# THE **DEFINITION OF CONTROL OF CON**

Martin Edge with Stuart Gibson

# FIFTH EDITION

A Focal Press Book

ROUTLEDGE

# The Underwater Photographer

**FIFTH EDITION** 

In this long-awaited fifth edition of the best-selling book, Martin Edge continues to provide the definitive guide to underwater photography. This book covers everything from the basic principles, the equipment and approaches to composition and lighting through to creating an individual style.

The book features over 400 updated colour images – taken on numerous dives around the world – with an accompanying narrative that provides detailed information on how the shots were taken, their strengths and weaknesses and how to fix mistakes. Practical examples take you step-by-step through the basic techniques: photographing shipwrecks, divers, marine life, macro images and taking photographs at night. New chapters cover the latest equipment, processes and techniques including SLR Cameras, water contact lenses, mirrorless interchangeable lens cameras, micro four third systems, super macro techniques, motion blur, LED lighting and more.

Packed with inspiring examples from global diving destinations and speciality chapters written by professionals in the field, this book is an indispensable masterclass for both the novice and seasoned underwater photographer.

**Martin Edge** is a lifelong member of the British Society of Underwater Photographers with over 35 years of experience dedicated to advancing the art and technique of underwater photography. He teaches and runs workshops in underwater photography and is a regular columnist for major diving magazines.

**Stuart Gibson** has been diving for over 20 years. His passion for underwater photography started in 1999 with an old Olympus film camera. He met Martin in 2006 and has joined him on many photography trips and, in recent years, assisted him on several workshops.



# The Underwater Photographer

**FIFTH EDITION** 

Martin Edge with Stuart Gibson



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# Foreword by Alex Mustard

For a quarter of a century via the previous editions of this book, and for a decade longer through his workshops and 1:1 courses, Martin Edge has been helping the world take sharper, clearer, cleaner, more colourful and above all, more compelling underwater photographs. Most people never see the underwater world for themselves and our pictures are their window to the 70 per cent of our planet that is covered in water. The more eye-catching our shots, the more engaged the general public are with the wonders of the seas and also the problems they face. Throughout our community, you'd be hard-pressed to find an underwater photographer who has not got a well-thumbed previous edition of *The Underwater Photographer* and whose photography has benefitted from Martin's insight in creating those images. Indeed, Martin's ideas and explanations have become so much a part of underwater photography that they are repeated in almost every article written on the topic as simply the way it is done.

Those of us fortunate to call Martin a friend are not surprised, the man is addicted to teaching people. He's a natural-born coach, equally able to help both absolute beginners and the most celebrated names in the business produce better images.

But why have his books been the ones that have resonated? My view of what makes Martin unique is that his passion for teaching is combined with the enquiring, analytical mind of a retired police detective. Martin is gifted at asking the questions that get to the real heart of the matter and disarmingly good at getting you talking! When he got serious about photography in the early 1980s, photo-chat talk was limited to equipment and settings. These are important, but Martin dug deeper, forensically investigating how to give underwater pictures more visual and emotional appeal. Then, rather than hoarding this knowledge for himself, he thought through the best way to explain it and shared everything he considered important. And he's still the same today, always looking for new ways for us all to improve our pictures., as you'll find throughout this book.

The third piece of the puzzle is Martin's modesty and generosity, a rare quality in a photographer! Photography is a solo career and particularly when combined with the social media age produces more than its fair share of egomaniacs! The underwater photography community holds Martin in the highest esteem, yet he remains genuinely humble about his massive contribution and his fabulous pictures. Each year we judge the Underwater Photographer of the Year contest together with Peter Rowlands. Martin is the perfect judge: his huge knowledge and experience means he brings an authority prized by the entrants, but most importantly he'll always listen to the opinions of others. And this is a special strength of his books – in these pages you don't just benefit from Martin, but from his handpicked team, established names and rising stars who he has identified and invited to share their knowledge on specific topics.

In short, a new edition of *The Underwater Photographer* is something to savour. Something to pour over now, but also to keep revisiting over the coming years as you improve. The magic of Martin's insight in these pages is that it grows with you as a photographer. Enjoy immersing yourself in this fifth edition, which will ensure that Martin's wise words will be helping us all share powerful pictures of the great spectacles of the oceans for decades to come!



Martin and Alex in Misool, Indonesia, January 2019.

# About the Fifth Edition

## CHAPTER 1 Principles of Underwater Photography

Before you can ever get started shooting underwater you first and foremost need to know the basics of photography in general, such as *f*-numbers, shutter speeds and depth of field. They are all discussed in Chapter 1, in particular 'The Problems with Shooting Down'. Ensure you bookmark this chapter.

# CHAPTER 2 Digital Compacts, Mirrorless Cameras and Micro 4/3rds by Mario Vitalini

Everything you need to know about what to buy and what you can shoot with these superb small cameras.

## CHAPTER 3 SLR Cameras

There are so many cameras out there and I do concede that it is difficult in this day and age to make a decision on what to buy. I have always used SLR cameras, they are in my blood and I will never change. The question of full or crop sensor and other considerations covered in this chapter not only apply to these traditional tools of the trade but now apply to other camera families such as smaller mirrorless 4/3<sup>rds</sup> and other compact options.

# CHAPTER 4 Diving to Take Photographs

This book is very much a 'hands on guide' to all aspects of underwater photography. It's been 10 years in the making since the last edition and if

you are new to this wonderful pastime that we all share then you are in for a treat. Since the1990s, I have had the pleasure of teaching many hundreds of up and coming UW photographers both in swimming pools and in the sea. If I look back it's all I ever wanted to do with my diving, to teach you how to be the best photographer you could be.

# CHAPTER 5 The Mindset of a Successful Underwater Photographer

My mindset is always at the heart of this book. In particular the way in which I and other students have been taught to think and consider. The chapter is all about how we can fulfil our potential. Five books later, I'm still convinced that it is all about how we can teach ourselves to think underwater. How can we reduce our distractions and on any given photo-dive, learn to concentrate on what we choose to shoot and, most importantly, what we choose to reject. Throughout Chapter 5 I will share my thoughts and my feelings at the time I was taking the pictures and, most importantly, my own way of thinking.

# CHAPTER 6 All About Lighting

The topic of underwater light is vast. I have split this topic into four 'mini sections'.

- 1. **Natural Light**, where we look at all the individual types of light we observe underwater and how best to record that light.
- 2. **Strobe Lighting**, where we look at both the shape of the subject and the accessibility of the subject. Also, the position of the subject and the positioning of the strobes (either one strobe or two). All of which are in relation to how we wish our subject to look in camera.
- **3. Inward Lighting**. An innovative idea, which I stumbled upon 10 years ago. The concept of Inward Lighting is to point your strobe backwards towards your face behind the camera with the edge of the beam cutting just in front of your port, be it a macro port or a wide angle port.
- 4. **LED lighting with Sascha Janson**. You could say goodbye to your strobes if you follow in Sascha's footsteps. Very tempting indeed!

# CHAPTER 7 Composition Underwater

We all know that composition is a key subject in topside photography; however, when we take composition underwater it becomes enormous, and I have found more than a few underwater photographers who leave composition back on land. My tip to those is to take down three or four compositional ideas and get used to using them underwater rather than back on land. Composition can make or break so many images. Throughout this book I will urge you all to pay more attention to composition underwater.

# CHAPTER 8 Close-Up, Macro and Super Macro

Perhaps the most popular type of underwater photography there is today. If you are looking for a challenge then The Art of Bokeh and in particular Alex Tattersall's super macro piece will keep you absorbed for hours.

# CHAPTER 9 Wide Angle

I do concede that my most favourite of the underwater photography genera is wide angle. It's a huge chapter, covering: working with a model, wrecks with Nick Blake, motion blur with Nick More, wide angle surface suggestion, shooting mangroves and, last but not least, popular opportunities.

# CHAPTER 10 Three Deadly Sins by Kevin and Maggie Reed

At some time in your photo–dive profession you will be subject to an equipment leak. If you ignore them they will certainly come back to bite you. Make sure you look after your equipment and have contact with aquaphot. co.uk.

# Introduction

Twenty-five years on and four editions of *The Underwater Photographer* to my name, I am delighted with the success it has become. For those of you who have read my books before, then you know what to expect and having had all these years to perfect and deliver my teaching to you in an 'easy to read' and 'to the point' approach you may notice that my philosophy and ideas are similar to other editions. I write as I teach and as I speak. It's worked before so I have had to consider, why change.

New in this fifth edition are topics on the following:

- SLR cameras: cropped sensor (Dx) or full frame (Fx), with Shannon Conway
- Water contact lenses for full frame cameras, with Alex Mustard
- Mirrorless interchangeable lens cameras (MILC), with Mario Vitalini
- Micro 4/3rds (MFT), with Mario Vitalini
- · Compact system cameras, with Mario Vitalini
- Super macro techniques, with Alex Tattersall
- Snooting the light, with Stuart Gibson
- Motion blur, with Nick More
- · LED lighting for stills, with Sascha Janson
- How to service your housing with Kevin and Maggie Reed of Aquaphot UK

If you are new to my book then allow me to tell my story. It began 40 years ago having learnt to dive at the end of the 1970s. For some reason I developed an interest (which soon became an obsession) with underwater photography. I learnt all the theory, became infatuated with underwater camera equipment but knew in my heart that something was missing. Cut to the chase, I was quite hopeless!

In 1983 I came across BSOUP The British Society of Underwater Photographers located in London. Each month I regularly made the 230mile round journey to attend BSOUP meetings, pestering anyone I could with questions, attending every seminar and trade show possible. There was this huge divide between the best BSOUP members and the rest of us and I became fixated on finding out how the best took such great underwater pictures. BSOUP legend Peter Scoones told me years later that I had 'A habit of asking the right questions'. If I look back, I recall that the majority of my questions revolved around topics such as patience, visualisation, imagination, and above all, 'subject choice'. How on earth do I decide what to shoot and what to ignore? I began to label what I had discovered and applied it to my own underwater photography beneath Swanage Pier on the South Coast of England. It worked and I began to improve very guickly. In short, I found a way to communicate topics that were less to do with equipment, shutter speed and *f*-stops and more to do with how to think and apply my concentration and imagination underwater. Competition success turned into magazine articles and in the mid-1980s I began teaching and leading workshops abroad. In 1996 the first edition of The Underwater Photographer was published and the rest is history, which I am delighted to say is still being written today, but I need to emphasize that this is my book, my way of taking pictures, my way of teaching technique, not the only way but the way which works for me and has done for many years. So don't accept one idea, look at other photographers whose work and wisdom you admire. The first person who comes to mind is my good friend Alex Mustard.

# **Before You Start To Read**

It's a big book so let me offer some assistance. I write in the same order to the way I teach. I start with the basics and move through with the Equipment, the Technique, the Mindset, Lighting and so on. My suggestion is this: Go to what interests you most and what you immediately want to know, but at the same time also consider working through the book in the order it's written. This fifth edition is full of colour images which have a narrative full of information on how that shot was taken. I have also included mistakes I made when shooting, along with my own strengths and weaknesses, my patience and impatience and all the things I wish I had done differently. Back in the '80s I learnt so much from my peers, many of whom would open up to me with their own tales of mistakes and setbacks. It helped me enormously and I have been passing on to all of you my hints, tips and advice ever since. Another tip! Avoid viewing the images in isolation. Every photograph in this book can be examined and scrutinised for alternative tips and techniques. For example, when you've read the chapter on composition, flip through the pages and look at other images in other chapters and identify their compositional characteristics. Use all the image examples possible and study them against other traits. At the heart of the book is Chapter 5 concerning the mindset of the successful underwater photographer. This is where you will instantly improve - I did!

After a good deal of thought I have decided to develop my images for this book with as little processing as I can. Less is more in my opinion! I never intend to over process in a book like this in order that you, the reader, if you wish, can create your own benchmark. For competition entries it would be wise to clean and process the images a little more than I have done in this book. For example, don't forget the extremities around the edge of the frame! The viewer's eye will pick it up instantly. Most of all: do not over process! One more thing. To save you all the trouble of going back and forth to remind you of strobe positioning, I have repeated examples of placements throughout the book.

MARTIN EDGE, 2020

# **Housing Cameras**

To my knowledge and at this present time there are more than 60 cameras on the market which can be housed, however, it's a fact that numerous cameras are unknowingly purchased by enthusiasts, which cannot be housed. Below is a list of cameras, which at the time of writing, can be housed, and I do emphasise 'at the time of writing'.

- Nikon D600
- Nikon D500
- Nikon D800/D800E
- Nikon D4/D4s
- Nikon D7100
- Nikon D7200
- Nikon D7500
- Nikon D5
- Nikon D500
- Canon 7D
- Canon 650D
- Canon 1DX
- Canon 6D
- Canon 70D
- Canon 5D Mark 111
- Canon 7D Mark 11
- Canon 5D Mark 111
- Canon EOS 1DX Mark 11
- Canon EOS 1DX Mark 11
- Canon EOS 5DS
- Canon 80D
- Canon EOS C200 4K

# Mirrorless Interchangeable Lens (MIL) Camera Housings

- Fujifilm X-Ti
- Canon EOS M3
- Sony NEX-7
- Sony NEX-5R
- Sony NEX-6
- Sony A7/A7r
- Sony A5000
- Sony A6000
- Sony A6300
- Sony A7 11/A711R
- Panasonic Lumix GX7
- Panasonic Lumix GH4
- Panasonic Lumix GX8
- Panasonic Lumix DMC –GX85/GX80/GX7 Mark 11
- Olympus OM-D E-M5
- Olympus OM-D E-M1
- Olympus OM-D E-M10
- Olympus OM-D E-M5 11
- Olympus OM-D E-M10 11
- Canon Power Shot G16
- Canon Power Shot S120
- Canon Power Shot G7X
- Canon Power Shot G7X11
- Sony Cyber Shot DSC-RX100 11
- Sony Cyber Shot DSC-RX100 111
- Sony Cyber Shot DSC-RX100 1V
- Panasonic Lumix DMC-LX100
- Olympus Tough TG-3/TG-4

# Acknowledgements and Photographic Information

This is my fifth edition of *The Underwater Photographer*. Since it was first published in 1996 I have had a vast amount of support from so many people. The list is long! It all began at home in the early 1990s with the most supportive wife any man could ask for. Sylvia, thank you so much for your never-ending belief in me. On our UW photographic journeys, you soon became known as 'Sort it Sylv'. You handled everything and everybody. You made room for me to throw everything into my teaching whilst you were forever sorting all that needed to be sorted. Without you, without your support, without your back up I would never have finished this fifth edition. So thank you from the bottom of my heart. I love you so very much. To Katie and Jamie for putting up with me when I was away. I would also thank Alex Mustard. We finally got to photo-diving side by side. A few hours underwater, hanging out together. I will never forget that Alex M.

To Peter Rowlands, I often feel that you have been by my side for a very long time, inspiring me, pushing me on. If ever I had a mentor, guiding me in some way over the years, it is you my friend. Debbie Rowlands, many thanks for all you have done behind the scenes with UPY. Dan Bolt, not only are you the rock that holds UPY in place, you are an excellent UW photographer. Saeed Rashid, you are doing great work for UPY and it is very much appreciated. To all at BSOUP British Society of Underwater Photography. To Lousie Sanger of Baby Splashers. What a journey Lou! I cannot think of any subject underwater, which could compete with photographing babies. To Judith Young and Bob and Carol Wrobel and Adam Hanlon. Contributors Alex Tattersall, Nick More, Nick Blake, Sascha Janson, Lauren Siba, Shannon and Amanda Conway, Mario Vitalini, Kevin and Maggie from Aguaphot UK and all who have contributed to this fifth edition. Caroline Vitalini and all the team from Scuba Travel. Georgie Bartlett, Scott Gietler. Tony Wu, Marty Snyderman and Nirumpam Nigam. Amanda and Craig from Pinewood Lodge Hotel, Poole, Dorset. Kevin Craddock and all the crew at Flippas-n-Fins in Poole. Elaine and Simon Wallace from Bunaken Oasis Resort. Gwen and Martin Armstrong. All the class of Misool January 2019 – love you guys.

Sarah Pickles from Focal Press for her support, patience and understanding. Last but not least, a huge, huge, thank you to Stuart Gibson and Debbie Harrison. Stuart, I am so grateful for all the support you have given to me in putting everything together for this fifth edition. We both know that I could not have done it without you and that is why you are acknowledged on the front cover. Thank you so much.



Martin (left) and Stuart (right) busy at work.

# **Photographic Information**

For the last 10 years, I have been delighted and honoured to work in the Nauticam UK camp, together with my dear friends Alex and Kat Tattersall. Thank you both, you have never let me down once and I am most grateful for your professionalism, your attention to detail and talents with what you both know best, Nauticam Housings and accessories of course! Your support over the last 10 years is so very much appreciated.

MARTIN EDGE, 2020

# What Type of Underwater Photographer Are You?

Over the last 35 years I have trained and mentored many UW photographers from complete beginners to seasoned professionals. At the very beginning of their photographic journey they are usually delighted to capture images of fish, corals or shipwrecks, which they can proudly show to friends and family. At this stage of their voyage it may seem a good idea to combine a topside holiday with a few days of diving thrown in. I'm sure that many of you started out in this way. I know that I did! I shared my underwater photography with others who were diving to bring back a booty of finds from the local shipwrecks. On a tropical diving holiday I was looking to take my best pictures whilst my buddies wanted to go diving. I soon began to realise that there was a difference between myself and my pals! They wanted to dive, dive, dive, whilst I wanted to take underwater photographs and I soon realised that the two were not always compatible. I wanted to stay shallow to take advantage of the light with no worries of times or depths and to go where I wanted to go. Years later when my credibility was valued I began to take enthusiastic underwater photographers to far away destinations. I was fortunate and particularly grateful to have control of the choice of dive sites together with the time of diving those sites.

In 2020 and for many years earlier my first and foremost consideration to my clients has been the quality of the underwater photographic potential on that particular dive site in that particular area be it the wilds of Raja Ampat or the clear blue waters of the Red Sea.

# How to Practice

Every single time we enter the water as dedicated underwater photographers we are on a mission to take great photographs. However, we all know that the chances of excellent imagery is in the lap of the gods. We have a good dive, we have a great dive. Unfortunately we can often have a disappointing photo dive when nothing, and I mean nothing, is occurring. We have all been there I'm sure. Over the years I have been there many times, too often to mention! So, sometime ago I decided to do something about it. I started to plan a routine to occupy my mind when very little was occurring underwater. I turned disappointing dives into a practice session. See if these ideas work for you. For example, shooting wide angle with just a single strobe by lighting a colourful hard or soft coral against a dark reef background. Your goal is to light the colourful corals without illuminating the dark reef behind. To make it a little harder but more rewarding, try using your long arm wide angle strobes to light a larger colourful coral, again without illuminating the darker reef.

I often spend at least 30 minutes practicing on anything and everything which comes to mind. The technique of inward lighting was born one day directly from my own monotony. At times like these when very little is occurring I find myself playing and having fun with my strobes, my strobe arms, my power settings. In my head is a clear mantra of what may happen if I do it this way or that way.

Try it the next time you are bored in the water. Have fun with your underwater photography by practicing. Don't beat yourself up when you're disappointed with your results, It's very much just part of the game.

MARTIN EDGE, 2020





# Principles of Underwater Photography

# Introduction

**S** ince the last edition was released in 2010 I have spent most of my 'work' time teaching underwater photography to enthusiasts in the UK and overseas. There is no doubt that one topic that is repeatedly misunderstood by a majority of beginners is the basic photographic essentials, i.e. apertures, shutter speeds and ISO. I have therefore devoted the beginning of this chapter to the basics of photography and other digital principles. I would urge you to bookmark this chapter as a sort of 'advanced glossary' should you need to grasp some of these concepts in later chapters. These topics are discussed frequently throughout the book but will relate to tips and techniques specific to underwater photography.

# **Understanding Exposure**

Many underwater photography enthusiasts are eager to progress from the auto/program mode on their cameras but don't have the confidence to carry it through when they are underwater. Those who are unfamiliar with the basics may find it restrictive because it takes the control of the camera away from the user, and you can never begin to understand and appreciate why good shots turn out well and why less favourite shots are disappointing.

Understanding manual exposure is most important. Throughout this book I intend to discuss and explain in detail the merits and technicalities of using manual exposure as well as aperture priority and shutter priority underwater. To do this we need to revisit the basics of apertures, shutter speeds and ISO settings. I know that even experienced photographers can become confused by *f*-numbers, stops and speeds, so if you feel that you can benefit from a refresher then please read on.

# **Camera Exposure Modes**

All DSLRs, Micro 4/3<sup>rds</sup>, and mirrorless cameras together with the majority of compact system cameras feature the following modes.

- Auto/Program. Which works out all aspects of the exposure for you. You don't have to do a thing.
- Aperture priority. In which you set the aperture (*f*-number) and the camera automatically works out the appropriate shutter speed.
- Shutter priority. In which you set the shutter speed and the camera automatically works out the appropriate aperture.
- Manual exposure. In which you set the shutter speed, the aperture and also the ISO.

