

# PHOTOGRAPHY AND POST-PROCESSING TECHNIQUES FOR NATIVE FISHES

**Scott Smith and Jesse Bissette**

North Carolina Division of Marine Fisheries, Morehead City, NC

## INTRODUCTION

There are many well-documented methods for photographing fishes, using everything from point-and-shoot cameras to professional DSLRs. These methods often produce excellent photographs, albeit with varying background colors and different lighting, depending on the weather. In an effort to standardize our photographs, we use an approach that builds off of known methods, consistently provides solid black backgrounds, removes any concern over ambient lighting, and reveals a level of detail not normally seen in photographs of fish. This article aims to outline our process so that anyone, whether equipped with entry-level or professional gear, will be able to duplicate it.

## GEAR

### Camera

The hard truth of the matter is that in order to obtain high-quality photographs, you will need to have a high-quality camera. Any camera that is capable of shooting in a RAW format, has a fully manual mode, and has the ability to use a detached strobe will work. It will be hard to reproduce the type of shots found in this article using a point and shoot camera, but low-end DSLRs will more than suffice. The cameras we use most often (a Nikon D3000 and a Nikon D610) span this range. Keep in mind that you will often find yourself in wet and dirty conditions, so think twice about bringing out that \$10,000 camera.

### Flash

The second most important piece of equipment you will need is a detached flash. The on-camera flash will not work. We use Nikon SB-600 strobes because they use technology (i-TTL) that automatically meters the scene so you don't have to manually adjust any settings before each shot. If you

have an older flash knocking about, it will work as well. Just know that you will be required to adjust the flash settings manually. Price is the second reason for choosing this flash, as a used SB-600 costs about \$200. We find this well within our "oops, I dropped it in the water" budget.

### Lens

In order to properly resolve the fins of small fishes, a macro lens is an absolute necessity. We use the Nikon 40mm f/2.8G AF-S Micro Nikkor on the D3000 and the 60mm f/2.8G AF-S Micro Nikkor on the D610. Due to the cropped sensor of the D3000, both these setups have an equivalent working focal length (i.e., the angle of view is the same). We've found this to be the perfect focal length, any longer and you have to be too far from the fish to properly position the flash.

### Miscellaneous

The ability to use the flash off camera is essential to our method. There are a few different ways to operate a strobe remotely: through the "Commander Mode", by using a flash synchronization cable, or with a wireless transmitter. Commander mode is a feature on some Nikon cameras that can trigger an off-camera flash by using a quick burst from the



The system in action: Scott photographs a sunfish.

All photos by the authors.

Scott and Jesse are both employees of the North Carolina Division of Marine Fisheries, where they spend an inordinate amount of time identifying and sampling native fishes. To see more of their photos, visit their website: [www.ncfishes.com](http://www.ncfishes.com).

camera's popup flash. We use commander mode on the Nikon D610, and a hotshoe extension cable (Nikon's SC-17) on the D3000. There are many knock-off brands online, but generally a used Nikon SC-17 will cost about \$20. A wireless transmitter will work as well, but make sure it can transfer metering instructions to the flash and doesn't just trigger it.

Everyone has his or her own favorite phototank, and nothing special is required. We would, however, recommend that you use as thin a tank as possible and the highest quality glass you can find (low-quality glass may have imperfections that affect the quality of the photograph). Acrylic can be used in place of glass, but it is easily scratched. A squeeze plate that is slightly smaller than the interior width of your phototank is also needed.

We also use a homemade device that fits over the lens that blocks reflections from the phototank (we call it a blackout board). It can be as basic as a black sheet of paper with a hole cut in it or as high-tech as a lightweight piece of hardboard painted black on a sleeve made to the exact size of the lens. Without it, the camera will try to focus on the reflection instead of the fish. It also prevents reflection by blocking light from the on-camera flash if it is being used in commander mode.

Last, we carry a black piece of poster board in case we need to block light from behind the phototank. The vast majority of the time this is not needed, but it could be necessary on really bright, sunny days.

## METHODS

First and foremost, the camera should be in its fully manual mode, the ISO should be set on whatever the camera's base ISO is (usually 100 or 200), and files should be saved in the RAW format. Since a flash is used to light the fish, the shutter speed should be set to 1/200th of a second and the aperture value to f/18. These settings will never need changing; set them and forget them. If the photograph is over or under exposed, use the exposure compensation button on the camera to adjust it.

Our flash settings are kept on automatic, as we use Nikon's i-TTL compatible flashes (the flash's computer determines the appropriate flash power). If you don't have that option, just adjust the flash power manually until the photograph is correctly exposed (you would not use exposure compensation in this instance). The zoom setting on the flash is usually set to the widest setting.

Once you have the camera settings correct, take a picture through the phototank of the scene behind it to make sure it is solid black. It does not matter what the background consists of. It could be trees in the distance, your car, or any number of things; unless the bright sun is shining directly on it, the background will be black. If you find that your test shot is not black, try to find a background that is in the shade. If you cannot find a shaded background, place a piece of black poster board (or any black material) at least a foot behind the tank.

Using the squeeze plate, pin the fish against the front of the tank. It may take some maneuvering to get the fish to pose with its fins spread (taking pictures and holding the squeeze plate seems to take three hands, so having a friend help out makes it much easier). The flash should usually be held above and slightly in front of the fish, but play around with different flash positions and use the camera's LCD screen to see how they affect the photograph. If the fish looks translucent, the flash is positioned too far behind it; if the background is lit up, the flash is too far in front of the fish. The flash should be as close to the fish as possible while still completely covering the fish evenly with light. A softbox or some other light diffuser will provide softer light and help eliminate shadows and hotspots (small, highly overexposed areas). It's generally best to focus on the base of the dorsal fin; the large depth of field created by the small aperture ensures that all parts of the fish will be in adequate focus. Perhaps the most important part of taking a good photograph is making sure the camera is perfectly perpendicular to the fish (on both axes). If the camera is askew, parts of the fish will be blurry.



