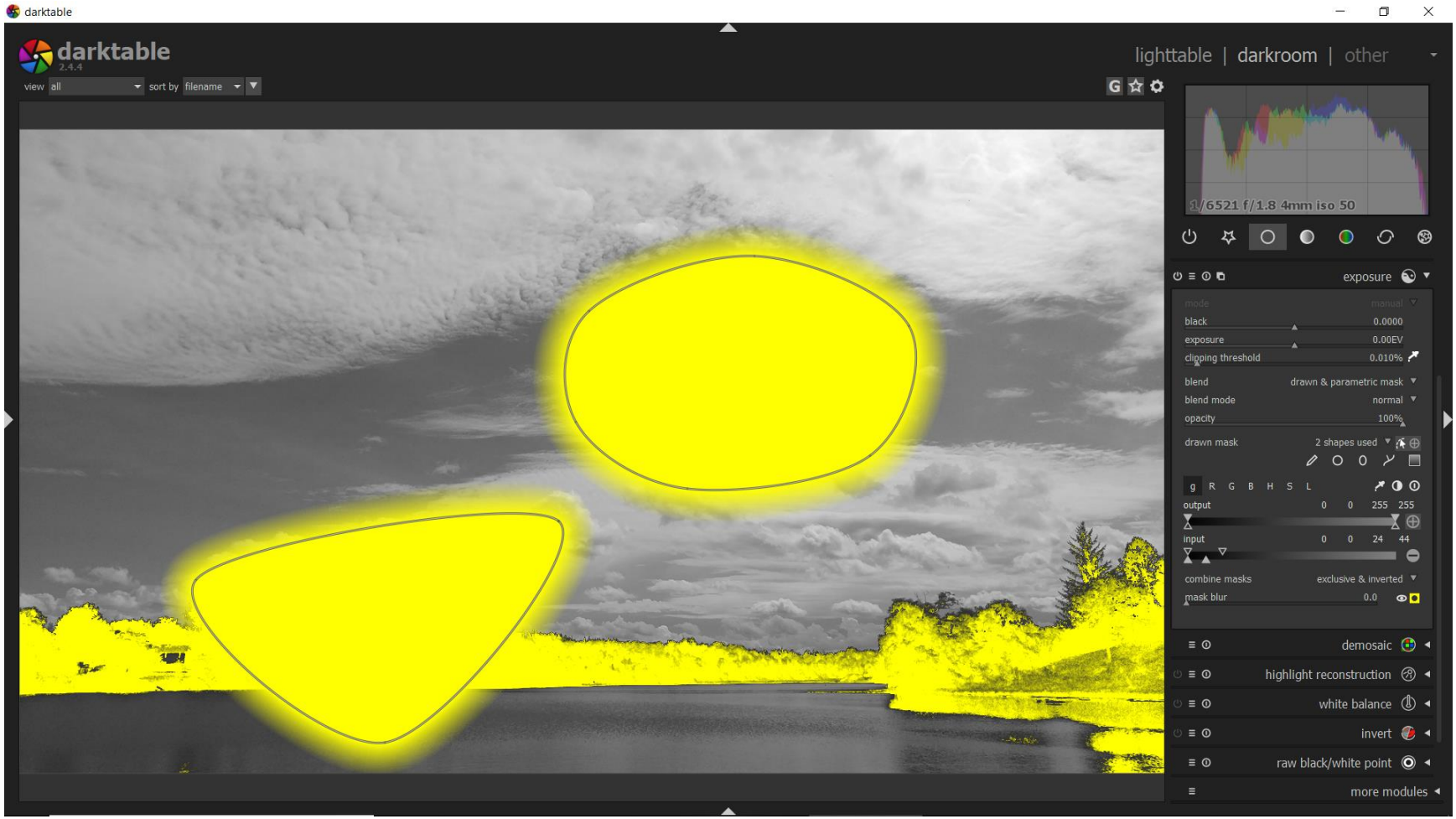
So, what if we now invert only the parametric mask instead. So, trees are now zero and the rest of the image is non-zero. The drawn mask is back to normal so non-zero inside and zero for the rest of the image and so again where the overlap of the two masks leads to a value greater than zero when you multiply the pixels together you will have a masked area.