Many cameras also have additional 'Auto' modes which depict icons in the form of landscapes, portraits, sports/action, close-up, food photography, and so on. I never use these for my own photography underwater.

# **Light and Time**

The two fundamentals of taking a photograph are light and time.

- · Light comes in via the lens and strikes the sensor.
- Time determines how long the light strikes the sensor for.

If you get these two aspects correct then you achieve an accurate exposure. If you have too little light or not enough time, then you get a dark picture which is considered 'under exposed'. Too much light or too much time results in a picture which is too bright or 'over exposed'. The time element is controlled by the shutter speed selected and the amount of time the shutter mechanism remains open for. The light element is controlled by the size (diameter) of the aperture.

# **Understanding Aperture**

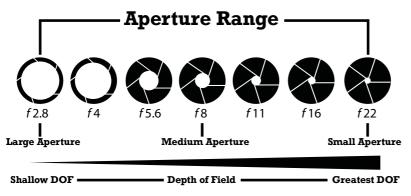
The size of the aperture, iris, or hole (it's referred to in different ways) which light passes through to reach the camera sensor can be controlled by you to allow more or less light into the camera. The aperture is measured in *f*-numbers (also often referred to as a '*f*-stops' or 'stops'). The largest holes have small (low) numbers like *f*2.8 and *f*4 and the small holes have bigger (higher) numbers like *f*22, *f*16.

The full list of *f*-numbers is as follows:

f1.4, f2, f2.8, f4, f5.6 f8, f11, f16, f22, f32, f45, f64. Where this sequence starts or finishes depends on the lens in use.

So, what do all these *f*-numbers mean and where do they come from? Aperture is regulated in a 2:1 ratio so that each *f*-number represents a doubling or halving of the size of the hole and therefore the amount of light which is allowed to pass through it and onto the camera sensor. For example, *f*8 provides a hole which is twice the size of *f*11 and the *f*11 hole is twice the size of *f*16 which means that twice as much light passes through the aperture at *f*11 than it does at *f*16. Conversely, *f*8 receives half as much light as *f*5.6. Remember: Big numbers like *f*22 have a small hole. Low numbers like *f*4 have a large hole.

The origin of *f*-numbers is simply a calculation whereby the focal length of the lens is divided by the diameter of the aperture.



### My Tip

I always encourage beginners to remember – big numbers have a small hole – small numbers have a large hole.

### A Note About Compact Cameras

Compact system cameras have an aperture control but because compacts are physically smaller in size, they have smaller image sensors and shorter focal lenses than the typical SLR. Because of this, the calculation is smaller. For example, on most compacts an aperture of *f*4 will provide similar characteristics to *f*8 on an SLR.

# **Understanding Shutter Speeds**

The time element and the second way to control the amount of light entering the camera is to regulate the length of time the aperture remains open. This is done by controlling the shutter speed of the camera. When you press the shutter button, curtains inside the camera body, just in front of the sensor, slide apart to open the shutter. After the proper exposure time the curtains slide shut to close the shutter.

- The amount of time the shutter stays open is measured in fractions of seconds and on certain occasions in full seconds.
- The longer the shutter is open the longer the exposure and the more light enters the camera.
- The less time the shutter is open for, the less amount of light enters the camera.

Each shutter speed is twice as fast as the previous speed.

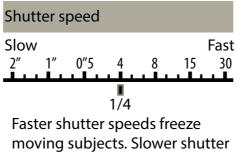
- Alternating from 1/30<sup>th</sup> sec to 1/60<sup>th</sup> sec halves the amount of time the shutter is open.
- Decreasing the shutter from 1/125<sup>th</sup> to 1/60<sup>th</sup> sec doubles the amount of time the shutter is open.

Shutter speeds generally range from 1/8000<sup>th</sup> sec, 1/4000<sup>th</sup> sec, 1/2000<sup>th</sup> sec, 1/1000<sup>th</sup> sec, 1/500<sup>th</sup> sec, 1/250<sup>th</sup> sec, 1/125<sup>th</sup>, 1/60<sup>th</sup> sec, 1/30<sup>th</sup> sec, 1/15<sup>th</sup> sec, 1/8<sup>th</sup> sec, 1/4 sec, 1/2 sec, 1 second, 2 seconds, 4 seconds, 8 seconds, 15 seconds and finally, 30 seconds.

Shutter speeds above 1/500<sup>th</sup> sec allow very little time to expose the photograph and are only used in underwater photography to capture very fast-moving subjects. Typically 1/500<sup>th</sup> sec and above are left for topside action like sports photography, however, there are always exceptions to this general rule and one that immediately springs to mind is when shooting very fast moving subjects such dolphins.

# Synchronisation Speed

When a strobe is used on a camera (whether built-in or external) there is a shutter speed that must not be exceeded in order that the strobe and the camera can synchronise with each other. Single lens reflex cameras have a sync speed of 1/250<sup>th</sup> sec and 1/320<sup>th</sup> sec. Numerous compact system, 4/3rds and mirrorless cameras can sync to much higher shutter speeds. Refer to the instruction manual as they can often differ to your advantage with much faster sync speeds being the norm in 2020.



speeds create motion blur.

### My Tip

1/15<sup>th</sup> sec can sometimes be confused with 15 seconds. The vast majority of SLRs indicate full seconds with inverted comas after the number. i.e. 4" indicates 4 seconds. Shutter speeds in the range of between 1/30<sup>th</sup> sec and 1/250<sup>th</sup> sec are considered the norm, but underwater there are many exceptions to this rule in that gravity is substantially reduced, which means we can hand hold a camera at shutter speeds much slower than we would choose to on land. I and other experienced photographers regularly shoot both macro and wide angle photographs at 1/15<sup>th</sup> sec and less – but more about this later in the book.

### My Tip

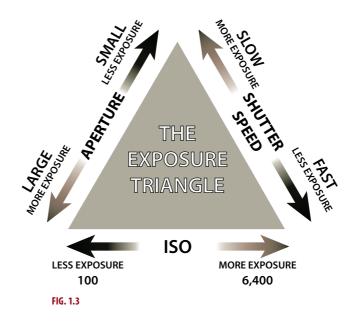
You may recall numerous occasions when your digital SLR camera has displayed various shutter speeds or apertures, such as *f*12 or *f*10. Likewise for shutter speeds, you may notice 1/45<sup>th</sup> sec or 1/180<sup>th</sup> sec, for example. Take note that these are stops in one third, or one half increments, set as factory defaults when you purchase the camera. Many users think that they are changing shutter speeds and aperture by one full stop (EV) when they see these half and one third numbers indicated. This is not the case. These slight changes will make little visible difference to an untrained eye as to the state of your exposure. If you are new to the concept of apertures and shutter speeds, then consider changing these camera settings to one full stop increments such as f8 to *f*11 in order to aide your learning process. (Changes can be made via the camera menu settings).

# How Aperture and Shutter Speed Work Together

In photography, the term exposure value (EV) is commonly referred to as a move, either up or down of one 'stop'. The difference between each aperture setting is one stop or one EV, i.e. *f*8 and *f*11 is a difference of one stop or one EV. The difference in shutter speed between 1/125<sup>th</sup> sec and 1/250<sup>th</sup> sec is one stop/one EV. You will see that both *f*-numbers and shutter speeds are sequenced in a series of 2:1 ratios, and this is where the two work in harmony with each other. A setting of *f*8, at 1/60<sup>th</sup> sec lets the same amount of light into the camera as a setting of *f*5.6, at 1/125<sup>th</sup> sec and *f*4 at 1/250<sup>th</sup> sec and so on. You will see that the latter is one *f*-stop lower and one shutter speed higher than the former.

| 1″  | 1⁄2 | 1⁄4         | 1/8 <sup>th</sup> | 1/15 <sup>th</sup> | 1/30 <sup>th</sup> | 1/60 <sup>th</sup> | 1/125 <sup>th</sup> | 1/250 <sup>th</sup> | 1/500 <sup>th</sup> |
|-----|-----|-------------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|
| f32 | f22 | <i>f</i> 16 | <i>f</i> 11       | f8                 | f5.6               | f4                 | f3.5                | f2.8                | f2                  |

These combinations of aperture and shutter speed will all provide an identical exposure.



# **Understanding Depth of Field**

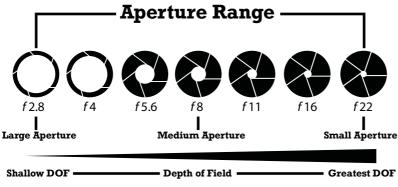
Changing the aperture number of a camera does two things.

- It controls the amount of light entering the camera.
- It determines the amount of depth of field (D of F) in the picture.

Although a lens can focus at only one distance, the decrease in sharpness is gradual both in front of and behind the focused distance, so that within the D of F, the un-sharpness is unnoticeable. This distance is approximately one-third in front of the point of sharpest focus and two-thirds behind the point of sharpest focus. For some pictures, such as underwater wide angles, a large D of F is appropriate, while for other opportunities, such as fish portraits, a small D of F may be more effective. Small apertures like *f*22 provide the greatest D of F, while a large aperture such as *f*2.8 provides the narrowest D of F. The shorter the distance between the lens and the subject the smaller the depth of field. Whilst the greater the distance between lens and subject, the greater the depth of field.

- If you want a large D of F with both foreground and background in focus use a small aperture such as *f*11, *f*16, *f*22
- If you want a narrow D of F with only a shallow focus use a large aperture such as f5.6, f4 or f2.8

After a little practice you will develop a feel for the effect of both sharp and out of focus portions of your photograph.



### My Tip

Depth of field (D of F) is the portion of a scene that appears sharp in the photograph.

FIG. 1.4

# **Understanding ISO**

At times it can be impossible to achieve the desired aperture or shutter speed to take a photograph. This usually occurs in low light situations where you need to use a large aperture but because it's getting dark, you have no other choice than to use a slow shutter speed. The shutter speed required may well be too long to hand hold the camera without causing camera shake and fuzzy pictures. In these situations this is where the sensitivity of your camera sensor comes into play by controlling ISO (International Standards Organisation). ISO refers to the light sensitivity of a camera's image sensor. Lower numbers like ISO 100 are less light sensitive and produce better quality images because 'digital noise' is kept to a minimum. Higher numbers such as ISO 6400, whilst more sensitive to light, can suffer from increased digital noise. Digital cameras allow you to adjust the image sensor's sensitivity by dialling in different ISO settings. This can be achieved very quickly and easily between shots and for this reason all digital cameras can rapidly adapt to changing light conditions.

The practical use of ISO is this:

- If you use a low ISO setting you may need more light in your photograph which is controlled by your aperture, shutter speed or both.
- A low ISO setting results in better quality.
- If you use a higher ISO setting you will not need as much light in your photograph, but you do risk a degradation in quality caused by 'digital noise', the degree of which is very dependent on the make and model of camera.

In 2020 Cameras generally have a huge ISO ranging from 100 to 6,400 and well beyond, and at the time of writing the Nikon D5 model goes up to ISO 102,400. In a perfect world it's best to shoot at the lowest ISO such as ISO 200 or 400, but this is not always possible.

## **Digital Noise: Types and Cause**

A simple explanation is to liken 'digital noise' to the 'hiss' of a musical sound system when you turn it up too loudly. Adjusting volume is an amplification of the signal. When you turn up the ISO number on your camera you amplify/ increase the electricity flowing through the circuitry of the camera sensor. As the ISO value is increased, so too is the flow of electricity and the more electricity which flows through the circuitry the more interference we get which results in more digital noise.

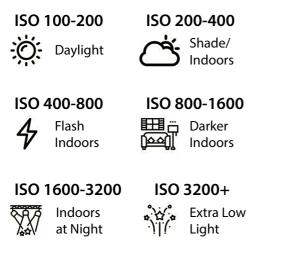
Digital noise is made-up of two parts. One is luminance noise and the other is chroma or colour noise. Luminance noise as an effect on the grain

structure of the pixels whilst colour noise appears as minute speckles of colour which are always more noticeable in the shadow areas of a photograph. Another factor which compounds the problem is the length of exposure. The longer the camera takes in making the exposure, the more likely the sensor is to pick up background noise.

Noise tends to appear in the darker parts of a photograph and shows up as tiny speckles of colour. Cameras with full frame sensors suffer less noise because their photo sites (pixels) are spread further apart from each other and are less likely to pick up background interference. Compact cameras are susceptible to noise because their sensors are smaller. The key is to use the lowest possible ISO setting which your camera will allow as this produces the least amount of 'digital noise'.

Many camera models have a facility within the menu to activate noise reduction programs at sensitivities of ISO 800 and higher. Another popular solution is to use a noise reduction filter in your image processing workflow. Both Photoshop and Lightroom 6 CC have very good noise reduction filters.

I regularly shoot at ISO 800 without any significant noise.





# White Balance

We have all taken photographs where the colours of the scene are totally false. You download it onto the computer and it has a garish colour cast. The reasons behind this will be connected to the white balance function on your camera.

All light has a specific colour associated to it, which is measured in degrees Kelvin (K). Take, for example, sunlight. Throughout the day the colour temperature of sunlight differs because of the sun's position in the sky and the surrounding atmospheric conditions. During early morning and late in the evening the sunlight takes on a warm golden hue. Photographers refer to these times of the day as 'magic hours'. However, around 12 noon the light is very blue and has a high colour temperature of around 8000K. Warm colours at sunrise have a low colour temperature of around 1600 to 3200K.

Whilst our eyes may recognise changes in colour at sunrise and sunset, for most of the day our brain compensates and we fail to notice the colour of light. This is the purpose of white balance. A camera has to take into account the colour temperature of a light source and we must remember that this is both indoors as well as out in the open air. Not only can we use white balance to achieve a natural result, we can also use white balance to warmup or cool down an underwater photograph without it looking unnatural.

# **The Colour White**

The aim of white balance is to ensure that a subject which is white in reality is reproduced as white in a photograph, not a shade of red or green. The colour white is made up of equal amounts of RGB – red, green and blue, which are the primary colours of light. In theory once a camera knows what the colour white should look like for a particular scene it can then produce natural colours for everything else.

# White Balance Settings

Auto, also known as AWB, is without doubt the most popular setting as it uses thousands of algorithms programmed into your camera to best work out the white balance for your particular photograph wherever you may be. Auto setting has been developed over the years and my way of working is to use AWB 100 per cent of the time. If I need to adjust colour for some reason then I will use either Lightroom CC or Photoshop, which I must point out is very rare. For your information:

**DAYLIGHT:** has a symbol of the sun and is close to a colour temperature between 5000–5600K, ideal for natural light and clear skies.

**CLOUDY:** has a symbol of a cloud and a colour temperature of between 6000–6500K. It has the effect of warming up the colours.

**SHADE:** has a symbol of a house in the shade, it is an increase of Cloudy WB settings. It has a similar warming up effect, but more accentuated than Cloudy.

**TUNGSTEN:** has a symbol of a light bulb denoting use indoors under domestic lighting conditions.

**FLUORESCENT:** has a symbol of a fluorescent light and can result in a yellow or green cast.

**FLASH:** has a symbol of a bolt of lightning and the results are very similar to the Daylight setting.

A white balance setting which I have yet to discuss is the 'Custom Preset' function. Underwater we have the most intense and predictable colour cast of all. You guessed it, the colour blue! As sunbeams pass through the surface, underwater colours are absorbed at different depths. Warm colours of red and orange are first to vanish and by the time we get to 25 m the light spectrum is strongly biased towards blue.

White Balance Preset has the symbol of 'Pre' or 'Kelvin'. With greater accuracy, you can control colour and limit the negative effect of the blue water cast by using this function. Locating the custom preset white balance function varies from one camera to another so check your manual for specifics. The general idea is to point the camera lens at something white or grey such as a piece of white card or perspex. The camera takes a reading from this object and adjusts the white balance to the colour temperature at this depth. Take a few test shots after the custom white balance is set and check the colour cast of the thumbnail in your LCD to see how closely it resembles what your eyes see.

### My Tip

These days I most often use the white balance colour picker in Lightroom 6. I press the picker on the screen and look for something white.



**FIG. 1.6** The image at the top is using the in-camera setting of AWB. The image below is using the colour picker in Lightroom 6.



FIG. 1.7 I know which one I prefer. Look at the shade of the sand and the colourful corals.

# File Types: Raw, JPEG and DNG

There is always debate about the merits of shooting either RAW or JPEG, not just for underwater but over the entire photographic spectrum. A large majority of photographers see the RAW format as the professional approach to photography and this is regularly borne out by current trends in magazines and internet forums. If I was looking to advise someone on the pros and cons of shooting either RAW or JPEG underwater I would be looking to ask questions about the way they would like to approach their underwater photography. For example:

- Are you determined to achieve the very best image quality?
- Do you enjoy sitting behind a computer to process your images?
- Do you have the hard drive disc capacity on both your home computer and travel laptop to sustain the typical size that RAW files generate?

After consideration of an individual's circumstances, it would be appropriate to offer a view – RAW or JPEG? Which one is best for you? Let us see if we can determine this.

With your camera set to JPEG, every time you press the shutter the camera takes a picture and saves it to the memory card. A JPEG file is what is called a 'lossy' format. This means that it discards data contained within the file in order to provide a substantially reduced file size.

A RAW file is the exact opposite. RAW is a 'lossless' format, which means that it retains every piece of data captured, hence the name 'RAW'. The result is a larger file size but with the added flexibility to produce images of the finest quality. A RAW file is not technically an image file at all. A RAW file has to be converted by a digital imaging program like Photoshop or Lightroom in order that it can be printed or published in a more recognised file format.

# **RAW and JPEG**

Both RAW and JPEG files appear similar when downloaded from the camera. JPEG have received some processing at the moment of image capture and they look better than RAW files, which can often appear quite flat to my eyes. Newcomers to photography are often quite disturbed the first time they see their RAW files looking so lacklustre, but one must remember that this is the effect of retaining all the data in an unprocessed format. It's a good thing!

It's a fact that the majority of professional and enthusiastic photographers both on land and underwater choose the RAW format over JPEG. From my experience the primary reasons are twofold.

- To capture and retain the highest amount of data an image has to offer.
   JPEG image compression discards an amount of data in the picture, which means that we are unable to make any aggressive adjustments when editing the photo.
- In the event of errors being made by the user in relation to exposure or white balance settings, more aggressive corrections can be made without too much degradation of quality to the RAW file.

## File Comparison: RAW v JPEG

#### JPEG Files: Pros

For many years JPEG has been adopted as a standard and can be loaded onto all computers, smartphones, tablets, etc. with ease, making display immediate and easy. Everything about JPEG is convenient and straightforward to use. All cameras enable you to choose what size of JPEG file (S, M, or L) to save to your memory card. This provides you with the choice to use smaller images that are easier to handle for email attachments and web display. The vast majority of cameras offer the facility to shoot in both RAW and JPEG at the same time.

#### JPEG Files: Cons

In-camera processing discards a significant amount of data, the impact of which can be a loss of colour saturation, colour range and sharpness. JPEG files reflect a one-time interpretation of your subject based on the settings of your camera (white balance, exposure settings and output resolution, etc.) at the time of shooting. Altering these settings to any degree, as you can with a RAW file, can result in a lower quality result.

#### **RAW Files: Pros**

It comes down to the infinite control which you have over the image. RAW is a digital negative which retains all data captured by your camera without loss of quality. When processing a RAW file, you have a huge range of adjustments available with a greater degree of control over the finished look. To name a few – exposure, white balance, saturation, sharpness, highlight, shadow detail and ISO noise reduction. All image processing is non-destructive.

#### **RAW Files: Cons**

RAW files take up more space on your camera's memory card. They require a degree of post-processing via photo editing software in order to convert the image into an editable file such as a JPEG, DNG or TIFF. RAW file editing software does have a 'learning curve' in order to process and for the uninitiated this may be intimidating at first.

Many people choose to shoot in JPEG because it is a universal format that can be immediately downloaded from the camera and shared via email. But at the end of the day and in my opinion, underwater photographers who are passionate about their imagery should shoot in RAW.

# The DNG (Digital Negative) File

In an effort to standardise the RAW format, some years ago Adobe created a DNG as a universal RAW file. The effect of this was to convert your RAW file into a DNG file, which in turn saved all the RAW data without being camera make/model specific. It allowed software makers to concentrate on tweaking their software rather than writing new RAW compatibility modules every time a new camera was introduced. In 2020 I convert my Nikon 7200 RAW files into DNG files simultaneously as I import them into Lightroom.

# Loss of Light and Loss of Colour Underwater

Topics concerning the difficulty of light and colour loss underwater have become so stale in recent years that it is a challenge to grab the attention of an audience. Let's face it, most of you have seen and heard it many times before, both in pictures and words. Light and colour are absorbed at depth, etc., etc. However, my experience in reality is that although these basics are commonplace, sometimes they don't really 'sink in'. That is, until one is comparing their underwater efforts with another and on the same dive, same place, same time, same camera, a disparity is suddenly revealed. Their underwater photos are better than yours.

'How can that be the case, we were using the same camera?'

'We were shooting the same subject side by side, and what's more, I found it first.'

This is where I tend to become involved. "Martin, can you look over our photographs? I don't seem to be getting the colour and clarity like everyone else.'