*Microgobius thallasinus* (Green Goby), saltwater pond off Neuse River, Carteret County, NC.



*Nocomis leptcephalus* (Bluehead Chub), Upper Barton Creek, Wake County, NC.



Photographing this fish against a dark background made it easy to achieve a pure black background in post-processing.

### PROCESSING

We use Adobe Photoshop CS5 Extended to process our photos and will describe how to do it in that specific program. Other versions of Photoshop, as well as other editing programs, will work just as well, but you may need to tweak the process a little. Digital photographs often need some level of noise reduction and sharpening, and since these topics are explained in great detail all over the web, we will not discuss them here.

Since we shoot in a RAW format, we must open our photographs in Adobe Camera Raw (it comes with Photoshop). But first, a digression: while we will not go into all the specifics of exactly what a RAW file is, we do feel a little bit of an explanation is in order. A RAW file is the digital equivalent of a film negative. It is not exactly a photograph in and of itself. It is a collection of information that can be used to create an image. We must assign values for white balance, exposure, contrast, etc., before the photo can be printed or saved for the web. If you use your camera in the JPEG mode, the camera sets these values and develops the image for you. The reason to shoot in RAW is simply a matter of image quality. Instead of the camera's computer making all the decisions for you and developing your image, all the information captured by the camera's sensor is retained and you control exactly how the image will look, much like working in a darkroom. In short, shooting in RAW results in a much higher-quality final image. Also, JPEG is a lossy format: information is discarded as the image is compressed, and that information can never be recovered.

Once the photo is opened in Camera Raw, the first thing to do is set the white balance. The camera's auto white balance usually gets it right and no changes are needed, but now and then a slight tweak is required. Once the white balance is set, it's time to move onto the actual image editing. Adobe Camera Raw has multiple sliders available; the only two we're interested in is the fill light slider and the blacks slider. In a nutshell, these are used to adjust shadows. The fill

light slider brightens shadows and the blacks slider darkens them. Play around with them to see how they affect the image, but remember the goal is to use them as little as possible. If you did everything correctly while shooting, they'll only need a very minor tweak just to enhance contrast. You can now open the image in Photoshop.

Once the image is in Photoshop, it's time to make sure the background is solid black. Again, if you did your job correctly while taking the photograph, the background is already black, and you'll just have to get rid of some spots caused by debris floating in the water or stuck on the photo-tank glass. The easiest way to accomplish this is to use the quick select tool to select the fish, invert the selection (Select > Inverse), and then create a black fill layer (Layer > New Fill Layer). This will create a black layer that has the fish masked out so the black does not cover it. As much as we hate to repeat ourselves, we must reiterate, if you took the photographs correctly in the field, this step is simply a matter of a few quick swipes with the quick select tool and a click of the create fill layer button. It shouldn't take longer than five minutes. However, if you didn't have a black background to begin with, the selection process will take much, much longer, and, in all honesty, you'd be better off trashing the photographs and retaking them.

Occasionally, you may notice a blue hue on the subject's fins in your image that is not present on the specimen itself. This generally only happens with small, translucent fins, and we believe is caused by the light scattering as it passes through the tissue. In order to remove this you will need to create a merge stamp visible layer (Mac: command-option-shift-e; PC: ctrl-alt-shift-e). This will create a new layer with all of your previous adjustments applied. Next, select the fin with a quick select or marquee tool, then go to Image > Adjustments > Hue/Saturation. On the window that pops up, select "Blues" from the second drop down box, and then adjust the saturation and lightness sliders until the blue is gone. If done correctly, this will just affect the selected area,





and the blues in the rest of the fish will remain.

The final step in the editing process is using the Unsharp Mask to bring out detail. Create a merge stamp visible layer (Mac: command-option-shift-e; PC: Ctrl-alt-shift-e), click on Filter > Sharpen > Unsharp Mask. Enter 15 in Amount, 250 in Radius, and 0 in Threshold. Click OK. This slightly increases the midtone contrast and will greatly enhance the detail of your photograph. And that's it! Your image is now ready for printing or resizing and saving for the web.

### CONCLUSION

Hopefully, with this information, you can take photographs that do justice to the extraordinary native fishes of our waters. In reality, the biggest piece of advice we can give you is that if you are serious about taking photographs of fishes, you must learn about other types of photography. Skills from landscape or portrait photography transfer over, and there is a vast amount of free knowledge on the internet in those fields. Plus, you'll already be in gorgeous locations collecting fishes, so you might as well go ahead and take pictures that capture the spirit of the places these fishes call home.



### TIPS

- Clear, clean water is essential, as is clean phototank glass. We bring our own water.
- Crop all your images to the same size (we crop to 16x9, but any size will work). It's not absolutely necessary, but it really cleans up the look of your collection.
- Take a lot of pictures, more than you think you need. Digital storage is cheap, and you can always delete pictures later. There have been many instances where we later wished that we had taken more photographs of a certain fish, but never that we had taken fewer.



From top: *Fundulus confluentus* (Marsh Killifish), saltwater pond off Neuse River, Carteret County, NC; *Hypentelium nigricans* (Northern Hog Sucker), New River, Grayson County, VA; *Hypseleotris geminata* (Crested Blenny), Newport River, Carteret County, NC; *Eleotris amblyopsis* (Largescaled Spinycheek Sleeper), Bogue Sound, Carteret County, NC.

*Macrobrachium acanthurus* (Cinnamon River Shrimp), Tributary to Bogue Sound, Carteret County, NC.