Figure 6-Invert both masks



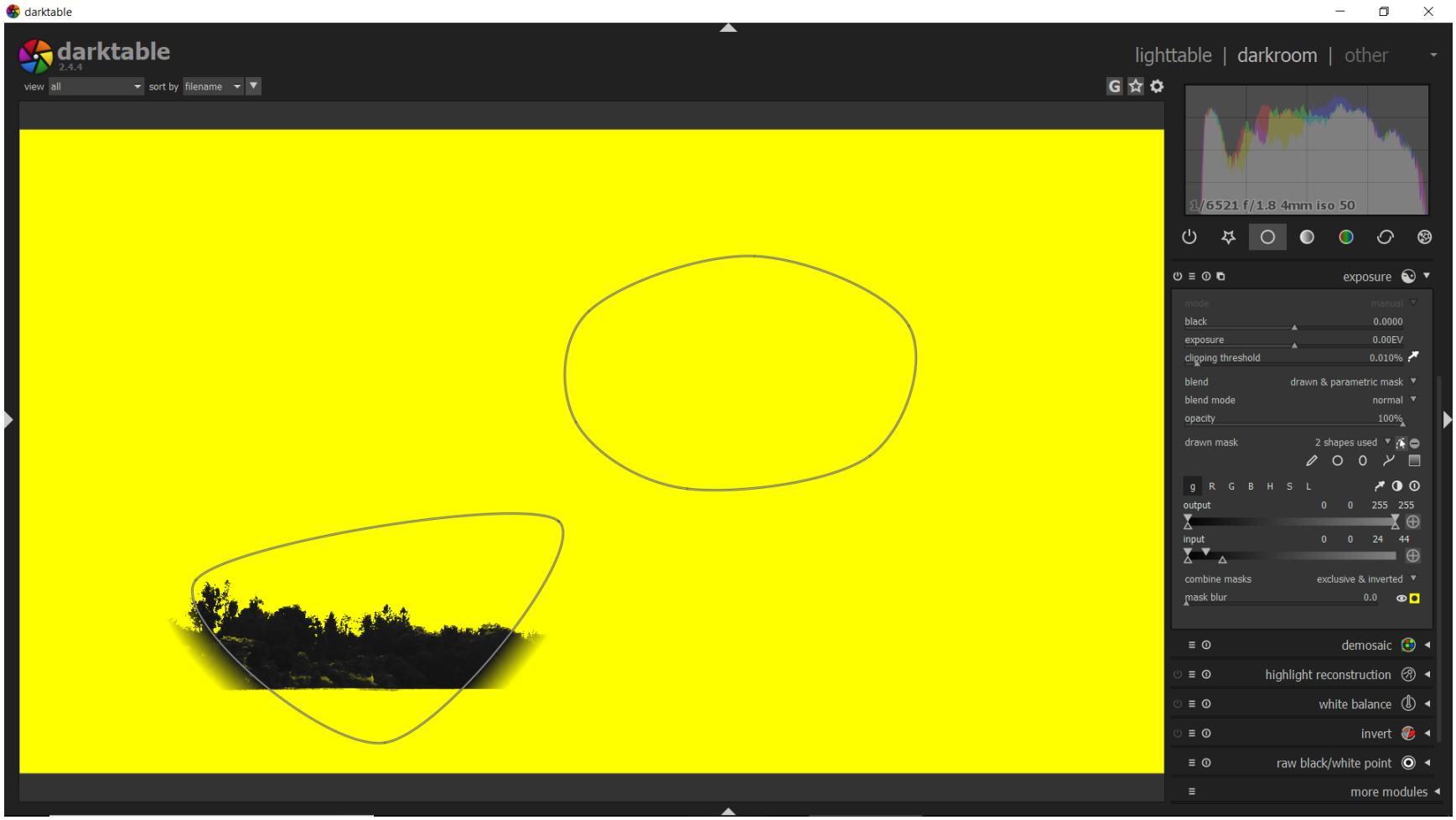
So now what if we invert the polarity of both the drawn mask and the parametric mask. The trees are zero and the rest of the image is non-zero and the shapes of the drawn mask will be the same so large areas of the image will be non-zero and therefore masked. So that is the basic set of options possible for exclusive. There is also an option to select exclusive + inverted. This will essential produce a completely inverted mask of the entire combined mask. So, we could have switched to that at any of the previous masks and created inverted versions of them. I will provide two examples below.