From my experiencing of teaching you can be assured without a shadow of doubt that the reality of light and colour loss will one day catch up with you if you do not understand and work hard to remember the principles whilst you're shooting. Beginners and improvers often forget that horizontal distance also reduces light and colour. If you are 7 m deep and 2 m from your subject, the total light path is actually equal to 9 m. For another example, cast your mind back to an occasion of good visibility in 10 m of water. Can you remember that your eye saw a much more colourful spectacle than your camera was able to record? This is because your brain compensates for the blue colour cast and effectively 'saturates' the warmer colours. Your camera cannot perform these tasks by itself, it needs some help from you, and by understanding the fundamentals of how light behaves underwater you will be able to take greater control of your underwater photography.

The behaviour of light underwater is unlike the behaviour of light on land. For starters, the density of water is 800+ times that of air. Such is this density that we can compare a picture taken in 3 m of water with a picture taken on land at 800 m away. As soon as light enters the water it also interacts with suspended particles, resulting in a loss of both colour and contrast. Particulates and water molecules react with the light entering the sea, and it immediately begins to be absorbed. Red goes first, then orange and yellow, until only green and blue are left. So rapid is the loss of red that within half a meter of the surface those red swimming shorts are muted and dull. Even in the best imaginable visibility, particulates are suspended in the water column. In a typical tropical diving destination with good visibility, these particulates tend to reflect and scatter light as they move through the water. Whilst you can reduce their effects, you can never eliminate them entirely.

It is also important for the underwater photographer to:

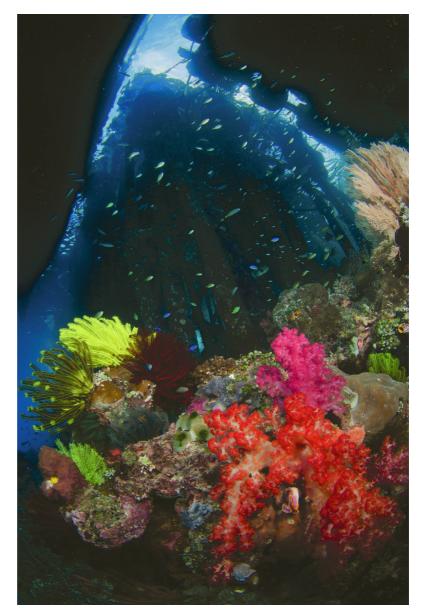
- Recognise that the conditions on the surface have an effect on how light passes through the water.
- Calm seas allow more light to pass through whilst a choppy sea reflects light.
- The position of the sun in the sky and the time of day also have an effect on the amount of light entering the water.
- When the sun is high in the sky over a flat calm sea most of the sun's rays pass through the surface. As the sun arcs closer to the horizon the light loss due to the angle of refraction against the water surface increases dramatically.

The light which does penetrate at these times is usually soft and diffused and I find it the most inspiring and magical time of day to take natural light photos underwater although if you want to take pictures when the sun is high in the sky the best lighting conditions are between 1000 hrs and 1400 hrs.

#### My Tip

There will be much more about strobe light later in the book, but in the meantime the overwhelming mistake made by a vast number of enthusiastic underwater photographers is failing to get so close to your subject that you think that you are going to overexpose the entire frame. You won't, believe me. If you know your strobes are working and on at least half to three quarter power, move in as close to the reef as you possibly can and shoot some colourful corals. You will see the vibrant colours burst out of your viewfinder. Make a mental note of your distance to the colourful corals and you will never look back, I assure you.

FIG. 1.8 Misool Pier, Raja Ampat, circa 2012. Nikon D300, f11 at 125<sup>th</sup> sec, ISO 400. I waited for the dive boats to come together to balance the composition each side of the Jetty. I'm aiming my camera upwards towards the surface whilst at the same time my strobes are pointing downwards from above my housing. Notice how the soft corals are well lit whilst the dark shade at the bottom is in shadow. If I had my strobes level with my housing then all of the clutter at the very bottom would be far too bright.



# **Closer and Closer**

Throughout this book you will read and be reminded of the fact that the reduction of the column of water between the lens and the subject is paramount. This point cannot be emphasised enough if you are intent to minimise the problems of colour loss, diffusion, refraction and backscatter.

The choice of lenses makes it possible to reduce the column of water because of their close focusing properties. Macro lenses achieve considerable magnification and focus very close to underwater subjects. Wide angle lenses also focus extremely closely, whilst their wide angle of view is able to take more subjects into the viewfinder. This trait frequently affects beginners to underwater photography. They fail to get close to a subject and as a result take their photos from too far away. Not only does the subject look small in the finished picture, but also the distance involved reduces the effectiveness of flash, resulting in poor colours and sharpness. There is no point in blaming your camera and strobes. Getting as close as physically possible is often all it takes to produce a significant improvement in results, as long as you can do this with due consideration for the environment, a subject covered in detail elsewhere.

#### My Tip

For any underwater photographer who is struggling to achieve pleasing results, my tip is to get close to the subject and fill the frame. Use this maxim at every opportunity. When you think you are close, get closer! FIGS. 1.9 and 1.10 The distance between the photographer and the sponge in the first image is about 2m. Notice how dull the colours are in relation to the second image which was taken much closer at around 0.5m. Nikon D7100 Tokina 10-17 at 10mm *F*10 1/320<sup>th</sup>. Images by Stuart Gibson.





# The Problem with Shooting Down

The practice of shooting underwater at a downward angle is the single most destructive fault in underwater photography. It is a common trait of 99 per cent of all beginners, and unless recognised and corrected it will blight your efforts for evermore!

## How and Why this Occurs

From the very first moment we fit a dive mask to our face and stare below the waves we develop a pattern and habit of looking into the sea at a downward angle. Next comes the snorkel and fins. The very nature of swimming in this way causes us to lie face down on the water at a horizontal angle and fin from point A to point B. Many continue and qualify to use scuba whilst others are content to snorkel. Whatever we choose, after our first steps into the sea we develop a pattern and habit of looking down, and why not? It's comfortable and it's the most effective way to move through the water and looking down is where the fish are!

When I learnt to dive in the late 1970s I was taught to look down at a 30° angle towards the seabed in order to see what the dive had to offer. Everything about this downward position was easy, undemanding and relaxing. Once in a while I would look up towards the surface, but on the whole it was not until I made my ascent in a vertical position that I would extend my neck muscles to look upwards towards the surface.

# Have You Ever...

Cast your mind back to a recent occasion when your dive guide escorted you. A clink from his dive tank and his extended arm directs your vision upwards into the blue water column. Perhaps a turtle, napoleon wrasse or a white tip reef shark. You look upwards out into the blue and towards the surface but as soon as the sighting has finished you re-align your body position to what is comfortable for you – horizontal, fining alongside the reef with your eye-line looking downwards.

When you first take your camera underwater it is the most natural and relaxing thing to look through the viewfinder at a downward angle. You can feel the controls between your fingers. See the LCD screen on the back of the camera and everything feels so easy and simple. It's commonplace to frame your composition and press the shutter because it is the easiest position there is to shoot. However, this angle of view usually makes for drab images. Think about the photographs which you take on land. Would you stand tall and point your camera downwards to photograph a young child playing on the grass? For those of you who have a domestic pet in the house, would you shoot downwards from a standing position? I'm sure you wouldn't. Human nature convinces us to crouch down at eye level. Neither would we shoot down on to the heads of friends and family when taking a portrait. The same principles apply underwater. But as I have already discussed, it is so natural to look and shoot downwards underwater and it is a very comfortable body position. However, we need to break this bad habit and like other practices, which are so common, it can be easier said than done to correct and put right.

# Are You Prone to this Fault?

- Are you continually photographing subjects surrounded by unflattering rocks, sand and reef?
- Is your underwater photography a birds-eye view of the subject? A great view of something from a high position?
- Are these unflattering 'backgrounds' often brighter and more reflective than your intended subject?
- Do you have a stack of photographs with a cyan coloured sandy background?
- Do your pictures appear flat and two-dimensional or frequently lack a 'sense of depth'?
- Are you in the habit of shooting subjects underwater at a downwards angle?

By adopting these upward attitudes and angles on subjects, you not only achieve better separation against the background and a sense of depth, but the subject also gains a greater sense of prominence in the picture frame. Placing the subject on the proverbial pedestal, above the eyes of the viewer, will always afford it greater attention.

# A Little Psychology

'Life is full of ups and downs'

Ups

- Things are looking up
- Thumbs up
- Are you up to it?
- I look up to my parents and mentors

#### **My** Tips

- You must, and I reiterate must, train both your mind and your eye to get below a subject and shoot up towards the surface or at least at eye level. Do not shoot down.
- Remind yourself constantly to shoot at eye level or upwards.
- Attach a bright 'Shoot Up' sticker to your camera housing to remind yourself.
- Look for subjects growing proud of the reef which can be approached from below.
- Practice approaching fish from below and shoot upwards.

Downs

- 'Down' in the dumps
- Feeling a little bit 'down' today
- Looking down on 'belittling'

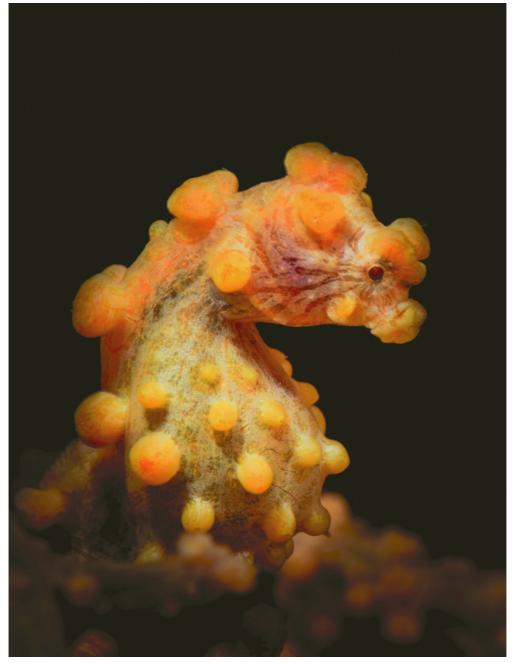
The most significant improvements to my own underwater photography occurred during my early days in the 1980s. It came like a 'bolt out of the blue' when one day I realised that 95 per cent of everything I shot but disliked was composed at a downward angle. However, I also had a small selection of underwater favourites, all, without exception, were taken shooting at eye level or upwards. I felt I needed some additional, professional based verification, so I checked out back copies of *National Geographic* and the best underwater photo magazines and books around at that time. I found that 90 per cent of quality images published, and those which were winning competitions, were also composed at eye level or upwards. I didn't stop there. I then began to look at the exceptions to shooting up. Those shots, which were successful and dynamic, but seemed to work at a downward angle.

#### Exceptions to the Rule. When it's Good to Shoot Down

There will always be exceptions to this general guideline, and over the years I have documented those situations and circumstances in which underwater downward angles can be dynamic, effective and visually pleasing to the eye. However, I have not found that many. So, make sure you affix the rules to your housing in order to remind you. If you don't, you will forget them, I assure you of that.

#### 1. When there is no Visual Orientation to the Horizon

In topside photography the horizon line is a way of connecting to the orientation of subjects. We look at photographs and gain a sense of what is up or down. However, if there is no visual orientation to an underwater subject, we have little or no idea of which way is up or down. Abstract photos are an example: we can shoot detailed patterns of a parrot fish fin at a downward angle but unless we include background detail it is impossible to determine the orientation of the fish so, aided by human nature, we tend to interpret it as an eye level angle of view.



**FIG. 1.11** No visual horizon or orientation. The eye of the viewer will see the subject standing proud, when in reality we have no reference point at all to determine where in the water column it is.

2. Subjects which have a Dynamic Shape when Viewed Downwards

During my workshops I refer this concept to marine life, which have a 'great back'. For example, turtles, mantas, whale sharks, and dolphins are very photogenic when shot at a downward angle. They all display a great back. Whilst visiting Hawaii's Kona coast some years ago I was fascinated by the number of paintings, sculptures and other types of artwork which depicted mantas, turtles and dolphins from a downward angle. Even scuba-orientated T-shirt designs represented them from above. There are numerous subjects which suit this exception. Eagle rays, sealions, and whale sharks to name a few, can all look photogenic shooting downwards from above. Don't stop at wide angle examples, consider the myriad of close-up and macro subjects: clams, shrimps, gobies, etc. You just have to think of subjects which have colourful markings and features on top of their backs. For example, Coleman shrimps, and porcelain crabs, both are so exceptionally photogenic from a downward angle.

#### 3. Subjects with their Features, Eyes and Mouth on Top

There are some subjects, like blue spot stingrays, scorpion and crocodile fish etc., which often can only be photographed from above, as there are no other options. It can be difficult, if not impossible, to photograph from below. Their key features i.e. eyes and mouth are situated on top and offer the best view from a slight downward angle.

#### 4. Strong Eye Contact

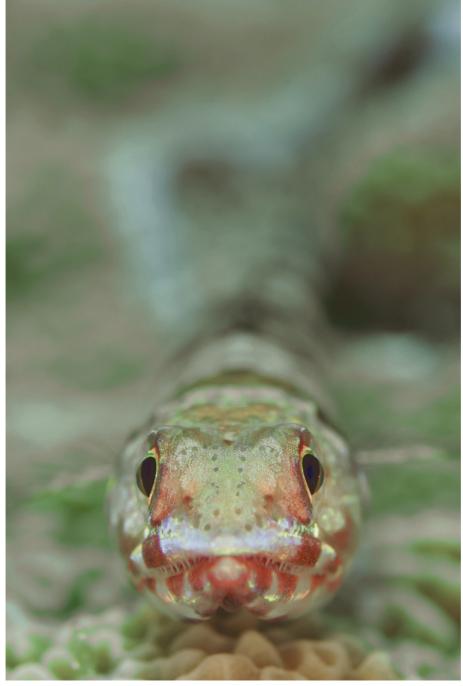
Eye contact with the viewer can win over the negativity of a downward angle. The absence of eye contact from a subject has the effect of leaving the viewer detached and indifferent. That's why I always wait and look for eye contact before I start shooting. If you have the patience to wait around for both those two eyes to lock on to your two eyes you will be so rewarded. Eye contact is such a powerful connection be it on land or underwater and I have always applied this to my work both above, and in particular, below the surface.



FIG. 1.12 A 'good back' such as turtle along with mantas, sharks, eagle rays, flat fish and a whole host more. For my taste, a downward angle on the back of a turtle with a clean carapace cannot be bettered.



**FIG. 1.13** Subjects with features, eyes and mouth on top are best photographed at a downward angle. Due to the eye and mouth position here is a compromise between eye level and straight downwards.



**FIG. 1.14** Strong eye contact. The power between the eyes is all it needs to suggest an eye level view when in reality it could have been shot at any angle at all.

#### 5. Ship and Plane Wrecks

One of the most photogenic downward angles of all is when photographing shipwrecks. Wrecks look great from above and this angle of view is ideal for capturing the atmosphere and, from a practical point of view, it affords an angle in which the strongest features of the wreck can be emphasised. Wrecks have so many classic angles, at eye level, shooting up and shooting down, all work so well.



FIG. 1.15 Planes and shipwrecks can be photographed from so many angles, in particular from a downward perspective.

#### 6. Seascape Vistas and Magic Filters

In topside photography it is a popular technique to angle the camera downwards and from above to capture a landscape in a rural setting. UK land photographers Joe Cornish and Paul Gallagher are masters of this technique. Alex Mustard's Magic filters in shooting underwater seascapes are not dissimilar. Magic filters actually work best when the sun is coming from behind the photographer and the camera is aimed at a downward angle. Aiming your camera in this direction is a prerequisite to achieving the best possible results using these filters.



FIG. 1.16 Shooting down tends to be the preferred method when using Alex Mustard and Peter Rowland's Magic filters.

Consider your favourite underwater photos. It's an interesting exercise to see just how many of the images you admire are shot at either an eye level angle or upwards. Make a point of considering your downward angle of views and the best way of doing this is to affix the six 'headlines' to your housing next time you photo dive. I have them all committed to memory and experience, but I still encourage you to affix them in, on or around your housing, just to jog your memory. In short they are:

- 1. Good back. Something which looks good shooting down. Turtles look great
- 2. No visual horizon or orientation
- 3. Strong eye contact
- 4. Subjects with their features, eyes and mouth on top
- 5. Planes and wrecks
- 6. Seascapes, vistas and Magic filters



**FIG. 1.17** My buddy is eye level with a pair of butterfly fish. Excellent opportunity.



FIG. 1.18 But as you can see, when the fish swim down, the angle of shooting also becomes a downward angle including all the white distraction of the drab corals. For a successful outcome my buddy has to get much lower down, towards the sand and shoot at either eye level or upwards, however, did he think to do this?



**FIG. 1.19** Yes he did. One metre further down was enough for him to frame the butterfly fish against a blue water background. It was an easy shot to achieve but it had to be thought out in the first place. Image by Bob Wrobel.



CUBA

# Digital Compacts, Mirrorless Cameras and Micro 4/3<sup>rds</sup> by Mario Vitalini

C amera technology has changed and evolved enormously in the past decade. Go into any electronics shop and you will find a massive range of cameras, all looking quite different. The goal of this chapter is to help you work out which one might be best for you underwater.

Traditionally only few divers were willing to pay for and carry expensive photographic equipment underwater. However, in the early 2000s, the boom of digital compact cameras took the world by storm. Everything changed in the world of underwater photography. Cheap, small, powerful digital cameras could be housed. In only a couple of years, compacts were suddenly everywhere. Today it's almost impossible to go on a diving trip without encountering fellow divers, snapping away along the reef with a compact camera and housing in hand.



In 2004 the first mirrorless camera, the Epsom R-D1, was released. But it wasn't until 2008, when Panasonic launched the Lumix DMC G1, that this kind of camera started to become popular with underwater photographers. Soon other brands like Olympus and Samsung joined the race and now, most of the major manufactures including Nikon and Canon offer mirrorless cameras, which can be put in a housing and taken underwater.

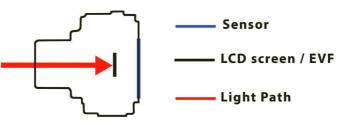
In recent years we have seen a change in the entry level compact camera market. With the huge development of smartphones and their photo abilities in particular, the sales of small and basic compact cameras has dropped dramatically. This means that compact users have fewer choices when it comes to select a diving camera.

On the other hand, the high-end compact cameras have seen huge improvements, with larger sensors, better optics and a huge range of controls.

# What are the Differences Between Compact, Mirrorless and SLR Cameras?

We are relatively familiar with how a compact camera looks, but it is important to understand the key differences between a compact camera and a mirrorless system, and how they differ from a digital SLR (DSLR).

Compact cameras are small and have a single (often zoom) lens. Light passes through the lens and hits a sensor, which records the image and produces a JPEG file as the final picture. Historically they have a limited range of controls built in – the camera does most of the thinking and sets key functions when taking a picture.



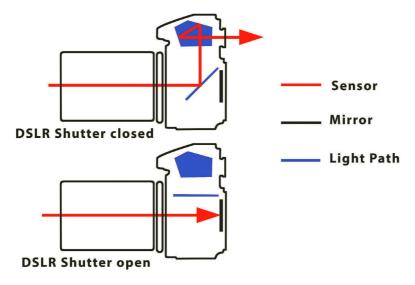
## **Compact Camera Structure**

FIG. 2.1 Light path on a compact camera.

However, like most things in life, the more you pay, the more features you can get. Some of today's high-end compact cameras will offer the advanced controls and features (e.g. full manual controls, the ability to shoot in RAW format, etc.) more commonly associated with mirrorless and DSLR cameras.

On a DSLR camera, the light passes through the lens and instead of reaching the sensor directly, it hits a mirror that is positioned at 45°. This mirror sends the light straight through a prism that will direct it to the optical view finder. The user sees a reflected image of what the lens sees. This is what the SLR bit refers to – the single lens reflex. When the user presses the shutter button to take the image, the mirror lifts, the sensor is activated, and the image is recorded digitally.

Unlike compact cameras, DSLRs allow the user to change lenses, depending on their subject matter. This allows a huge amount of flexibility from the same camera body.



## **DSLR Camera Structure**

FIG. 2.2 Light path on a DSLR camera.

At an optical level, a mirrorless camera essentially works the same way as a compact. These cameras have a large sensor (much closer to the sensor size of a DSLR), but no mirror or optical view finder – hence the name mirrorless camera. This allows manufacturers to create smaller systems than a DSLR with enhanced image quality compared to a compact camera, and like their larger DSLR cousins, mirrorless cameras allow you to change the lens you are using. This means you have a full range of lens options and can be far more flexible than with a compact. Indeed, as the distance between the lens mount and the sensor is much smaller, manufacturers typically make lighter and cheaper lenses for mirrorless cameras than they can for DSLRs.

## **Mirrorless Camera Structure**

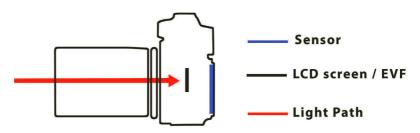


FIG. 2.3 Light path on a mirrorless camera.