Figure 7-Select Exclusive _ Invert combine mode



As you can see selecting exclusive + inverted has simply created a completely inverted version of the combined mask shown above.

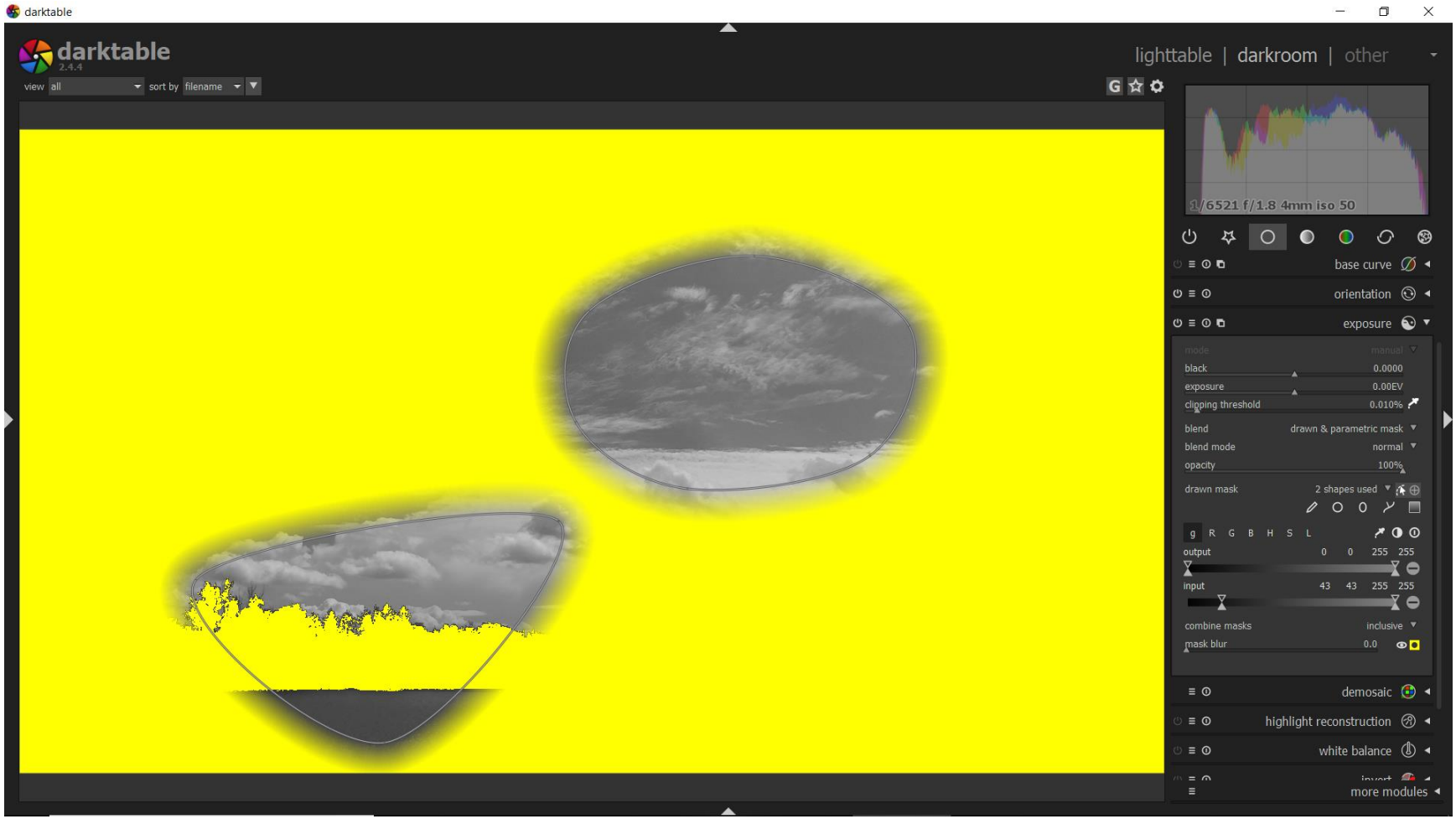
Figure 8-Another example of exclusive+Inverted on the original combined mask



Here is the result that you get when you select exclusive + inverted from our original combined mask when we first added the drawn elements as shown in the Figure 3.

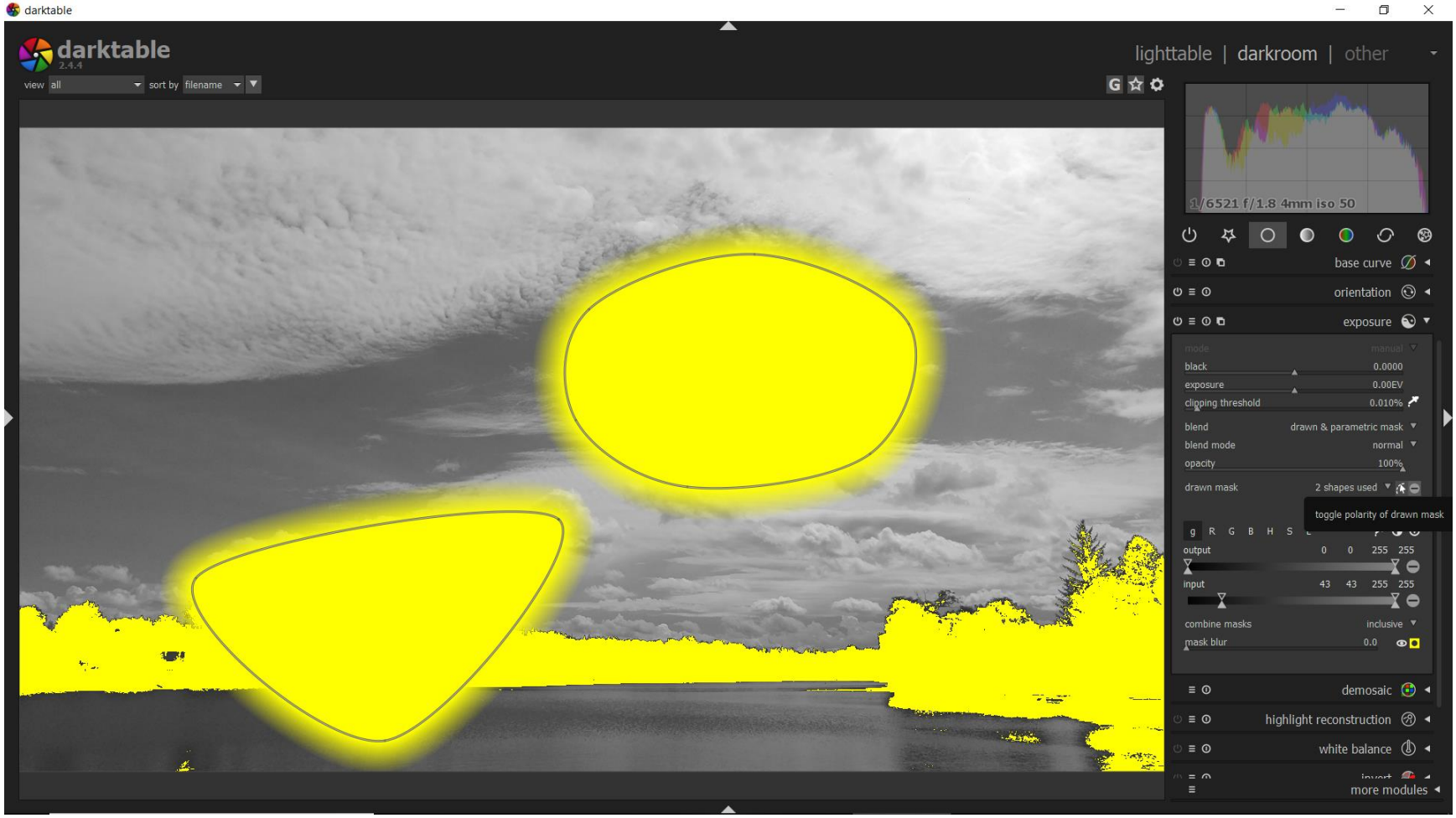
The same logic can be applied to inclusive mask options keeping in mind that the math is a bit different and if any value of either the drawn mask or the parametric mask is non-zero then the pixel will be masked. Also, you start with the polarity reversed from exclusive mode.