So mirrorless cameras share qualities of both compact and DSLR cameras – they mimic the size and portability of compacts with the DSLR's ability to choose the right lens for the shot.



FIG. 2.4 Size comparison. Compact camera on the left, mirrorless in the middle and DSLR on the right.

Memory space is relatively inexpensive and large memory cards can be easily bought. This means image size is not something to worry too much about. However, it is worth remembering that mirrorless cameras have a larger sensor than the sensor found in compacts, and the file size they produce is also larger. If you are thinking to upgrade your camera, it is a good idea to upgrade to bigger, faster memory cards.

One final note: mirrorless and compact cameras have to use the sensor constantly to generate the image we see on the LCD screen or the electronic view finder (EVF), and this has practical implications for battery life. Always have a spare charged and ready to go.

Now we understand the basic differences between each of the camera options on the market, it is worth looking in more detail at some of the key aspects. These can be important considerations when you come to buy your next camera and housing.

# Sensor Size and Image Quality

As the name implies, compact cameras are smaller and, in many cases, simpler than DSLR, and mirrorless cameras. Because of their compact size, the sensor inside is smaller and that has many repercussions, specifically in terms of image quality.

A larger sensor has larger pixels and the larger the pixel, the more photons it will gather. The greater the amount of light a pixel can receive, the greater the range of tones it can gather before becoming saturated (blown out or white highlights). The sensor is therefore said to have a higher dynamic

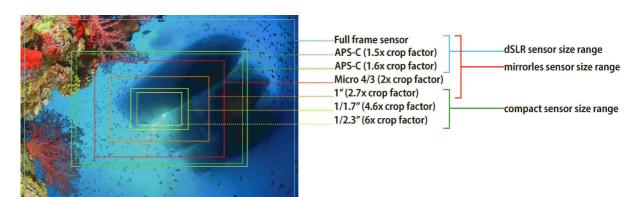


FIG. 2.5 Comparative sensor sizes.

range. It will produce clearer and sharper images with a superior ability to cope with a greater range in light levels.

The most popular sensor found in the mirrorless cameras is the so called Micro 4/3<sup>rds</sup> (MFT), used by manufacturers like Olympus and Panasonic. This is substantially larger than the sensor found in just about any compact camera, and as a result will give you better image quality. You can even find mirrorless cameras with sensors ranging from 1" to full frame. APS-C sensors can be found in some Sony and Canon mirrorless cameras as well as entry levels DSLR cameras. The Sony A7 series of mirrorless cameras even has a full frame sensor just like those used in high end DSLRs.

## Sensor Size and ISO

We use ISO to increase the sensitivity of the sensor. To a camera, underwater is a low light environment, and therefore the ability to change the ISO is important. The higher the ISO, the more sensitive the camera will be to light and the brighter the exposure. Unfortunately, this benefit does not come free. Whilst the camera can 'see' more, at higher ISOs you start to generate digital noise. Think of it as increasing the volume on a small speaker – the higher the volume, the more distorted the sound gets. By increasing the ISO on your camera, you are increasing the amount of electricity going through the sensor. This creates interference and heat, which shows up as noise or grain in your final picture.

Compacts are well known for noisy images at high ISOs. In auto modes, the camera will push the ISO to its upper limits to compensate for the lack of light. This results in grainy images. To overcome this, you must come out of auto mode, and change to a camera mode (e.g. P, or programme mode). This will allow you to manually select lower ISO levels (ISO 100, 200 or 400).

Mirrorless cameras will inevitably perform better at high ISOs because they have a larger sensor. This makes them incredibly attractive to underwater photographers. You can happily shoot at ISOs of 1600 without worrying too much about large amounts of noise. You can go to the upper limits of ISO 3000+ in the right conditions and still retain decent image quality.

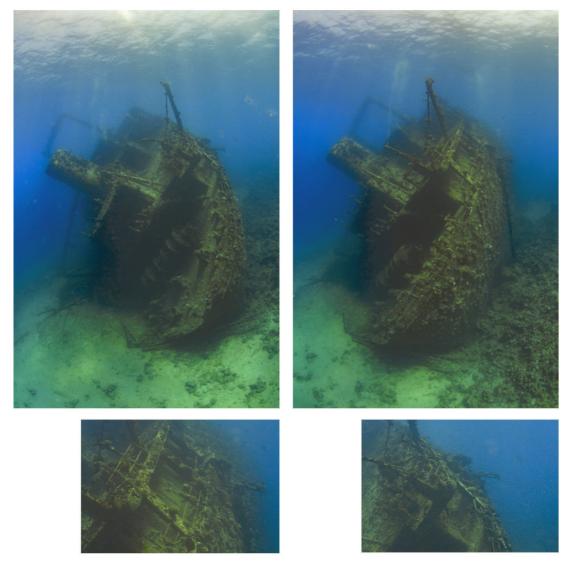


FIG. 2.6 These two photos and the 100 per cent crop show the difference in noise at ISO 400 on the left and ISO 1600 on the right.

### Shutter Lag

Shutter lag is the delay between triggering the camera and the image being recorded. When we press the shutter button there are two clear stages. The first stage is used to calculate the exposure (if shooting in any mode other than manual) and to achieve focusing. The second stage is when the image is physically recorded. The time it takes to go from stage one to stage two is the shutter lag.

For a long time, one of the major drawbacks to compact cameras underwater was the shutter lag. The 'long' delay between hitting the button and the camera taking the picture meant you could come back from a dive with a lot of fish tail photos. To their credit, manufacturers have worked hard to reduce the shutter lag and today's models are far more responsive, so this is less of a concern.

The focusing system found in DSLR cameras is much more efficient and faster than compact cameras. This combined with superior processing capabilities make the lag on reflex cameras almost negligible, even if the camera still has to lift the mirror before it takes the shot.

The shutter lag found on mirrorless cameras is comparable to that of most DSLRs, making them an attractive option to budget conscious underwater photographers. In addition to Auto and P mode, high end compacts and mirrorless cameras will also have shutter priority, aperture priority and full manual modes. In the last 8 years, manufacturers like Canon and Sony have offered compact camera models such as the Canon Power-shoot S series or the Sony RX100 with full manual controls and larger sensors. These offer a great range of options for underwater photographers wishing to get great results without the bulk and weight of larger kits.

Unfortunately, not all the housings available for these cameras allow easy access to all the camera controls, making them incredibly fiddly, if not impossible, to use underwater. Only recently have housing manufacturers like Nauticam started offering housings for compact cameras, so that the true potential of these small marvels started to become apparent.

Mirrorless cameras offer the exact same controls as any DSLR. Therefore, you can use any of the modes available, but you will only be able to get the most out of your camera if you use it to its full potential. It is worth making the effort of learning to use the camera in manual mode.

 Aperture priority (AV): this mode allows us to choose the aperture (how much light is let into the camera), whilst the camera chooses the appropriate shutter speed. This function is particularly useful to control the depth of field (the part of the image that is in focus). It is also handy when using an external strobe to light your foreground or subject. The camera choses a shutter speed that will determine the exposure of the background.

- Shutter priority (TV): this mode allows us to choose the shutter speed (how long light is let into the camera for), whilst the camera will select the right aperture for the shot. It is incredibly practical when shooting fast moving subjects like dolphins or sharks. Simply flip the camera into TV mode, select a fast shutter speed such as 1/250<sup>th</sup> sec and above and shoot away.
- Manual (M): by selecting manual mode, we are responsible for selecting the right aperture, shutter speed and ISO. We are taking full control of the exposure. You will be able to control both the background and foreground exposure. Essential if you want to be more creative with your camera.
- As you progress onto AV, TV and manual mode, you should be aware of how ISO, aperture and shutter speeds are related to each other – together they will affect your final image exposure.

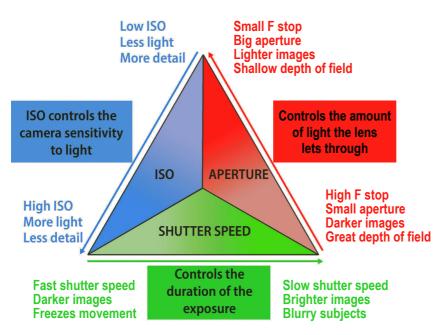


FIG. 2.7 If you would like more detail about the relationship between these three elements, there is plenty of information available online.

# **Optics: Lenses and Accessories** for Compacts

When we talk about underwater photography, one of the most important rules is to get as close as possible to your subject. Water density and particles mean that the farther away you are from the subject, the poorer the image quality will be. Sharpness and contrast will be seriously compromised.

Remember: in most situations you should use the fins on your feet and not the zoom on your camera. For this reason, the optics/lens – the bit of glass between your camera sensor and subject – is an important consideration and can change dramatically the finished look of your picture.

## Wide Angle Conversion Wet Lenses

Compact cameras have a single lens and offer a small zoom range. The widest point most cameras offer is the equivalent of a 24 mm lens which give around 40° of view. This is a good lens for general use on land, however, this is not wide enough for the majority of situations underwater.

As underwater photographers, we get around this with the use of wide angle conversion wet lenses. We can restore not just the original land value of the lens, but increase it up to around 165° view – this is comparable to a fisheye lens on land. With a wide angle wet lens, you can be close enough to that shark, dolphin or wreck to maintain image quality and colour, and fit everything into the frame.



FIGS. 2.8 and 2.9 These two shots were taken at the same distance. The photo on the right was taken with a wet wide angle lens allowing me to have a wider view and fit the entire anemone and the blue behind it.

Wide angle wet lenses simply screw onto the front of your existing housing. The ability to add wet lenses makes the compact cameras the most versatile solution for underwater photography. Unlike DSLR users who have to choose the kind of lens before they enter the water, compact camera users can screw-in or remove their wide angle lens underwater as they wish over the course of a single dive. Simply store the wet lenses in your BCD pocket, pouch or lens holder and enjoy the freedom of shooting a variety of subjects during a single dive.



FIGS. 2.10–2.13 There is a huge range of wet lenses, not all of them will fit every housing and work properly with every camera. Make sure you check the manufacturers compatibility charts.

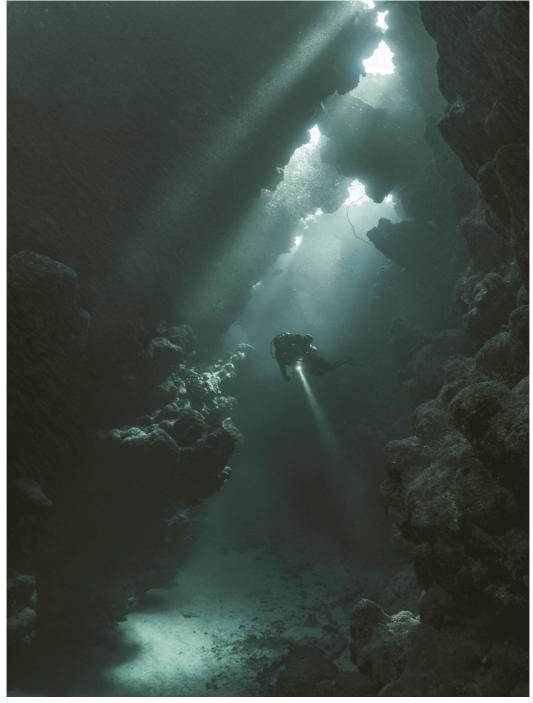


FIG. 2.14 This image was shot with an Olympus mirrorless with the kit lens and the Nauticam WWL-1 wide angle conversion lens.

# **Close-Up Lenses and Dioptres**

When it comes to shooting small critters, the macro mode on your compact camera will give you some decent results. The macro mode (flower image) allows the camera to focus on subjects much closer to the front of the lens/ housing.

In practical terms however, you have to hold your housing so close to your subject that you are likely to disturb it. There are not many creatures that like a housing just millimetres away from them. It's also very easy to damage the reef. Lighting also becomes an issue, as the housing itself can cast a shadow over part of the image.



FIGS. 2.15 and 2.16 By using a macro wet lens, you can achieve a greater magnification and maintain a friendly distance to your subject. This will also allow proper lighting.

For these reasons, we rely on a different type of conversion lens – the closeup wet lens – to get great shots. Optically a macro lens works in a similar way as reading glasses, allowing the camera to focus at a much closer distance. Use the zoom on your camera (the *only* time you ever do) and you can retain your distance from the subject. Don't use both a close-up lens and the macro mode at the same time. Like their wide angle counterparts, they simply screw onto the housing and can be taken off/added on as you wish during a single dive.



FIGS. 2.17 and 2.18 A number of brands offer good close-up lenses. They come with different mounts and strengths.

Not all close-up lenses will produce the same results. A dioptre is the unit of measurement of the optical power of the lens. Common lens strengths are +5 and +10. Interestingly, you do find some variation between brands so even +2 or +5 lenses from different manufacturers can produce quite different results.

## Mirrorless: A Wet Lens System or Port System?

Mirrorless users (in particular Micro 4/3<sup>rds</sup>) are a lucky bunch. You can choose a housing that allows a wet lens system as described above. Make sure to check before you commit to a new camera purchase.

If you prefer, you can change the physical lenses on the camera like a DSLR. If you decide to change the lenses, you will then need to invest in a series of separate ports to accommodate each different lens choice. This is clearly more of a financial investment. Dioptres and close-up lenses can be used in conjunction with fixed macro lenses to achieve super macro.



FIG. 2.19 By using an external dioptre (macro lens) on top of the macro lens on the camera I was able to photograph this minuscule hairy shrimp. This critter is no bigger than a few millimetres and just a macro lens is usually not enough to capture it in detail.

# **Using Built-in Strobe**

Compact cameras have a small flash/strobe built in. The flash is very useful for land use, but underwater it's not ideal. Mirrorless cameras also have a built-in flash and this also suffers from the same limitations as that of a compact.

If you are serious about your underwater photography, you need an external flashgun/strobe simply because the strobe from the camera does not have the power to penetrate the water column in front of the camera. It's important to get close to your subject – less than half a metre if possible. Any farther away and the light won't reach the subject. It is recommended to use a diffuser (a piece of opaque plastic) in front of the built-in strobe. The idea is that the diffuser will spread the light more evenly and reduce harsh shadows, but to be perfectly honest, it's a stop-gap. Because of the fixed strobe position, it lights the particles suspended in the water column in front of the lens causing what is called backscatter.

# **Using External Flash (Strobes)**

In order to archive consistent results underwater it is recommended you use an external source of light that can be repositioned and independently controlled. This external flash is called a strobe in underwater photography. Compact and mirrorless cameras use the same strobes as DSLRs. The main difference is that DSLRs can use an electrical connection between the camera and strobe. Compacts and mirrorless cameras connect using fibre optic cables.



FIGS. 2.20–2.22 Examples of strobes.

Because the connection is optical there is no true TTL (Through The Lens) flash. Instead we have to use Slave TTL (sTTL). Slave TTL uses the camera pre-strobe to set the correct power on the strobe, therefore you need to set your camera strobe correctly. It's worth mentioning that some compact cameras will not use a pre-strobe when used on manual mode and will only work on TTL when used on program, aperture or shutter priority. Be aware that not every brand of strobes in the market offers reliable sTTL and it is worth investing in good brands such as Inon or Sea & Sea. When it comes to choosing your next strobe, I would recommend you go for the most powerful your budget can afford. A good powerful strobe will last you many years and will be compatible with future cameras.

#### Sync speeds

Sync speed is the fastest shutter speed at which you can use the strobe. With most mirrorless and DSLR cameras the shutter is controlled by a physical curtain, which must move for an image to be taken. The strobe is active during this whole process. This limits the shutter speed at which the image can be taken. Normally the flash won't sync at speeds above 1/250<sup>th</sup> or possibly 1/320<sup>th</sup>. Beyond this the camera will simply refuse to take the picture.

Compact cameras use an electronic shutter to mimic this process. This means that the speed at which the strobe can sync can be much higher. Compact cameras can therefore take a variety of images which mirrorless and DSLR cameras cannot. Compact cameras use an electronic shutter, and are capable of using external strobes at very high shutter speeds.



**FIG. 2.23** Wide angle vista taken in Raja Ampat. Shutter speed at 1/320<sup>th</sup>, and aperture of *f*11 allowed the ambient light to balance with my strobe.

### **Using Constant Light Sources**

An increasingly popular option is to use a constant light source like a video light mounted on arms or to the top of your camera. With the recent development in LED technology, video lights have become smaller, more powerful and affordable, making them a viable option for underwater photographers. A video light won't be as powerful or be as wide as a strobe, but it will aid the camera focusing system and more importantly, you will be able to see how the image will look before you take the shot.

# **Buying Guide: Which Camera is Right for Me?**

When it comes to buying a camera, there's clearly a lot to take into consideration before you part with your hard-earned cash. Budget is a big factor for many of us, and the relative affordability of compact and mirrorless set ups makes them attractive.

Size is another important consideration. DSLRs are large and by the time you have added ports, lens options, strobes, arms, clamps, batteries and chargers, you have a pretty heavy load. If you plan to use your camera primarily overseas, it makes sense to get a more baggage friendly set up. A compact or mirrorless rig can fit into your hand baggage on many airlines – saving you the worry of checking it into the hold. Large rigs are more unwieldy underwater. Do not underestimate the task of loading involved in diving and handling a big camera with lots of attachments coming off it.

Think too about the typical conditions in which you plan to take photos. Will you need lights? If so, how many? What kind of subjects do you enjoy shooting? There's little point worrying about the macro performance if you are a die-hard wreck diver. Choosing a camera that can take a high quality wide angle lens makes more sense. Make sure you can add the accessories you want. Not all cameras can be housed and not all cameras that can be housed will allow you the option of accessories and lenses.

Ultimately, the best piece of advice I can give is to buy the very best specification your budget will permit. Modern compact cameras are impressive, and we've all seen incredible pictures being produced from these tiny marvels of modern engineering. Mirrorless cameras are giving DSLRs a 'run for their money'. Someone that knows how to get the very best out of their kit will generally produce better results than someone with a higher spec camera, but little understanding of how to use it. That said, one of the most common reasons I see people looking for a new camera is that they have outgrown the functionality of their initial compact. Ideally you want to give yourself a camera that will challenge you and allow you to grow as an underwater photographer over 4 or 5 years.

#### TABLE 2.1 Which camera is right for me?

|                          | ENTRY LEVEL<br>COMPACTS   | HIGH END<br>COMPACTS  | MIRRORLESS  | DSLR CAMERA   |  |
|--------------------------|---|---|---|---|--|
| Camera<br>options        |   |   | Olympus OMD series<br>Panasonic GH5<br>Sony A7 III<br>Nikon Z7  | Nikon D500<br>Nikon D850<br>Nikon D5<br>Canon 7DMkII<br>Canon 80D<br>Canon 5DMkII   |  |
| Sensor size              | Small sensor  | Medium size   | Medium to large   | Large sensor  |  |
| ISO/noise                | High level of noise<br>even at low ISO.   | Reasonable control of<br>noise even at relatively<br>high ISO.  | Low noise even at high ISO<br>and/or low light environments,<br>excellent noise process.  | Low noise even at high<br>ISO and/or low light<br>environments, excellent<br>noise process.   |  |
| Low light<br>performance | Performance in low<br>light condition is less<br>than optimal.<br>Focusing is<br>extremely slow and<br>a focusing light is<br>necessary.  | In low light this camera<br>will perform relatively<br>well, images will have<br>some noise but will be<br>more than adequate for<br>personal use and small<br>prints. Focusing still<br>suffers and is relatively<br>slow. A focusing light is<br>recommended. | Very good quality in low light,<br>the noise level at high ISO is<br>not a limiting factor for most<br>users.<br>Focusing is not great and<br>the use of a focusing light is<br>recommended.<br>The performance varies<br>between the different formats.  | Having a large sensor<br>and a superior<br>focusing system the<br>low light performance<br>of dSLR cameras is<br>excellent. Specially on<br>the pro models like the<br>Nikon D4s or Canon<br>5D series.                           |  |
| Versatility              | Small range<br>of accessories<br>available. Mainly<br>the ones offered<br>by the camera<br>manufacturers.   | The excellent range of<br>accessories offered by<br>third party companies<br>make this range the most<br>versatile in the market.<br>Excellent options in wet<br>lenses and lighting are<br>available.  | Some mirrorless can be used<br>with wet lenses as long as the<br>lenses used and the housing<br>are compatible. Generally<br>speaking, the versatility is<br>limited to the lens used on<br>the camera. Good range of<br>lighting is available.   | Only dioptres lenses<br>can be used with dSLR<br>cameras.   |  |
| Weight<br>and size       | Incredibly light<br>and small. Easily<br>transported as hand<br>luggage.  | Small systems, however<br>high-end housings are<br>made of aluminium and<br>they are heavy.<br>If you add the accessories<br>it can be a bit bigger, can<br>still be carried as hand<br>luggage.  | Depending on the camera<br>model and housing<br>manufacturer the weight<br>of the system varies a lot.<br>Olympus offer very light<br>polycarbonate housings but<br>the grater range of housings<br>are made of aluminium. You<br>will need strobes and different<br>ports and lenses which adds to<br>the bulk and weight. | The heaviest option,<br>high-end housings are<br>made of aluminium<br>and they are heavy.<br>Glass dome ports give<br>the best image quality<br>but they are heavy and<br>bulky. Need to think<br>how to transport the<br>system. |  |
| Cost                     | Relatively Price of the cameras is<br>inexpensive. not high but by the time<br>you add housing, wet<br>lenses and strobes the<br>cost can be high. Good<br>solution if you want to<br>travel without massively<br>compromised image<br>quality. |   | Not the cheapest option<br>but at the time of printing<br>you are looking at anything<br>between £1000 for camera, kit<br>lens and plastic housing for<br>an entry level mirrorless up<br>to £5000 for a high-end full<br>frame mirrorless camera and<br>housing.   | Expensive.  |  |

# **Buying Guide: Which Housing do I Want?**

Don't ever buy a camera for use underwater without also checking out the housing option available for that model. Not all cameras can be housed, and not all cameras enable you to add accessories or access specific functions underwater. It's not uncommon to find that a dial on the back of a camera cannot be accessed via the housing – and you have lost all that functionality underwater. Camera manufacturers regularly update their camera models and small changes in layout mean that older housings don't work with newer models.



FIGS. 2.24–2.27 There is a variety of housings available for both compact and mirrorless cameras, ranging from the inexpensive polycarbonate ones to high-end aluminium options.

For many compacts, and Nikon or Olympus mirrorless cameras, the proprietary housings supplied by the camera manufacturers are considered an accessory and therefore cannot be serviced. Over time 'sticky' buttons are a common problem. If you plan to use your set up a lot or keep it for a long time, you will want a housing that can be serviced. It may be worth investing in a higher end housing from specialist manufacturers such as Nauticam, Subal and Recsea. Aluminium is obviously more robust than plastic and is strong enough for the back dive deck or zodiac floor.

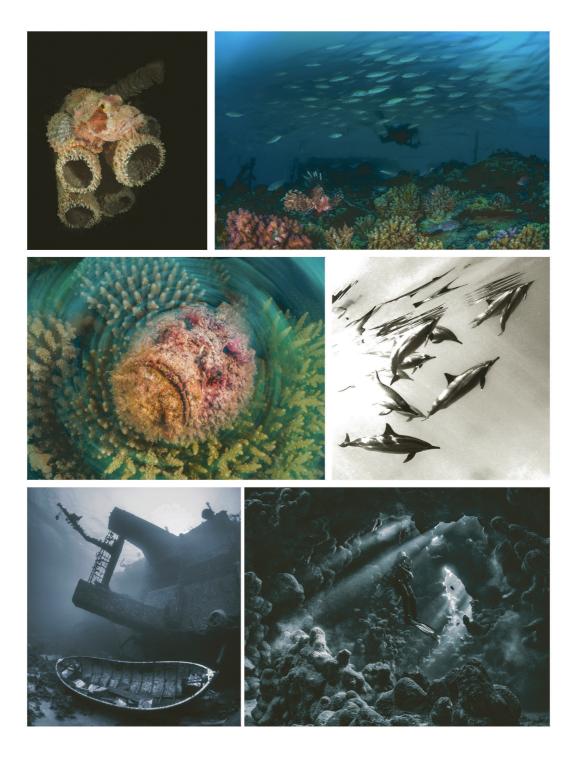
Most housings available for compact and mirrorless cameras can be used to recreational depths (up to 40 m). If you plan to dive deeper than this (60 m or 100 m), traditionally aluminium housings are your best option. Because the housing is designed around the camera, the ergonomic layout of the housing will be superior. Ergonomics are important – it's perfectly reasonable to spend more on your housing than you do on your camera. Try to hold a housing before you buy a camera. How does it feel? Can you reach all the buttons and controls with your hand? What suits one person may not work for another.

# Summary

For the underwater photographer these are very exciting times. The options out there are incredible and the image quality achievable with modern cameras is astonishing. Compact cameras now have sensors of considerable size and offer a full range of manual controls. They are a serious contender for the diver who is very conscious about the weight and size of their kit but does not want to compromise too much in terms of quality. Mirrorless cameras, as I mentioned earlier, are probably the fastest growing market in underwater photography. With images comparable in terms of quality to most semi professional DSLR cameras, but as a much lighter and smaller setup they are attracting a lot of attention. They are a great solution for serious UW photographers who are not prepared to compromise on image quality.



FIGS. 2.28 and 2.29 Gallery of images using digital compacts, mirrorless cameras and Micro 4/3<sup>rds</sup>.





# **SLR Cameras**

# **Introduction to SLRs**

or decades, the SLR (single lens reflex) camera has been the first choice for those who want to take their underwater photography to the next level. Whether you're a novice or a professional, an SLR camera should be considered. They offer three particular components, which are manual controls, excellent picture quality and most significantly, interchangeable lenses. An SLR remains a cost effective way to acquire a camera with both interchangeable lenses and a viewfinder.

It's true to say that a large majority of professional sports, press and wildlife photographers choose an SLR over other camera types. The decision to commit to an SLR camera and housing is daunting to say the least. Financial costs can be considerable and one's aspirations as an up-and-coming underwater photographer may fail or succeed depending on whether you acquire the right equipment or not. Later in this chapter Shannon Conway will discuss the choice between acquiring either a full frame SLR (Fx) or a cropped sensor SLR (Dx).

### **Exposure Modes**

From the outset, there is no right or wrong exposure mode to use underwater. In the hands of an able user, shutter priority, aperture priority or manual mode can all be controlled to produce the same desired exposure of an image. This mastery of exposure modes is quite easy to learn. Yes, you have to practice, but after a short while it becomes second nature. The ideal is the mental agility of an UW photographer who is in complete control of their diving and concentration to the photo task in hand. There will be more about concentration in Chapter 5: 'The Mindset of a Successful Underwater Photographer.'

All SLR cameras feature the following modes:

- Auto/program, which works out all aspects of the exposure for you.
- Aperture priority or 'AV', in which you set the aperture (*f*-number) and the camera automatically works out the appropriate shutter speed.
- Shutter priority or 'TV', in which you set the shutter speed and the camera automatically works out the appropriate aperture.
- Manual exposure, in which you set both the shutter speed and the aperture.

Some SLRs have additional 'Auto' modes which depict icons in the form of a landscape, portrait, sports/action, macro/close-up, night landscape etc.

For anyone other than a complete beginner or someone taking underwater photographs for the first time, I would dismiss the notion of using 'P' program exposure mode underwater. Whilst aperture, shutter and manual exposure mode all have a place in underwater photography, in my opinion, P program mode is the lesser. It is accurate and convenient for land use, but can be unreliable underwater. To some readers, using P mode may sound ideal. But trust me on this. If you wish to achieve more than just a snapshot, it is essential to develop a basic understanding of how aperture, shutter speed, ISO and depth of field all interrelate. Getting to grips and experimenting with these three exposure modes will help you to achieve this.

Those of you who can recall the 35 mm film era of photography will remember that you were unable to view the result of your endeavours for days, maybe weeks, so back then Program/Auto mode on SLR cameras was a popular and reliable method of achieving a satisfactory exposure. However, having lived in the digital age for so long, things are easier. We have no worries regarding how many frames we have left to use up. We are able to view our LCD screen milliseconds after we press the shutter. In this way our learning and understanding of exposure is instantaneous. So, take that leap of faith and go for it! Forget about the 'P' program mode and learn to use aperture, shutter and manual mode. Here's how.

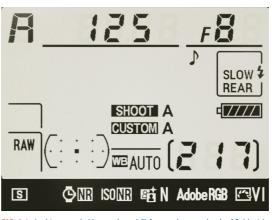
#### Which to Use Underwater

It's important to understand and accept that the application of exposure underwater is an inexact science. There is no specific quantity of light or duration of exposure required for a given underwater subject. There is no single way to expose an underwater scene, it's more a case of numerous ways of how to interpret it. Liken it to a personal opinion; one interpretation is no more right or wrong than another opinion. Underwater photography is different than land photography in this sense. As a general principle, on land one looks to expose a scene so it appears similar to how it looks to the human eye. However, underwater we predominately have a blue water background in tropical climes and green water in temperate climes. An experienced photographer will look to record this column of water to their own taste and partiality. We can choose to record the blue water column as light blue, dark blue, midnight blue or black. For example - I like to shoot subjects with my 60 mm macro lens against a dark blue or black background. The way in which I do this is to find a subject, which I can frame against the background blue water column. Using either the shutter speed or the aperture or a combination of both, I am able to manipulate the blue water background to appear in my LCD as dark blue or black. Technically I am underexposing the ambient light in the background, which in reality is a light blue tone.

### **Aperture Priority**

You, the photographer, choose the *f*-number and the camera automatically works out the appropriate shutter speed required. As the name 'aperture' suggests, the emphasis is on the selection of the aperture by the photographer. The majority of underwater photographers favour aperture priority as they can directly regulate depth of field. A general 'rule of thumb' is to consider the priority of the subject you have chosen. I will take this concept one stage further. Ask yourself this question: 'What is my priority with this photo opportunity'?

Is the priority having sufficient depth of field for the subject? Or, is it to have control of the shutter speed in order to capture a moving subject in sharp focus? This is the decision of the photographer – with each individual subject chosen, there is no right or wrong way.



**FIG. 3.1** In this example I have selected *f*8 for an adequate depth of field with wide angle, and the camera has chosen 1/125<sup>th</sup> sec as the correct shutter speed to expose the scene before me.

- Aperture priority is an advantage when shooting both close-up and wide angle. In close-up and macro photography it is important to achieve a good depth of field and by selecting an aperture of *f*16 or *f*22 a generous depth of field is assured.
- We are fortunate that wide angle lenses provide the largest depth of field possible, so when shooting seascapes and sunken shipwrecks it is better to set aperture priority in order to maximise depth of field so that the resulting image shows sharp detail from foreground to background.
- Another advantage of aperture priority is that stepless shutter speeds are automatically selected by the camera. This concept of stepless shutter speeds means the shutter is not confined to set increments such as 1/60<sup>th</sup> sec, 1/80<sup>th</sup> sec, 1/125<sup>th</sup> sec. The onboard camera computer selects its own speeds of 1/96<sup>th</sup> sec or 1/243<sup>rd</sup> sec. The camera does not display these intermediary speeds, just the ones that we are all accustomed to, and by using stepless shutter speeds we get the optimum accuracy of exposure.
- An advantage, which is often overlooked in aperture priority mode, is the amount of corresponding shutter speeds available.

See below. Set to aperture priority, the on board camera chip has 13 shutter speeds to choose from as opposed to just eight apertures to choose from when shutter priority is set.

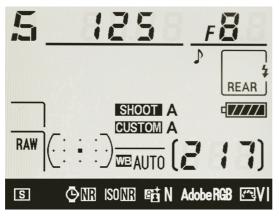
| Shutt | er Speed            | Range | 5          |      |                   |                    |                    |                    |                     |                     |                     |                          |
|-------|---------------------|-------|------------|------|-------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------------|
| 4″    | 2″                  | 1″    | 1⁄2        | 1⁄4  | 1/8 <sup>th</sup> | 1/15 <sup>th</sup> | 1/30 <sup>th</sup> | 1/60 <sup>th</sup> | 1/125 <sup>th</sup> | 1/250 <sup>th</sup> | 1/500 <sup>th</sup> | 1/1000 <sup>th</sup> sec |
|       |                     |       |            |      |                   |                    |                    |                    |                     |                     |                     |                          |
| Lens  | Lens Aperture Range |       |            |      |                   |                    |                    |                    |                     |                     |                     |                          |
| f2    | f2.8                | :     | <i>f</i> 4 | f5.6 | f8                | <i>f</i> 11        | l i                | f16                | f22                 |                     |                     |                          |

When using aperture priority you do have to keep your eye on the display inside the viewfinder. If 'HI' appears on the LED display, you need to select a smaller aperture (higher *f*-number) to avoid overexposure of the natural light. Unless we are shooting underwater in very bright sunlight and shallow water, it is not often that we see the 'HI' icon in the LED.

### **Shutter Priority**

Consider the same underwater photographer who wants to capture a small school of fish shoaling around a coral head. Here shutter speed may be the influencing factor that controls whether the fish are in sharp focus or not. Ask yourself the question: 'What is my priority with this opportunity?' If it is the ability to freeze the movement of a subject, then shutter priority mode should be considered.

Let us look at some practical 'in the sea' examples of moving subjects such as dolphins, seals, jacks, bat fish. Using a slow shutter speed such as 1/30<sup>th</sup> or 1/60<sup>th</sup> sec could most likely record the subject fuzzy and out of focus. Unless this is the effect we are after then our priority is to freeze the movement, and the most effective way to do that is to select shutter priority mode.



**FIG. 3.2** In this example I have selected a shutter speed of 1/125<sup>th</sup> sec to stop movement. The camera has chosen an aperture of *f*8 in order to correctly expose the scene before me.

The next step is to consider the shutter speed on the camera that we feel will adequately meet our needs. A rule of thumb for seals or dolphins is at least 1/250<sup>th</sup> – if not higher! Slow moving fish may be in the region of 1/125<sup>th</sup> sec and other slower-moving subjects may not require a speed that fast. So, let us make the decision and select an appropriate speed in shutter priority mode. The camera will select an appropriate aperture in whichever direction we point the camera. In the direction of the sun, the aperture may read *f*22 or *f*16. Point downwards into the blue and it may change to *f*4 or *f*5.6. What is so efficient about this is that we can concentrate totally on the composition through the viewfinder, safe in the knowledge that the computer in the camera is selecting an appropriate aperture in order to record the ambient light.

Once again, when using shutter priority, you do have to keep your eye on the display inside the viewfinder. If 'LO' appears on the LED display, you need to select a slower shutter (lower number) to avoid underexposure of the natural light.

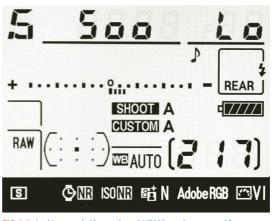


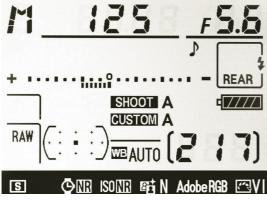
FIG. 3.3 In this example I have selected 1/500<sup>th</sup> sec shutter speed for very fast action, however the camera has indicated 'LO' for insufficient light to correctly expose. I need to reduce the shutter speed so a corresponding aperture can be made available.

#### **Manual Exposure Mode**

The options of aperture or shutter priority are useful because they speed up our decision making, which can be critical when there is little time to react to an unpredictable underwater event. In these circumstances, the speed and accuracy of the camera to provide precise exposure is invaluable. However, there are many circumstances whereby taking control of setting exposure via the M 'manual exposure' mode is preferable and offers greater opportunity for in-camera creativity.

Light and colour have such different characteristics on land than underwater, and this is where manual exposure mode comes into its own. Underwater photographers can only really begin to lean about the light in the sea and how it influences our own individual image style when we take control of the entire exposure process. The concept of manual exposure mode is as follows: you must select the aperture, you must select the shutter speed and, most importantly, you must ensure that the exposure is correct as you perceive it to be! This may seem obvious to all but there are some who are accustomed to setting A, S or P modes and who, when faced with Manual exposure mode, will often set an arbitrary shutter speed and aperture and then shoot, not realising that they have to check the LCD display in the viewfinder.

As soon as you have set the control dial to M (manual) and slightly depress the shutter, a small chart will appear on your monitor and/or inside your viewfinder. With Nikon SLR cameras it's called the electronic analogue exposure display. It acts as a light meter, and shows + (plus) or – (minus) to indicate whether the photograph would be + overexposed or – underexposed at its current setting.



**FIG. 3.4** In manual exposure mode at 1/125<sup>th</sup> at *f*5.6 the internal light meter indicates + over exposure to the amount of 1 stop.

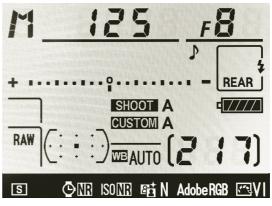


FIG. 3.5 By reducing either shutter speed or in this case the aperture from *f*5.6 to *f*8, the overexposure is corrected and the display returns to zero.

If the analogue display indicates exposure towards the plus side, then you may need to close the aperture or select a faster shutter speed; likewise, with a minus indication you may need to open the aperture or decrease the shutter speed. Towards the middle of the analogue display is a zero, which indicates optimal exposure. By manipulating either shutter or aperture, a series of small black squares appears and moves up and down the grid. The theory is that if the small square is in the middle, near to or on the zero, you have matched the exposure that the camera is advising. Consequently, if the small square is over to the minus side, you are underexposing.

### **Advantages of Manual Exposure Mode**

If you wish to develop your underwater photography, then manual mode will help you to understand exposure and how to use it to illuminate the sea. Going back to the disadvantages of program mode, whilst it may be convenient, you never quite know for sure how you were able to get the result you did. The beauty of using manual is that you have a choice about how the image will appear. It's a win–win situation, you have an unlimited amount of frames to work with. If it's wrong, you can correct it, right there and then.

### Manual Exposure Mode: A Personal Approach

Do I have the time? This is the bottom line, whether I am shooting for myself or advising others. Do you have the time to read the information inside the viewfinder and make exposure adjustments? If you are following your dive group and falling foul of the dive guide who is always having to wait for you to catch up, you may not feel comfortable in taking even more time over your underwater photography. Another example is if the subject is passing by. In this scenario don't waste time by changing settings on your camera or else you will miss the passing manta ray, shark or turtle.

### A Lesson Learnt

The first day of photographing whale sharks in Djibouti, East Africa was interesting from my choice of choosing manual mode, aperture priority or shutter priority mode. Which one to use? Just when I thought that I knew pretty much most things about cameras and underwater photography, the choice of making a simple decision regarding exposure modes caught me out big time on day one.

I have a maxim of when to choose an automatic program mode such as aperture priority or shutter priority: when there's action taking place with marine life (however small or large). Do not waste valuable time trying to measure the light and taking manual exposures when it's all going on around you. You don't have time in circumstances such as these! Forget manual mode, just choose aperture or shutter priority. But which one is best in circumstances such as these? This I'd like to discuss! Before our first encounter on day one I briefed my group of my own decision choices regarding camera settings etc. It's relevant to note that the use of strobes is not recommended as it can alarm the sharks, so we had to use natural light. I selected aperture priority mode based on the fact that I required a reasonable depth of field for the size of sharks we were shooting. Using a Nikon 10.5 mm fisheye lens, I set the ISO to 400 to provide a little more light sensitivity. I set the aperture to f11 – enough depth of field to capture sharpness front to back of the animal, which just left the shutter speed to provide a figure appropriate to balance the light in shallow depths of 1 m to 3 m.

My intention was to keep a close eye on the shutter speed within my viewfinder to ensure the speed was fast enough to freeze the movement of the shark and this is what caught me out! Whilst in profusion in these parts, whale sharks are wild, they come out of the gloom from all directions, and whilst they allow you close encounters you still need a little stamina to snorkel alongside them. We're all excited, after all, they are the largest sharks in the sea and on day one we each swam like someone possessed to keep them in view. The sheer thrill of being in the water with these creatures cannot adequately be described in words. One second you're shooting at eye level just below the surface, the next you're shooting down composing the patterns and shape on their magnificent backs, and this is where my efforts were flawed. At various camera angles, in particular when shooting them from above towards the depths, the shutter speed provided by the camera was too slow to freeze the movements as they swam by. At least 70 of the 250 shots I took on day one were out of focus due to motion blur caused by my camera's slow choice of shutter speed. So fast and exciting was the action, I totally forgot to monitor the shutter speeds my camera was selecting!



**FIG. 3.6** *f*8 at 1/50<sup>th</sup> sec shutter speed. ISO 200. Depth no more than 3 m. You can see that the movement of the shark is blurred – all down to my flawed choice of shutter speed!

The solution was to choose shutter speed priority not aperture priority. With shutter priority I was able to select a constant 1/250<sup>th</sup> sec, a shutter speed fast enough to prevent motion blur. Whilst this in turn resulted in wider apertures ranging from *f*5.6 to *f*8 it was still sufficient to provide sufficient depth of field for my ultra-wide angle 10.5 mm fisheye lens. My efforts throughout the week, without exception, were all in focus.

In my own photography I use manual exposure mode 95 per cent of the time. For the other 5 per cent I use aperture priority or shutter priority mode in those circumstances where I feel I may be distracted by light readings, camera settings, etc., to the detriment of my concentration on the subject. For the example I related in Djibouti I would now choose shutter priority. I may start by setting f8 or f11 and maintain a close eye on the shutter speed chosen in-camera. In 2020 I currently use a Nikon D7200 SLR. This model has a facility for the setting of Auto ISO, which before now to my knowledge has not been available on Nikon Dx cameras. I now use Auto ISO in wide angle

circumstances in such a way that I may for instance set *f*16 for good depth of field, set 1/250<sup>th</sup> sec for a fast shutter speed and let the Auto ISO choose its own setting. A win-win situation.