Figure 9-Drawn and Parametric mask - inclusive mode



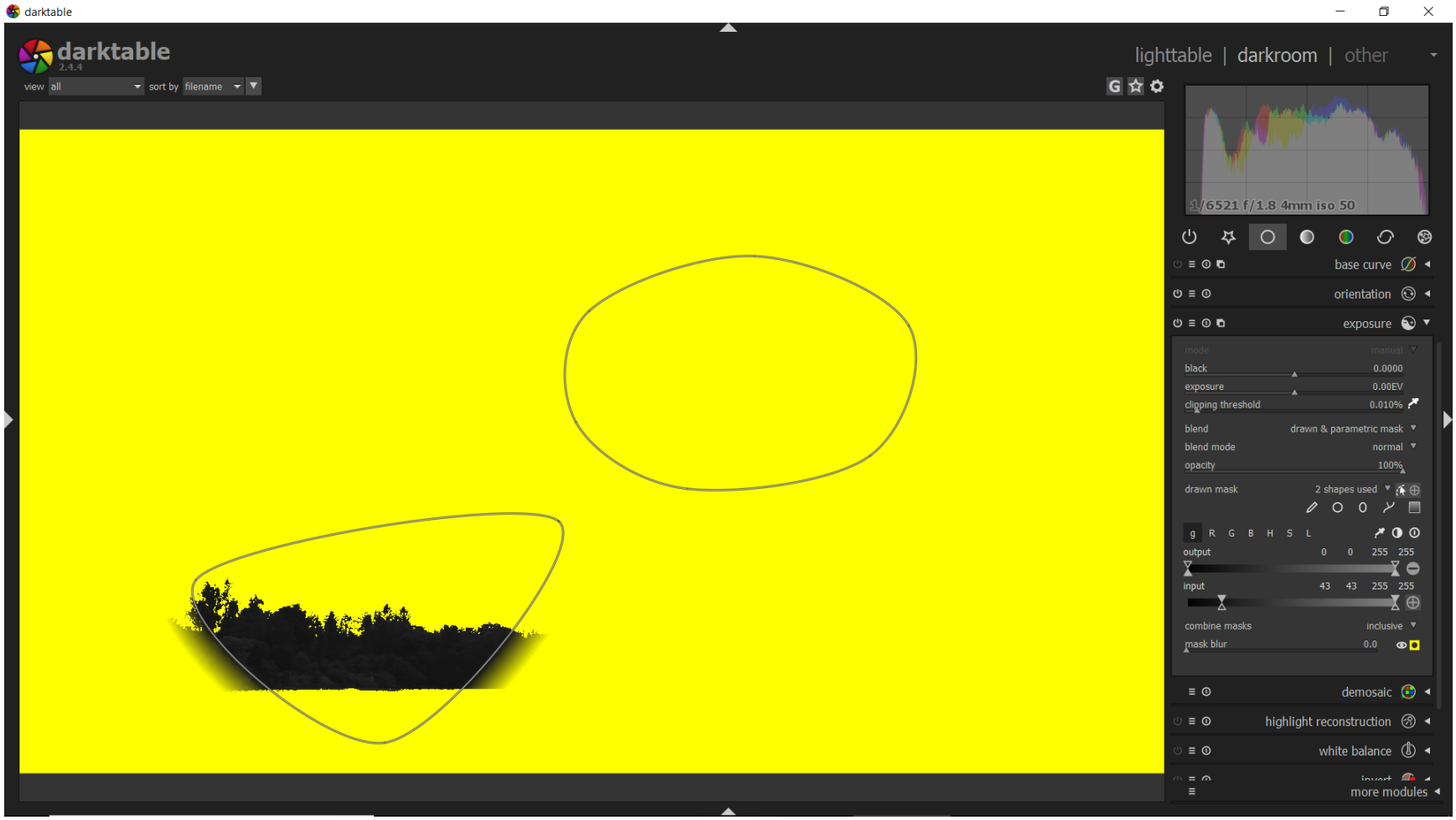
Masked using our same image in inclusive mode. Yellow is masked and indicates either the parametric or the drawn mask is non-zero for those pixels. Areas that are zero for both masks will not be included.