# **Back Button Focus Mode**

In my opinion the most confusing and misunderstood aspects of an SLR camera is the auto focus system. In this fifth edition I intend to discuss just one specific focus technique and that is a method called 'back button focusing' (BBF). When I first heard about this technique, I must admit, I was a little sceptical about the idea but once I got used to using it there was no going back. It's a method that has gained huge popularity in all aspects of photography, whether underwater or topside. So what is it all about?

We are used to focusing a camera when the shutter button is pressed halfway down, then the shooter takes the picture when the button is pressed all the way down. In back button focusing, the shutter does not control the focus activation, but instead assigns another button on the back of the camera (hence the name of this technique) to activate focusing on the camera. The implication of this means that your index finger is now solely responsible for pressing the shutter. Your thumb is solely responsible for focusing the lens. So why would you want to do this? Well, I've been using back button focus for quite a few years and it makes focusing simpler and more precise. As explained by a photo friend of mine, when you remove the job of focusing from your shutter release button you leave it to do the thing that it does best, which is making the exposure. With this technique you don't need to keep refocusing. You focus once and then you're free to take as many shots of that subject as you want. If the subject moves then you refocus with your thumb without having to disturb your index finger. When you do have sharp focus using your thumb, you shoot/press the shutter with your index finger.

The implications of this technique are all over the internet with guidance for individual camera systems. For Nikon users go to https://www.youtube.com/watch?v=FzqQskGoURE

For Canon users go to https://www.youtube.com/watch?v=xqX1FO1XGFI

### Ideas on How to Expose In-camera Histogram

SLR camera histograms have come a long way in the past 10 years, in particular the method of 'exposing to the right' (ETTR). The basis of ETTR is a simple technique of making the most of your in-camera exposure in order to get the highest quality image possible.

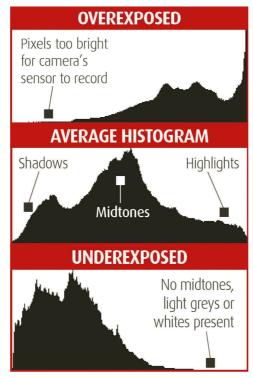


FIG. 3.7 Image showing exposure to the left, middle and to the right.

I believe that the majority of us expose a scene so that the image on the back of the camera looks how they want it, and this makes complete sense. Optimum exposure is different though. Instead of exposing the scene 'correctly', many experts suggest that it is better to expose a scene to be as bright as possible without blowing out the highlights and losing much of that data, then in post-processing like Lightroom 6 or Photoshop you darken the image so that it looks the way you want it to. By darkening an exposure in post-processing, you are effectively using a lower-than-base ISO. This also brings similar benefits, such as a decrease in image noise, richer colours, and a greater dynamic range. Images exposed using ETTR are more flexible in post-processing, making it easier to produce the image that you may have in your mind's eye.

The tricky part about ETTR is putting it into practice. You must be careful to avoid exposing too far to the right. The danger is that you accidentally render an image's highlights completely white which means there is zero data there. Although it is fairly easy to recover dark shadows in post-processing, it is nearly impossible to recover completely blown out highlights. This is what turns many people away from using ETTR, which is unfortunate. There are a few ways to determine the proper ETTR exposure and still avoid blowing out the highlights.

One way to do so is to look at the photo's histogram when reviewing the image in-camera. Your goal is to take the brightest photo possible that does not push too far to the right of the histogram. The histogram on your camera may not be as accurate as it looks. The majority of cameras are incapable of showing a RAW histogram of an image, even if you shoot in RAW. Instead, the histogram is based on the processed JPEG image that is embedded into RAW files. This means that although the camera might indicate that you have pushed your exposure too far, there is potentially more headroom for recovery in post-processing. Although the camera-generated histogram is not 100 per cent accurate, it does serve as a useful guide for what the proper ETTR exposure could be.

#### My Way

Underwater, I shoot in RAW and expose for the brightest tones towards the right hand side when shooting both underwater wide angles and macro. If the highlight warning blinks on the back of my camera I make a judgement call on the nature of the over exposure, i.e. surface detail, sun shafts, specular reflections, etc. I will not necessary reduce exposure unless the highlights 'blink' excessively. If they do blink excessively then I will make a judgement call, perhaps to reduce my exposure usually by one stop. Over the years of shooting wide angle I have learnt by 'feel' when to make an adjustment or not. When a scene is high-key I will endeavour to expose for the highlights, if the histogram is 'clipped' slightly I no longer automatically correct this, but I do emphasise the word 'slightly'. I currently use a Nikon D7200, which has an improved dynamic range for Dx SLR cameras and from experience I have learnt when to reduce exposure as a result of a flashing histogram in camera.

Full frame (Fx) cameras have had a huge dynamic range of exposure for some time now. This not only includes the highlights, where underwater

photographers can shoot directly into sun, but also at the other end of the dynamic range when shooting in very low light.

To conclude, in 2020 I continue to expose the majority of my in-camera images to the right. When I process in Lightroom 6, I can recover any blown highlights using the recovery slider. However much care I may take with my wide angle exposures, there will be times when I will get it wrong. Take heart though! This also applies to countless other photographers.



### Full Frame v Crop by Shannon Conway

Way back in May 2012 I made a decision to purchase the full frame Nikon D800 Camera. Scubapix.com.au swiftly supplied me a Nauticam NA–D800 housing. This purchase was a big decision for me as I had been shooting Nikon cropped framed cameras since 2003. I did not see this as a move to replace my existing cropped frame system but more of an extra tool to my UW photographic bag. I had been most impressed by the high ISO capabilities of the D800 after trialling it for a few days on land. I was also looking for a system that would produce ultra hi-res quality for the enormous images required for my commercial work. This camera on paper looked the ideal tool for the job.

In 2020 photographers have made the choice of full frame, whilst others have chosen to go cropped such as Martin Edge, the author of this book. There are also those who have made the expensive but flexible option of investing in both formats, So it's no wonder the question I am asked by those looking to upgrade or invest in their first SLR is: Should I purchase a full frame or cropped frame SLR? It's a difficult question to answer, so let's explore a little more and weigh up the pros and cons.

#### ISO

Full frame CMOS (complementary metal-oxide semiconductor) sensors are used by Nikon, Canon, Sony and others in their current SLR products. The large sensor has the advantage of creating less noise at a higher ISO. This gives the photographer a significant advantage when shooting underwater and was initially the main reason for my purchase of a full frame camera. It's nothing short of a breakthrough, having the ability to make the camera sensor significantly more sensitive to all types of light with little noise degradation to the final image. Underwater photographs previously unachievable are now a possibility. A good example is deep wreck images.



**FIG. 3.8** This image was taken using a Nikon D800, 16 mm Fisheye lens at *f*6.3, at 1/30<sup>th</sup> and a staggering ISO 5000. Angelita Cenote, Yucatan Peninsula, Mexico. Extremely low light with a layer of algal bloom water at the surface and a hydrogen sulphide layer at 28 m.

Back in the day with my cropped Nikon D300, noise was always a problem over ISO 800, resulting in slower shutter speeds and perhaps more importantly, wider apertures. The camera settings I required were near-on impossible to achieve without the need for cumbersome tripods. Now, with the advantage of quality high ISO, this type of image is well within my grasp.

### Superb Dynamic Range

The way in which a full frame sensor deals with the lightest light and the darkest dark is a significant advantage when used for underwater wide angle. Compared to my previous cameras this was the biggest difference I noticed. For example, images I had struggled to capture previously came much easier. An example of this came when shooting large wide angle schools of silversides, big-eye trevally and barracuda. In the past I had become frustrated and disappointed with my exposures, blown out highlights on their fish flanks time and time again. I experimented with both natural light and flash with little reward. I'm sure many of you from time to time have come across large schools of such fish only to be disappointed



FIG. 3.9 ISO 200, f8, 1/250th.

with the resulting images and finding the balance between natural light and flash extremely difficult. I know I have! If I pointed my wide angle lens upwards towards the surface, perhaps trying to capture sunbeams for a close focus wide angle opportunity, it was obvious that the intensity of the sun in the sky would over expose my efforts no matter what camera settings I selected.

My change to a full frame sensor has overcome so many of these problematic exposure examples. For years now I can point my wide angle lens towards the sun (from under the water) and achieve a satisfactory exposure. This progress and my examples are due to the enhanced dynamic range of my full frame camera sensor.



FIG. 3.10 Raja Ampat, ISO 200, f11 1/60<sup>th</sup>.

#### Sensors

APS-C (Advanced Photo System type-C) or Cropped sensor is smaller than a full frame sensor. Depending on the manufacturer and camera model there can be some significant differences.

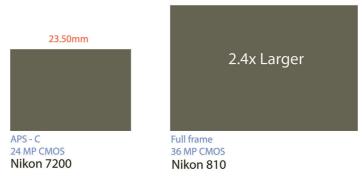
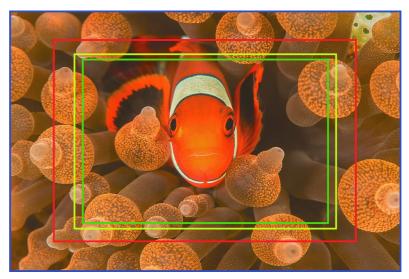


FIG. 3.11 Crop sensor compared to full frame sensor.



**FIG. 3.12** Blue: Full frame; Red: ×1.3 Crop Factor; Yellow: ×1.5 Crop Factor; Green: ×1.6 Crop Factor.

Some of the Canon and Nikon range of full frame cameras:

| Canon EOS 1D X Mkll | Nikon D5   |
|---------------------|------------|
| Canon 5D MKIII      | Nikon D810 |
| Canon 6D            | Nikon D750 |

Some of the Canon and Nikon range of Cropped-frame cameras:

| Canon 7D MKII ×1.6 crop | Nikon D500 ×1.5 crop  |
|-------------------------|-----------------------|
| Canon 70D ×1.6 crop     | Nikon D7200 ×1.5 crop |

The larger the sensor in the camera, the larger the camera becomes, and in turn, the larger the housing needs to be to accommodate it. This carries over to the size and weight of the housing. It doesn't stop here! With full frame using a wide angle lens we need a larger dome port. Suddenly we are looking at a substantially larger underwater system. Especially when we are looking at the top of the range pro cameras such as the Nikon D5 or Canon EOS 1D X Mark II.

#### **Dome Ports and Corner Sharpness**

Using a full frame sensor creates a few problems with dome ports. For example, once purchased I decided to do my own testing with different wide angle ports and extension rings in a swimming pool. I didn't get too scientific about the tests, as I had already read several articles on this problem. Taking a fixed distance from the tiled pool wall using a tripod I took images at different apertures using different lenses and different ports and extensions.

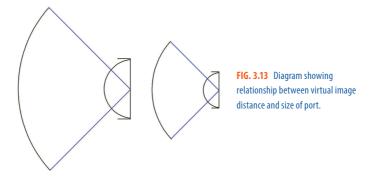
Interestingly, the 16 mm fisheye was acceptable in a 190–200 mm (8 inch) port, the corner sharpness of the resulting images being perfectly acceptable. I then introduced the Nikon 16–35 mm rectilinear lens and an appropriate port extension ring into the mix and the results were markedly different. The corners of the images became very soft, totally unacceptable even when stopping up to *f*16. Corner sharpness is always subjective and what can be acceptable to some is not to others.

There have always been some corner sharpness problems with rectilinear lenses even with cropped frame sensors. Most of these issues could normally be corrected by using +2 or +3 dioptres, or extension ring adjustments and even shooting at a higher *f*-number such as *f*16. On full frame I felt this lens/ port combination had become unusable for my style of photography. The only solution was to use a larger, 9 inch 230 mm dome port or even a super dome.

After replacing the 190–200 mm (8 inch) dome with the 230 mm (9 inch) and 80 mm extension ring, I found the lens more than satisfactory. Certainly, the corners of the test images were sharp. My preference was to use an aperture of *f*11 or *f*16, as stopping down obviously helps with corner sharpness. I tend to use the rectilinear lenses more for pelagic/larger animal shooting where lack of corner sharpness can be lost in the background blue water. This is helpful because the larger more dominant subject tends to draw the eye of the viewer away from the corners of the frame. For example, shooting pelagics with a rectilinear is not as critical as it would be when taking reef or wreck images, where parts of the reef or wreck tend to be in the corners of the image. This can make or break a potentially superb, well composed image by having to resort to the post processing route of cropping out the corners. In my opinion the best way is to use large dome ports for full frame sensor wide angles.

#### Virtual Image

A larger dome port optically makes the virtual image further away, giving greater depth of field at the same aperture. Let's briefly look what is behind this statement. When you place a lens behind a dome port and put it under water, the lens does not focus on the physical subject – it focuses on a virtual image, making the object seem closer to the port than it physically is. This virtual image distance from the port is dependent on the diameter of that port. The larger the dome port, the further the virtual image is from the port.

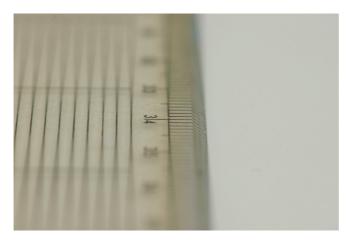


Without getting too deep into the technicalities, we can realise this will cause focus and consequently sharpness problems. The closer the subject seems to the lens, the less depth of field will be available. Using a larger dome port pushes the virtual image further away from the dome, hence helping with corner sharpness. Curvature of the port also affects the curvature of the virtual image. The larger the port, the less curvature is created across the dome. Some of the closer focusing lenses with better depth of field such as a fisheye lens will be a lot more forgiving than any rectilinear lenses.

### Depth of Field: Full frame v Crop frame

DOF (depth of field) is a combination of aperture size, lens and distance to the subject. The size of the sensor has no direct bearing on what DOF is being achieved in any image. I have attempted to demonstrate with a series of test images how the theory works in practice. The images below have been taken in a small land based studio using a ruler as the subject to demonstrate the DOF more clearly.

Take any lens, let's say a 105 mm macro and for our purposes I've chosen an aperture of *f*16. Attaching the lens to a full frame camera (Nikon D800), and taking an image – see Figure 3.14.



**FIG. 3.14** Full frame camera, D800, 105 mm lens at *f* 16.

I've then used the same lens and attached it to a  $\times$ 1.5 cropped frame camera (Nikon 7200) taking the same image from the same distance. Even though I have used the same lens from the same distance on the two different types of camera body, the depth of field in the image has stayed the same. The obvious difference is actual framing of the image.

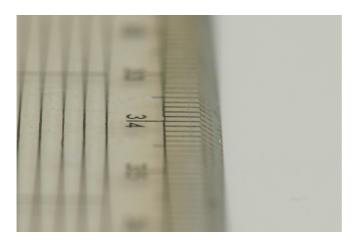
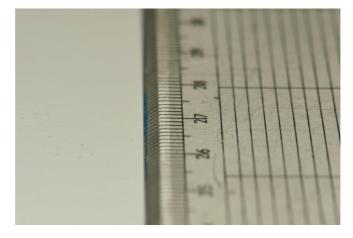


FIG. 3.15 The same 105 mm lens at f16 on a D7200, cropped sensor camera. Notice the DOF is identical but the image is noticeably 'cropped'.

I've then taken another two images to demonstrate the result of moving a full frame camera closer to the subject. Figure 3.16 shows another image taken with the  $\times$ 1.5 cropped sensor.

FIG. 3.16 Shot using the cropped sensor camera. Notice the number 26 on the ruler is almost in focus.



The full frame camera with the same settings and lens is then used to emulate the same framing (but obviously it has to be closer to the subject to achieve that). We can see in Figure 3.17 that this has made the depth of field at the same aperture more shallow.

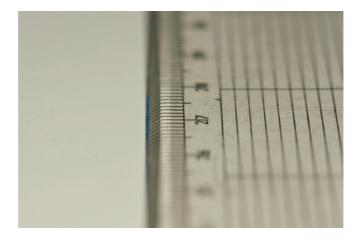


FIG. 3.17 Same framing as before but using a full frame camera and moving closer to the subject. Notice the number 26 is now out of focus due to the reduced DOF. So what do we learn from this? If the aperture (*f*-number), lens and distance to the subject are set the same, the depth of field will be the same. The only significant difference to the image will be the framing. However, using the same lens, aperture *and* framing for each image. The full frame camera will need to be significantly closer than the cropped frame camera, thus creating a shallower depth of field.

### **My Conclusions**

- I would like to say there is a definitive answer to the question of full frame or cropped but everybody will have his or her own preferences.
- If your underwater photography is predominantly full frame and you don't mind carrying and using a larger system then a full frame camera is the way to go.
- If you are macro orientated, a cropped sensor is the way forward. Both systems have their advantages and disadvantages. One of the big things to consider is the cost and weight. With a camera, lenses, housing, large dome ports etc, you can be looking at 50 per cent more than for a cropped frame system.

# Water-Contact Optics for Full Frame Cameras by Alex Mustard

In the previous section, Shannon shared the benefits he has found with full frame cameras and pointed out the major challenge of the format – the limitation imposed by using dome ports with wide angle lenses. These problems are created by the larger sensor size, so they occur equally in all full frame Nikon, Canon, Sony and Panasonic cameras, and whether the camera is SLR, mirrorless or even shooting video! The standard solution is to buy a big, expensive dome, to use it with the correct port extension ring and to religiously keep our aperture closed down (to at least *f*13 with full frame) to stop the corners of the frame going mushy.

But there is another way: water-contact lenses/ports. These are lens systems designed to work in water, rather than a lens designed to work in air, and avoid the restrictions of a dome port. The negatives of water-contact lenses are that they are heavy (because they usually involve lots of optical glass), expensive (because of their bespoke designs), and not widely available (either a limited stock of old designs or new products made in low numbers). Furthermore, not everything marketed as 'water-contact' is excellent – some are world beaters, while others are poorly designed and fail to outperform a good dome port setup.

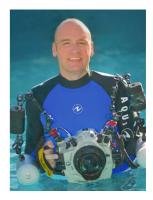




FIG. 3.18 Harbour seal in kelp forest. Full frame cameras offer the best image quality and tremendous resolution. Water-contact optics allow us to get the best out of them.

This is an exciting and growing frontier in underwater photography. In this chapter I am going discuss the three systems that I have been using over the last 5 years – all of which I can vouch for in delivering top image quality for full frame cameras.

#### Nikonos RS 13 mm Fisheye (RS-13)

The main reason that water-contact lens systems have not been more widely available to underwater photographers is the expense and expertise required to develop them. Our niche market is too small for it to be worth mainstream lens makers designing them. The most notable exception is Nikonos – specifically the wide angle lenses that Nikon produced for its Nikonos brand film cameras. Of these, the 13 mm autofocus fisheye lens (170° field of view) that was made for the Nikonos RS is by far the most valuable for modern underwater photography. The other RS lenses are not wide enough, and the Nikonos V lenses have only manual focus manual apertures. That said, the RS-13 is only useable with Nikon SLRs, it is not even compatible with Nikon's new Z-mount mirrorless cameras, let alone Canon or Sony!

The RS-13 requires two modifications to use it with a modern Nikon camera. First the electronics need to be reprogrammed/rewired to work with a standard Nikon F-mount configuration. Several companies offer this service, mine was done by Seacam, whose conversion allows the full aperture range to be used. Second the lens needs a waterproof seal for the housing. Seacam's solution is to cut the front element off the lens and make this into a standalone port. Not having a Seacam housing, I use an alternative, an insert mount made by Andrej Belic, which seals the complete lens to the housing.

The Nikonos 13 mm has been my main wide angle lens since 2014. I use it primarily because I know it provides the best fisheye image quality currently available. It also allows me to shoot at much more open apertures, when I need to, while maintaining excellent corner sharpness. I also value its small size for lighting close focus wide angle shots, for manoeuvring the lens very close to subjects and when freediving with large pelagics, when as small a rig as possible is a big advantage. I also appreciate its small size when shore diving. You won't find this lens in a camera shop, instead you need to search online and then arrange the conversion yourself. The lens has been adopted by quite a lot of photographers now and with only a finite number produced in the early 1990s, second-hand prices have soared.



FIG. 3.19 Water-contact lenses are particularly valuable when shooting available light images. Some cenotes are very dark – this exposure was 1/25<sup>th</sup>, f8, ISO 1600, the Nikonos RS 13 mm allowed me to have sharpness throughout this frame.

FIG. 3.20 Cetacean (whale and dolphin) photography is typically done by freediving, where a compact rig is highly desirable. The small size of the RS-13 was a big benefit for shooting whales in the Arctic.



### **Zeiss Underwater Corrector**

As Shannon has already commented, fisheye lenses already perform well behind dome ports, so there is potentially much more image quality to gain from a water-contact rectilinear (a normal, non-fisheye) wide angle lens.

To address this, I have been using a solution that makes use of an underwater corrector designed and made by the famous optics manufacturer Carl Zeiss. This lvanoff style design was commissioned by Hasselblad for their medium format housings in the 1970s and produced in tiny numbers, and to date I am the only person I know of who has adapted one for modern use, which I did with help from Pete Ladell. This system has proved very successful for me and produced many published images, including a shot that was awarded in the Wildlife Photographer of the Year contest back in 2016.

I use the Carl Zeiss Underwater Corrector with a Nikon 20 mm lens (94° field of view) and the result is very much like an autofocus Nikonos V 15 mm (also 94° FOV)! I have recently begun experimenting with a Tokina 20–35 mm,



FIG. 3.21 Cave formations are spectacular subjects for underwater pictures, where we want to use a rectilinear lens to avoid bendy stalactites! Because it is completely dark and the scenes are large, most photos are taken at more open apertures and struggle to be sharp right into the corners. The Zeiss Underwater Corrector allowed me to produce exemplary detail right into the corners of the frame, even at *f*8.



FIG. 3.22 The Carl Zeiss Underwater Corrector with 20 mm was well suited to shooting orca in Norway in winter. Photo of Alex by Robert Smits.

to try and add the flexibility of a zoom to this system. The main downside of the Zeiss Corrector is that it is heavy (more than 1 kg of glass) and the smaller internal optical element limits the range of lenses I can use behind it. On a lighter note, because the front element is only slightly curved on the outside (it is strongly curved on the inside), I have had problems of other photographers loitering in my shots assuming I was shooting macro! Also, since it is irreplaceable, if I scratch it, that will be it!

# **Nauticam Wide Angle Conversion Port**

My final option is by far the most versatile, indeed it is the most versatile lens I've used underwater. Nauticam, and specifically Edward Lai, have put a huge amount of time and expertise into developing high quality water-contact optics in the last few years that have and will continue to provide truly new opportunities for underwater shooting. Nauticam's first water-contact wide angle was the WWL-1 lens, designed for mirrorless cameras. The WACP is its big brother, designed to be used in front of a standard zoom and convert it into an underwater corrected, wide angle fisheye lens. I use it with a Nikon 28–70 mm that gives a field of view of 130° to 57° with only mild barrel distortion (for reference a 16–35 mm behind a dome offers 107° to 64°). The WACP can used on many different cameras and adapted for most housing brands. It can be used with a reasonably large selection of lenses although it tends to work better with slightly smaller, simpler lens designs. The downside is that it is very heavy (containing close to 3 kg of optical glass) and becomes quite bulky when fitted with the buoyancy required to make it neutrally buoyant underwater. The upside is excellent image quality, which is maintained across a very wide range of apertures, even in the corners of the frame. It offers unrivalled flexibility when combined with a zoom lens and I find it indispensable when diving an area for the first time, or in action-packed destinations where I know I will see a wide range of subjects: it is my go-to setup in places like Galapagos and the Maldives. Yet despite being involved in the development of this lens, I don't take it on every trip – I can't justify its share of the baggage allowance for destinations that lack bigger creatures!



FIG. 3.23 The flexibility of the 130° to 57° zoom of the WACP is ideal for precisely framing larger marine species, such as this sea lion pup playing with a starfish.

It does take some mental recalibration to exploit the WACP fully. We can, of course, bolt the WACP to our camera, shoot as normal and it works. But the real challenge is to break away from our go-to settings and create types of images we really couldn't before. This is where the WACP really breaks new ground.



FIG. 3.24 Nauticam's Wide Angle Corrector Port.

# Should You Invest?

One challenge of water-contact optics is that we invest heavily to buy them and the underwater world doesn't really look any different through the viewfinder! OK, on land, they won't focus properly, which suggests something is different, but it would be nice to have more reassurance of their game-changing ability! That comes when we download the files to Lightroom and our eyes are rewarded by the finer details.

The next step is to adapt our technique and go-to settings so that we can get shots that we'd miss or would be compromised when shooting through a dome. Quality water-contact lenses will always be sharper than a dome, but the margin of their advantage increases at wider apertures. Overall, all three allow us to open the aperture at least two stops (six clicks on the camera) wider than would be acceptable with a dome. The more I shoot with them the more situations I find where opening up the aperture allows me to create something new. Furthermore, as camera resolutions soar, so the loss of image quality due to diffraction becomes more significant when the aperture is closed. This increases the value of being



FIG. 3.25 Offering up to 130° field of view, the WACP is second only to a full fisheye in wide angle coverage, making it a highly suited to many subjects, such as this freshwater turtle swimming beneath trees in winter.

able to work at more open apertures to realise the full resolving power of our cameras.

All three of these water-contact options will focus right to the front element and all are much smaller in diameter than a large dome, which makes achieving high quality lighting on close focus subjects much easier.

In the negative column, the gain in image quality is much less apparent when the conditions allow or demand shooting at a closed aperture. Shooting at *f*8 on a full frame camera, for example, all three options very obviously outperform a dome port setup in corner detail. However, at *f*16, the advantage is only visible if you really pixel peek and the investment is much harder to justify.

A significant photographic downside of water contact is that split levels shots are severely compromised, and these are important shots both in competitions and for image sales. And we all know that dome ports aren't cheap, but water contact optics are usually even more expensive! That said, we can only shoot one underwater camera at a time, so it has always made sense to me to want to use the best available, the one that gives us the best chance of capturing the shot. Perhaps the most important lesson from water-contact optics is that they reinforce the old photographic adage – that it is better to spend money on glass than cameras. We're all keen to upgrade to the latest cameras, often spending \$10,000+ for a new camera and housing to get the best image quality. However, what is clear is that megapixels are not the bottleneck for image quality underwater. Those that want the very best quality in wide angle images should be investing in the right optics.

In short, water-contact lenses won't make you a better photographer, but will make every picture you take better.

# Diving to Take Photographs

# Underwater Photography and Protection of the Reef\*

# Introduction

The popularity of underwater photography has grown considerably since my fourth edition was released in 2010. There is no doubt that the way in which we dive with a camera has a huge influence over the quality of images we are able to create. Our community is often at the sharp end of the criticism, so it is absolutely imperative that we all dive responsibly. I firmly believe that topics such as accessibility and body angles are inextricably linked to the abilities of every underwater photographer. I have been coaching these topics for many years and have seen the benefits in both my own work and that of others. \* The tips and techniques shown here may be reprinted for your own use or for distribution around your club, for instance. Any reproduction, however, must display the copyright symbol © Martin Edge. They are made available on the strict understanding that no charge or fee is made.

## How to Take Pictures and Protect the Reef

Stay on this page! I know it's tempting to turn over with the intention of returning at a later date but I ask you to Stop, Read and Absorb. Please!

Whilst you may know what this chapter is all about, many others won't. You will be diving with these 'many others' in the near future. Their diving photo habits may be somewhat lacking and may compromise the group and the reef. It may also damage the reputation of other responsible photographers who are diving with them and you may be one of their group. You may be expected by others to challenge their behaviour. If you have ever been in this situation – or if not – when you are faced with these circumstances in the future, the following words of advice might be of help to you in passing on to others some tips about how to photograph the reef in a responsible way.

Many codes of conduct and environmental articles about photo diving emphasise the need to avoid touching the reef as much as possible, and to take care with 'this and that'. Rarely do they tell you how you should achieve this in practice. Here are some of my own tips for obtaining good shots without risking harm to the reef and its inhabitants, tips which I would like to share with you. Some of the following may be obvious but has, nevertheless, protected many underwater environments and made lots of friends around the world.

## The Two-Finger Technique

This is something that I encourage in other photographers, and I have found it is appreciated by dive photo resorts and dive-guides everywhere. It is simply the practice of making acceptable contact with portions of the



**FIG. 4.1** Amanda Conway with just her free hand to extend her distance from the reef.

reef consisting of nonliving rocks or sandy areas. It has to be done carefully, however. If you have good buoyancy control and a correctly configured and balanced camera set-up, you can hold the housing in your right hand whilst using two fingers of your left hand to lightly steady yourself on non-living rocks, not the living reef. This is an excellent way in which to get close but without the risk of making contact. With practice, you will be able to steady yourself at close range with the minimum of effort required to stay still. When the picture opportunity is ended, then lightly pushing away from the reef with one or two fingers is all that's necessary.

# **Pointers**

My pointer is a permanent feature of my dive kit. It allows me to extend the distance of my body away from the reef when using two fingers. It's also useful as a reef hook in unpredictable currents, but make sure you use them on non-living parts of the reef.



**FIG. 4.2** Amanda Conway with her free hand using a pointer to extend her distance from the reef.



FIG. 4.3 It is so easy to move in on your subject and create backscatter as you land on the substrate. The trick is to be self aware of your soroundings.

### **Avoid Collisions**

Most collisions occur when people move away from the reef in an uncontrollable way. They may be excited over what they've just shot, itching to check the LCD, and simply lose concentration for a moment. Forgetting about your fins can bring on that 'sinking' feeling in your stomach, when you are aware that your fins have caught on something and you know it's the reef before you even turn to look. This usually occurs when you turn around too soon and too closely to the reef. If you do find yourself in that position, stop finning! Use the air in your lungs or your BC to lift you clear of the reef.

Whenever you move in to take a picture close to the reef, just take a second to consider how you intend to make your exit. It's a sickening feeling to see a huge chunk of fire coral tumble down the reef after a retreating shooter has accidentally kicked it. If you have any doubt about getting close to a subject, then stop! Back off and find something you can shoot comfortably.

### **Buoyancy and One-on-One Buoyancy Refreshers**

For the underwater photographer who may have been out of the water for some time or purchased a new wetsuit or BCD, a buoyancy refresher course is an ideal way to build technique and confidence all at the same time. During my photo workshops abroad I have 'invited' a number of photographers to take a buoyancy course with a dive guide. It's a simple procedure at any dive resort in the world, and the apprentice returns with the confidence, and more importantly, the ability to approach a subject with care and a greater sense of responsibility.

# First Check-out Dive of Your Trip

Some resorts advise trimming your buoyancy on a check-out dive with your normal camera equipment. Others will encourage a buoyancy check without your camera. Whatever the case the majority of camera set-ups tend to be slightly negatively buoyant and you need to fine-tune yourself whilst carrying the equipment you intend to use on a photo trip.

### Your Weight is Paramount

Dive tanks differ in size and weight from one resort to another, so adjust and trim your weight accordingly on each photo trip. You will know when your buoyancy is correct, as you should be neutrally buoyant at your 3 m decompression stop at the end of the dive. I recommend a pouched zip-up weight belt or if preferred, an integeral system as part of your BCD. These systems allow weight to be removed or added quickly and efficiently for those photo dives when you want to reduce or increase weight for different depths. Leg weights should not be used on a reef. If you have a problem with your legs floating, then an adjustment to your tank or your weight belt is usually the answer.

# Position of Your Tank and Buoyancy Control

It's a generally held view that, if you fix your tank so that the strap of the BCD is towards the lower half of the tank, then your legs will tend to float more when hovering or swimming in the horizontal. It's trial and error with each person, but it works for me – so give it a try!

# **Underwater Camera Set-ups**

The 105 mm macro lens has a longer working distance to subjects than does the 60 mm macro. At life size with a 60 mm lens and depending on the length of the 60 mm port, minimum focus need be no more than a few centimetres from the subjects. If you have a penchant for small, shy subjects, invest in a 105 mm macro lens.

Strobe arms can often be a little too long for close-up and macro work, so, consider and if possible strip down to the bare essentials. Use only the smallest flash arms to do the job. If there are items attached to the housing and not required for the task on that particular dive then remove them. This will minimise the chance of accidental contact with corals and allow you to get closer. The ergonomic balance of your rig will improve, which will make picture-taking easier all round.

# **The Aching Elbow!**

Ever heard of Nauticam elbow? Some of you may know it as Subal, or Sea & Sea elbow. It usually occurs in the right elbow, and is caused by the weight and strain of holding your housing rig over a period of time. Explore the possibility of additional housing buoyancy aids.

# **Buoyancy Arms**

Consist of sections of buoyant arms, which counterbalance the negative weight of the camera housing. Not only does this help to eliminate elbow fatigue, it also provides a more balanced camera system for both close-up and wide angle use.

# Touching, Poking and Moving is a NO NO!

FIG. 4.4 In a genuine effort to please me the guide began to nudge the puffer fish towards a better background, I indicated a polite 'no thanks' and carried on. Whilst this is nothing more than a recording shot with a busy background, I know it was all I could achieve without harassing the fish. Prodding the nudibranch to 'help' it climb a little higher to get a better background, persuading the scorpion fish to look your way with a light poke of your pointer. If your dive guide acts in a similar manner in an effort to please you, then politely indicate with a shake of the head that you don't want to take a photo in such circumstances. He will get the message but until all of us acting as responsible photographers take a stance this practice will continue. Let us all stop doing it now, and encourage others to do the same!



# **Just Too Many Shots**

There comes a time when a seahorse or octopus has been exposed to your strobes going off just once too often. No one can be prescriptive about this, but we all have a sense of when enough is enough. Next time you find your self in this situation, indicate to your buddy or the dive guide that you want to move on to something else.

# **Towards a Better Underwater Environment**

There is an infinite number of photo opportunities, but many are simply un-photographable by virtue of the subject's location in, on or around the reef. Make an assessment. If it looks problematic, then forget it and continue your search. You will find the same species in another photographer-friendly situation, perhaps not during that dive or at the same location, but you will find the opportunities. When you do, take advantage and enjoy the experience. You will be content in the knowledge that you have behaved with integrity and at the same time done your bit for the environment of the reef and the life around it.



FIG. 4.5 Whilst lining up on the substrate for an opportunity to shoot this shrimp a diveguide began to use his pointer to direct it towards the best negative space. I politely held up my free left hand to indicate No Thank You! Using Inward Lighting, I still was able to get the shot I was after.

FIG. 4.6 One afternoon I was making great efforts to photograph this leaf fish but he was in such a poor location in relation to the reef that I had no chance. The potential was promising but once comfortable, leaf fish seldom like to be disturbed. I took a face shot and after a couple of minutes of lying on the sand with my eye directly behind the viewfinder he opened his mouth for a yawn. Now! I missed the yawn in the viewfinder but out of the corner of my eye another guide was holding what I could only discribe as a 'blower' which had the effect of making the leaf yawn somewhat. I recount this short tail because the guides where ok with blowing water at it to yawn. I sat on the proverbial fence for a short while and ever since this one particular occurrence I have refrained from any kind of critter fiddling at all. A 'blower' is really no big deal, but where do you stop on the scale of 1–10 of critter fiddling?



# **Underwater Photo Body Angles**

Continuing on from the topic of 'Accessibility' and how important it is to make every effort to select subjects, which can be (for want of a better word) got at! It is a fact that the large majority of decent photo opportunities found on the reef are best shot at an eye level or upward camera angle. Over time a competent underwater photographer can learn how to adopt their body angle underwater to enable these preferably eye level and upward angles.

During my UK photo workshops, an aspect of my pool tuition is to help participants to discover these alternative camera angles for themselves. I take a shot, perhaps lying on my back or side and then encourage my client to do the same. The trick in being able to copy the shot is nothing to do with camera settings but has everything to do with adopting the same or similar camera angle as myself. Some time ago now one photographic beginner, a Padi instructor with over 700 dives to his credit, had difficulty getting into a number of positions, i.e. lying on his back, his side, flat on the swimming pool floor etc. His response and reasons sparked a conversation. My instructor declared that he now realised that, to date, he had spent his entire dive career 'leaning to look cool underwater'. So simple but quite profound! He explained that to be a credible instructor and leader he needed to display perfect poise at all times. He had never attempted any of these positions before not even whilst having fun and playing in a pool or the sea and felt uncomfortable and clumsy attempting to replicate with a camera in hand. We set out to alter this way of thinking and within 30 minutes he had mastered all the awkward body angles I could throw at him and he ended our photo session rock steady, lying on his back shooting through the under surface of the swimming pool towards the architecture of the ceiling above.

As a result of this realisation, I now build into my pool tuition an appreciation of several vital camera body-angles to perfect underwater.

# **Comfortable Positions**

As discussed, the upmost improvement that can be made to your photography is to shoot at eye level or upwards but the reality of achieving this is a challenge without making an effort to work the muscle memory of your neck and upper body angle. The reason it is so easy and natural to shoot down is because it is the most comfortable angle to adopt when scuba diving. Think about it for a moment! Our dive equipment, fins, weight belt, BCD, face mask and tank are all ergonomically designed to encourage us to move at an horizontal position through the water. It feels so familiar and comfortable to direct our eyes at a downward angle and adopt this same position when we look through our camera. Try every single thing you can to break this habit by experimenting in water with body angles, which will enable you to achieve eye level, and upward angles of view.



FIG. 4.7 I have been saving this particular image for the end of this chapter. Over the last 30 years I have worked hard in teaching UW photographers to play and experiment with the adoption of their body positions in the water. Lining up effortlessly with both their left and right shoulder on the substrate is the objective. Angled viewfinders are extremely popular but I have prefered shooting straight and adopting a low position on the substrate without using them myself. Like many of the best football stars who can kick with both feet with ease, an analogy underwater is to view and shoot off the substrate using both your left and then you right shoulder. See if you can the next time you're in the water!



FIG. 4.8 Angled viewfinder on a Subal body.

Most importantly, if you have any doubt about your position in the water and harm to the reef then move away and look for a subject which is more accessible.

In all of the topics discussed in this chapter the priority is the welfare of the marine environment. No shot is worth damaging this fragile ecosytem for. If you are in any doubt regarding negative impact due to you actions then abort the shot and try something different. Even sandy bottoms that look deviod of life have small creatures inhabiting them. Dive and photgraph with care!



FIG. 4.9 I was lying on the substrate at Lembeh some years ago when I came across this seahorse. I had my eye to my viewfinder when I realisied that a dive guide (wherever from I never found out) had swiched on his torch to 'back-light' the subject for me. As a result of the guide's success I too began to backlight small critters in this way. I find it a lot easier than using a snoot.

# **Pre-Planning**

Whilst conducting a photo workshop around the area of Misool in Raja Ampat, I dispatched a liveaboard dive boat to an area of reef suitable for a sunset 'dapple light' shoot. Whilst the captain knew every square foot of the reef, I failed to accurately consult with him and for no fault of his own (my mistake entirely) he moored on the wrong side of the reef. The light was excellent but the reef was in the wrong direction as a result of my silly mistake.

Developing a sense for the pre-planning of a photo dive will ensure you are in the right place at the right time and shooting in the most preferable direction. Below are a few examples to illustrate how pre-planning can work for you.

# Pre-Planning your Dappled Light Photography

Shooting 1 hour after sunrise and 1 hour before sunset is an ideal time for dapple light but so often there is little subject matter to place in the lower half of the frame – therefore an element of pre-planning is required. For example, at a dive site close to Misool Eco Resort in Raja Ampat, lush beautiful hard and soft corals abound. They are excellent potential but you have to shoot towards the direction of the setting sun to include within the frame the shafts of light with the photogenic foreground of the shallow reef. If you are on the wrong side of the reef, you're at the wrong angle to the sun and it won't work.

# Panning your Over/Under (Splits) Photography

When shooting splits it is ideal to shoot with the sun at your back. This can become so frustrating when you're shooting a lovely beach and palm tree scene and the sun ball is shining directly into your camera lens! Whilst it may be good for practice and to test the dynamic range of your camera, in circumstances such as these your option may be to wait until the sun is setting in the direction you are shooting.

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FIG. 4.10 This split shot was taken in Raja Ampat by Stuart Gibson in the evening when the sun was setting. This required additional planning as the sun sets so very quickly. Water depth was changing and in this example the moving dive boat became an important part of the scene. To add to this complexity, in this particular example a little strobe light was required in order to light up the hard corals just below the surface. Without some element of planning split shots can be challenging but very rewarding at the same time. Settings: ISO 400, *f*13, 1/320<sup>th</sup>. Nikon D300 with Tokina 10-17 lens.

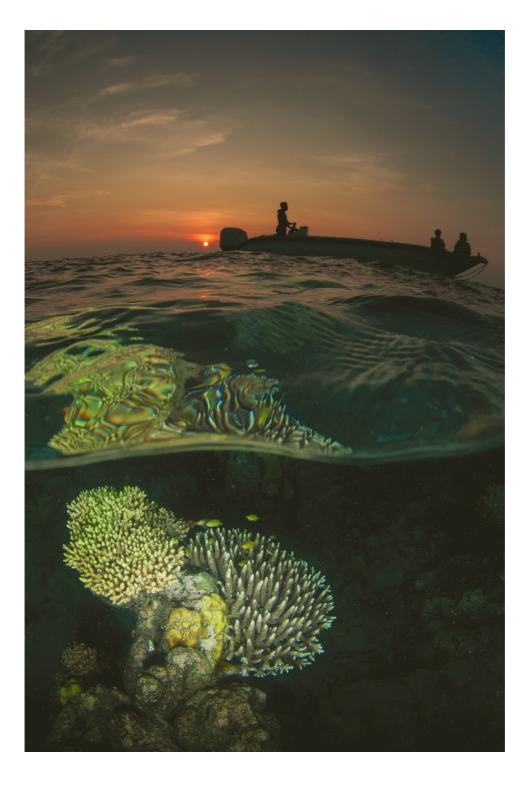


FIG. 4.11 The angle of the sun in the sky is equally critical when photographing inside wrecks to ensure any natural light can enter the scene. This shot of the tool room inside the Chrisoula K, Red Sea was taken at midday. This ensured that the beams of light entered as vertically as possible, illuminating the small space which adds to the feeling of depth front to back. Image by Stuart Gibson.