Figure 10- Invert Drawn Mask - Inclusive



Reversing the polarity of the drawn mask

Figure 11-Invert Parametric Mask - Inclusive

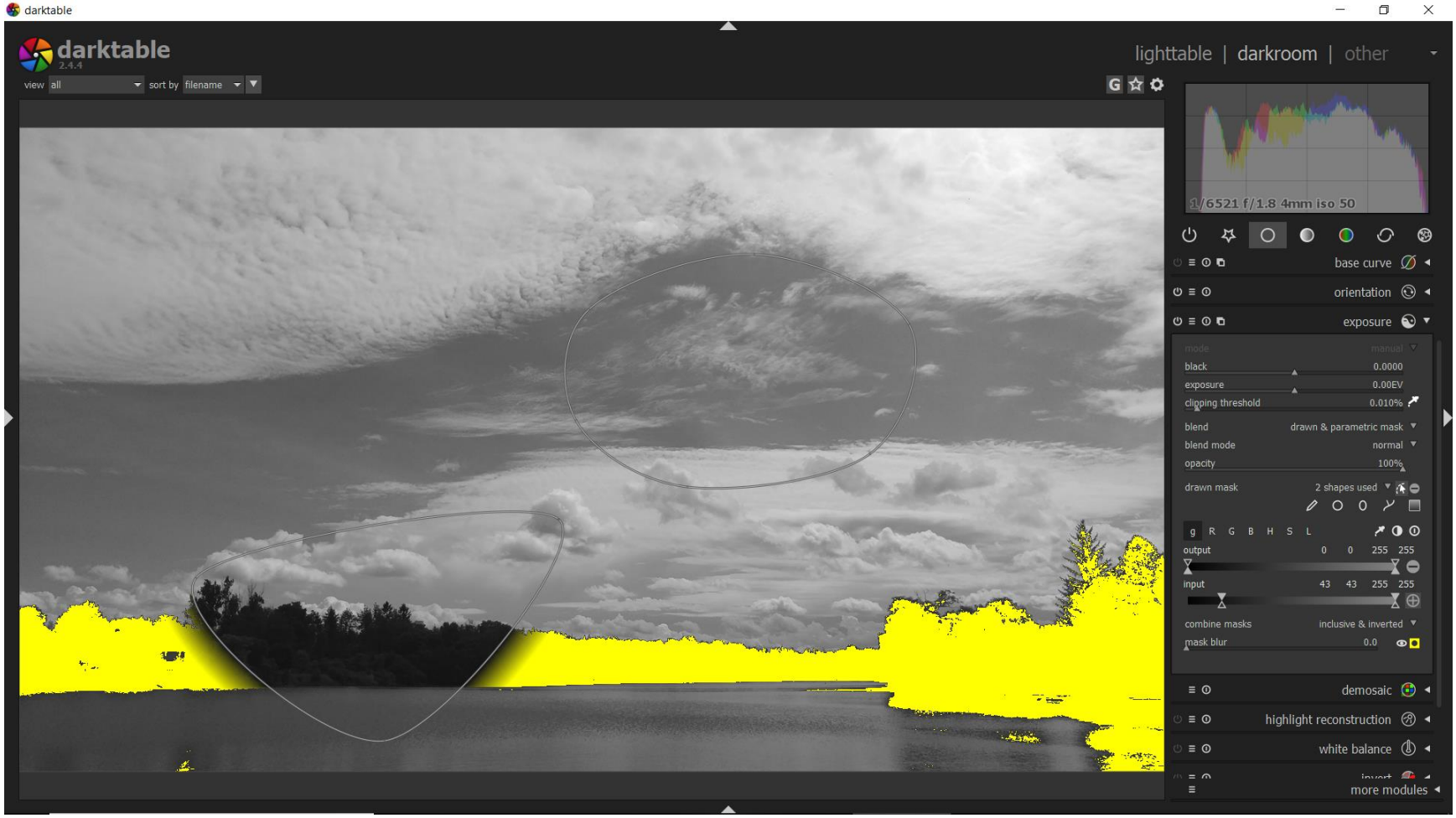


Reversing the polarity of the parametric mask

Figure 12- Invert both masks - Inclusive

Reversing the polarity of both masks

Figure 13-Finally switching to Inclusive+inverted to invert the combined mask



Using inclusive + invert to invert the combined mask shown above in Figure 12 This appears functionally equivalent to the exclusive combined mask with only the drawn mask polarity inverted…I think one or two other combinations produce the same or similar result as well.

This is pretty crude and its now 2AM but I think I have it right. If you started to add in other channels to the parametric mask you could really get some specific results I would think but its way beyond my imagination and capabilities….

Todd