# Pre-Planning your Magic Filter Photography

In wide angle Magic Filter photography it's preferable to shoot at a downward angle with the sun directly behind your back. To take full advantage of this concept it is essential that the reef you choose to photograph can be photographed in this direction. If you are shooting towards the reef and the sun is visible in the frame you have chosen the wrong time of day for this type of photography.

One of my all time blunders was to drive 120 miles only to find the tide was far out and at an all time low. Pre-planning can be as simple as copying some photo ideas to your memory card so you can refer to them in-camera whilst shooting. You can affix a list of 'ideas to try' to your camera set-up. If something goes wrong with your photo shoot and you feel it could have been prevented then give some thought to how you may avoid it occurring in the future.



# F11 Be There!

There is a well-known maxim in underwater photography: 'f11 at 1 metre and be there'. Whilst many of us will remember 3 feet, for the purpose of this example I shall use the equivalent – 1 metre. With the latest cameras, sophisticated metering systems, multi powered flash units, how can this adage be meaningful by today's standards? Is it relevant? What does it mean? I for one believe it is extremely relevant, particularly to beginners and improvers. *F*11 at 1 metre is all about a 'catch-all situation'. Let's look at it in detail.

We have a number of apertures from the smallest (least amount of light but greatest depth of field) to the largest (greatest amount of light but shallowest depth of field): f22, f16, f11, f8, f5.6, f4. f3.5.

SLRs show 'in-between' stops such as f18, f9 etc. For the purpose of this maxim, relate a Compact Camera aperture of f4 as being comparable with f11 on an SLR. You will see that f11 is a mid aperture. When using underwater wide angle, f11provides a good depth of field, which is often sufficient for the vast majority of subjects encountered.

FIG. 4.12 ISO 200, 1/125<sup>th</sup> sec at f11. Why 1 metre? 1 m from the camera lens is a very comfortable working distance in terms of the photographer using the camera and the subject in front of the lens. We are often close enough to the subject to fill the frame but not too close to threaten the reef with our arms or legs. Good buoyancy is a must. 1 m allows most subjects to enjoy their own comfort zone. Whilst the subject may be aware of our presence, it will often let you get that close. Think about it. Many of us have been within 1 m of a cuttle fish, turtle, a grouper, and blue spotted stingray etc. Image by Stuart Gibson.



# **Strobe Travel and Backscatter**

Strobe photography continues to be effective at a distance of 1 m and the result is good saturation and sharpness. Backscatter is kept to a minimum. To improve our underwater photography it is essential to get close and fill the frame, thereby reducing the column of water between lens and subject. 1 m is a catch-all situation when combined with a strobe. Remember that the shutter speed selected has no effect on flash distance or flash power whatsoever. The aperture controls the range in which the beam from the strobe will travel. Take a standard off-camera strobe such as the lnon 240 mounted just above the camera housing. At *f*22 the strobe beam travels a limited distance. At *f*16 that distance increases slightly. At *f*11, a little more. *F*11 is best placed to illuminate a subject at about 1 m from the camera.

# **Be There**

Simple! Be in the water. If you are not in the water you won't get the shot. Successful photographers achieve as much bottom time as possible so they have a good chance of 'being there' when that magic moment appears before them.

- When I use wide angle I always try to remember to set *f*11 before I enter the water, just in case of what I might see on my way to the photo site.
- When I start my ascent I again, set *f*11 just in case.
- Have a look at the meta-data on some of your best scenic or wide angle shots taken in the past. I know you will find the combination of f8/11 to be some of the most successful settings.
- Point your camera, horizontally into the blue. Set your ISO to 200, your shutter to 1/125<sup>th</sup> sec and with your aperture at *f*11 take a shot of the water column. Check out the LCD monitor, see how pleasing the blue water background looks in the image.

I still have the occasional few who contact me the day before leaving for a trip to a blue water dive resort asking 'I'm a complete novice, which settings shall I use?' My answer is always 'f11 at 1 metre and be there'. This combination really does work.

# **Accessibility and Subject Fixation**

Accessibility is a concept closely related to 'subject selection' and 'potential' which I will discuss in Chapter 5. I'm of the opinion that the ability to choose subjects that will photograph well, is a key similarity between the thought process of one underwater photographer and another.

# Definition

Accessibility, simply put, is how we, as scuba divers, have a necessity to 'get into' and access a particular spot on the reef to photograph a subject. If accessibility is difficult, take the shot by all means but there will be a limit to how good it 'turns out'. Likewise, if accessibility is easier and you can get into a position without harm to the reef, appreciate that this subject could make an excellent image. Accessibility may often determine how good a subject will photograph or not!

Whilst running a photo-workshop several years ago, I was approached by a couple, frustrated with their results. During the evening I critiqued their laptop and as a result of my findings, I proposed a practical solution for our next day of photo diving. I asked them to choose and shoot a small number of subjects to the very best of their ability. I would accompany them and shoot the same subject in the same place in an effort to 'better' their result. However on the second dive I would choose the subjects, I would shoot first and they would replicate what I had done. The upshot of this was that whilst their chosen subjects were all worthwhile shooting, they were to be found in locations, which were entirely inaccessible. It was almost impossible for my couple (or anybody else for that matter) to get near to them, not because they were shy but because their location on the reef was difficult to get to. Without exception, I was unable to access one single subject, which they had selected and my own shots were no different to theirs.

On the second dive I selected our subjects. I did this by choosing spacious sandy patches, close to the reef where we could lie on the sand and pick off various creatures at eye level or at an upward camera angle. I shot just below an overhang and used the 'two finger technique' to get within close proximity. They followed on and achieved some pleasing results. After a short debrief my couple could see that they had become totally subject fixated! If they found a good subject their mindset was that they could take a good photograph of it, simply because it was colourful or exotic or perhaps quite rare. The reason behind my choice of subjects first and foremost was because they were very accessible to us. Close and comfortable access could be achieved resulting in interesting compositional angles without harm to the reef. These subjects were worth shooting and worth spending time on – not because of their species but because of where they were located. They were easily accessible.

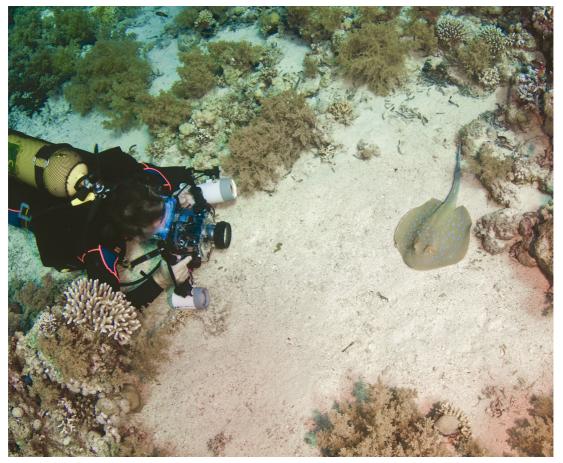
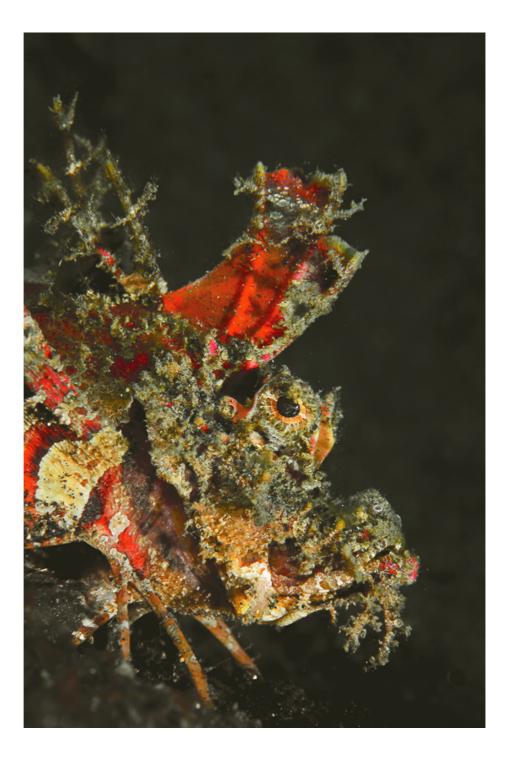


FIG. 4.13 This blue spot stingray is easily accessible. Notice the sandy channel, wide enough for the photographer to move in close to get a tight composition on the ray. A subject such as this, whilst easy to approach, is often obstructed by the contours of the reef. Notice the low, eye level camera angle being adopted. Imagine yourself attempting to move in on the ray. Would you have considered the sandy channel where the diver is, or would you just have swum in regardless. Looking for and finding areas of easy accessibility is something to think about when you are in these situations.



FIG. 4.14 Whilst it's accessible, it doesn't mean that it will always allow you this close. Far from it! They usually spook and flee but if you're slow, methodical and patient you may be rewarded. This opportunity allowed the photographer to move in and capture a tight composition of the eye and blue spots. He used a Nikon D300, *f*16 at 1/125<sup>th</sup> sec, ISO 200.

I'd like you to cast your mind back to an occasion when the dive-guide was pointing out to you a particular creature. At first you may not have been able to see what they were pointing to, you studied the space, your eyes intent on finding the critter – and there it was, thumbs up, the OK signal, 'I see it now'. You wanted to photograph it but it was awkward to get at. Your eye could clearly see it but you couldn't get your body into a position on the reef so that your camera lens could see it. You are a careful and responsible diver and had no intention of harming the reef in any way. The creature was nestled between the branches, you pointed your camera in the general direction, took three or four shots and then moved on. On reviewing your results you were disappointed, you believed that with such good subject matter you should have taken a much better picture, again a case of subject fixation.



Dive guides throughout the world are skilled at locating rare and exotic creatures – a good number are well aware of what we are looking for. I work with dive guides to distinguish between those subjects located in ideal positions rather than those which are inaccesible.

Think about blending this concept of awareness of the accessibility of underwater subjects into your photo repertoire. Ask yourself: Is it possible to obtain a decent photo in its particular location or shall I just shoot it as a record shot?

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FIG. 4.15 The accessibility of critters in and around the shores of Indonesia is excellent for UW photography. In Lembeh the sand is dark and provides ideal conditions for shooting critters both large and small. Accessibility for me was very easy indeed. The critter was isolated on the substrate in no more than 7 m. I settled myself down and approached on a direct line to its facial features, however he had other ideas and turned side on. I took eight frames, all in focus and well lit, unfortunately my goal to capture both eyes eluded me and I had to be satisfied with just the one eye. 105 mm Nikon Macro Lens, *f*16, 1/125<sup>th</sup> sec, ISO 200.



# The Mindset of a Successful Underwater Photographer

W hilst having every intention of enjoying a photo dive, do any of the following scenarios sound familiar to you?

- An escorted dive around a route with little time to stop, concentrate and take photographs.
- Your dive group, constantly changing dive sites, never returning to the same place twice.
- Reef dives, which start in 20 m or more, leaving you little bottom time to find subjects and take pictures.

Would you appreciate the chance to drop below the dive boat with your buddy for a slow and relaxing dive, looking for subjects to practice your new found photo skills on? Whilst many resorts and liveaboards are sympathetic to the needs of photographers, we all have to appreciate that they do have a business to run which caters for the majority and in most locations this represents newcomers and non-photographers, who may not care to stay in one place for a long time or to remain at a particular dive site for the whole day. If you find yourselves in this situation and have difficulty getting your 'mindset' into your underwater photography, then I can offer you the consolation of knowing that it's always difficult to apply your mind. In these circumstances, try not to get too frustrated. If this scenario is your reality, then you may have a few decisions to make.

I would like you to consider and ask yourself the following questions.

- Are you a diver first and foremost who likes to take a camera along on the dive to record what you might see?
- Is your primary objective to improve your underwater photography and take the very best photographs you can?

If the first question rings true and your primary aim is to dive and see many new dive sites then I would encourage you to continue diving with your group, accept the restrictions and enjoy your photography the best way you can. Appreciate though, that you may not have the time or opportunity to give a subject the photographic attention it deserves.

For many readers the second scenario may be nearer to the mark, but try to avoid frustration when:

- your dive guide and rest of the group go just a little too fast along the reef for your liking;
- you get left behind a little way, have a pang of guilt, abandon your subject and swim off to catch up with the group.

If these two strike a chord and you are enthusiastic to improve your pictures, then you need to consider the prospect of changing the way in which you dive to a method more suitable for underwater photography.

#### Fundamentally, it's a change of mindset.

All over the world, numerous diving trips cater exclusively for the needs of enthusiastic underwater photographers of all standards. The manner in which the diving is conducted, be it shore-based or a liveaboard, provides the conditions, stimulus and environment for UW photographers to do their thing. Only by creating the right environment, will you fulfil your potential and consistently perform at your best. The solution could be nothing more than:

- hiring a boat with like minded photographers to visit a particular photogenic dive site, or
- · joining a photo group who regularly dive together, or
- signing up for a dedicated UW photographic workshop.

#### My Tip

Every aspect of consistent photography requires a clear and calm unhurried state of mind to develop skills so that real improvement can begin.

# Think and Consider (TC) System

In the early 1980s when I was a complete beginner I was prone to silly mistakes and all the photo frustrations one could imagine. I recognised that I needed to change my photo mindset when diving but I had little idea of what methods to adopt or which direction to take. I was obsessed with underwater photography and passionately hungry for knowledge on how the top underwater photographers obtained the stunning shots they did. Quite by chance I identified that it was the person and not camera equipment that made the picture. I set myself the task to ascertain as much as possible about the mindset and methods of those whose work I most admired. Fortunately for me, a few BSOUP members (British Society of Underwater Photography) were, at that time, the worlds' best talent.

I questioned, pestered and badgered them into explaining to me how they got the shots which I so admired. Over a period of time I found a commonality in method and mindset of those who I had questioned. The terms they used to describe these methods differed, but each philosophy had remarkable similarities with others.

# My Way of Doing things

I call 'my way of doing things' the TC system, which simply stands for Think and Consider. It's nothing more than a check-list to be considered when taking a photograph underwater. It's the means of explaining to those I teach, the way in which I approach my own photography and the thought process that I and other successful underwater photographers use.

# The TC system is at the forefront of my whole approach and is fundamental to my teaching, coaching and mentoring philosophy.

My thirst for this knowledge has never subsided and I'm still eager to learn more. To this day, I listen to everyone and continue to discard those things I do not feel to be pertinent. I know that the TC system works. In the last 35 years, I have witnessed thousands of enthusiastic underwater photographers employ these techniques for themselves. Within a short period of time they have developed from complete beginners to competent, skilful and imaginative photographers. Some have become world class.

So, how do we use the TC System?

- Study each feature of the system until you are conversant with it.
- Relate it to your own photography and previous experiences underwater.
- It may assist you to affix these features to the back of your camera housing.



The analogy I use to compare the TC system is that of driving a car. Throughout the journey we make numerous and often instant decisions – when to pull out, to overtake, to brake and to accelerate. We consider many scenarios, and in an instant come to a decision.

The TC system is no different. I encourage you to consider the features, remember the features and use your experience, intuition and perception of an underwater photographic opportunity to progress your photography to the next level and then the next level after that.

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FIG. 5.1 Readers of my other books will recognize this photograph. I have used it in the last four editions and I make no apology for using it once again in this Fifth edition. Of all the underwater photographs I have taken, this particular shot has the most significance. I could describe it as the ultimate light bulb moment! That instant when an idea or realisation strikes you and what may have seemed like a problem suddenly begins to make sense. You could say that photographically, the 'lights came on' for me. At that time I was a very happy snappy scuba diver, but I knew I wanted more out of my photography. During an Easter weekend dive trip to Cornwall, UK, I came across a jellyfish, which had been stranded in a large 2 m deep rock pool. I instinctively knew that the circumstances would provide an opportunity to take a very good picture. I surprised my fellow divers and 'excused myself' from the afternoon boat dive on a well-known wreck. They thought I was crazy to miss a dive in favour of snorkelling in a rock pool. That weekend, jellyfish were in abundance. So, why not shoot one in the sea after the dive? My gut feeling indicated that the rock pool was the right decision. The word that continually came to mind was 'potential'. This opportunity had great potential. My buddy Bob Wrobel and I spent an hour or so in the rock pool with people looking on, perhaps wondering what on earth we were doing. In my head this opportunity was telling me over and over again that I was correct in choosing the rock pool instead of diving in the sea off an inflatable. As a result, I came out with this natural light shot taken on a Nikonos III with a 15 mm lens. It was soon after this picture that I first labelled the features of the TC system. It all fell into place and I never looked back. Shallow water environments have always been a strong feature of my underwater photography since that time.

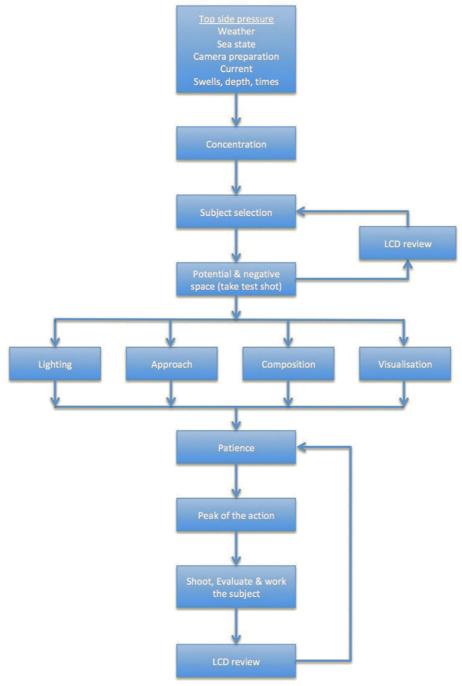


FIG. 5.2 Features of the TC System.

# **Camera Preparation**

Frustration is an emotion which can arise at any point of the photo process. Frustration towards an in-flexible dive group, frustration with water conditions, frustration with your results but most of all, I personally find the feeling of frustration towards my photo gear to be one of the main culprits.

How many times have you been in the water and discovered?

- You've left the lens cap on.
- Your strobe batteries are flat after five minutes.
- The camera will not turn on due to misalignment of the on/off switch.
- The autofocus will not work due to a misalignment of gears.
- The wrong port is fitted for the wrong lens.

The list is endless, and you're not the only one who suffers from these problems. Underwater photo professionals make the same mistakes. I am not particularly proud of this achievement, but I once neglected to put my camera into my housing!

You must and I emphasis the word *must* establish a routine of preparing your camera, strobe, housing, etc. for a photo dive. If you neglect to establish a 'prepping' routine then sooner or later problems will arise in one form or another. Technical divers have a rule that no one should be distracted by another person whilst they are preparing their equipment. If you can establish a similar system when preparing cameras for diving, the chances of flooding would be significantly minimised. In my experience, in 2020, 99 per cent of floods are caused by human error. More often than not it's down to rushing to get ready and making simple mistakes. The design of modern camera housings reduces the chance of experiencing a flood. However, mistakes are often made in the preparation stage which result in a strobe not firing, a lens not focusing and the camera 'packing up' in the first few metres.

#### **My Tips**

It's good practice to develop a routine. **Ensure that distractions** during preparation are minimised. If you feel that you are rushing things, then slow down and retrace your steps. Having experienced all of these errors for myself, I know that distractions lead to floods, not because of faulty equipment but from a lack of preparation and routine.

What is a great step forward in recent vears is the vacuum check and leak detector system, which was introduced by Nauticam in 2015. This system uses a one-way valve and an electronic monitoring system to confirm the housing is water tight. I use mine all the time for the peace of mind it provides when I enter the water.

# **Establish a Routine**

My own 'prep' routine may interest you: I challenge myself to get through a 1 or 2 week workshop without making a mistake, which may effectively ruin a single photo dive.

It's an error if:

- Either of my strobes fail during a dive.
- My camera battery fails on me.
- I accidentally misalign my 'limit' switch on my 60 mm or 105 mm macro lens.
- My zoom gears are misaligned.
- Focus light fails on a night dive.
- My fibre optic strobe won't fire.

The list is long: my latest blunder was putting a wide angle lens inside a macro port.



FIG. 5.3 Nauticam vacuum pump.

# **Developing our Powers of Concentration**

Along with rock climbing, hand-gliding and skiing, scuba diving is one of the most hazardous sports there is. In order to capture great UW photographs, it's essential for us to harness our own individual powers of concentration. When you think about it – photography and scuba diving are two totally unrelated activities.

Research has been conducted into hazardous sports and concentration levels. Specifically, a number of expert skiers and their ability to concentrate in adverse conditions makes for interesting reading.

Simple mathematical questions were piped through headphones to test their concentration levels whilst negotiating severely difficult 'black' runs. Their objective was to provide the correct answer in real time. Results showed that their ability to effectively concentrate on other (simple) stimuli was hampered.

Relate this example to our circumstances. Scuba diving is a hazardous sport. Photography is a technical subject. Somehow, we need to blend the two together. It's easy to understand why this is so challenging for us.

Early during my journey into underwater photography, I recognised that if I was to improve, I had to master my powers of concentration once I was in the water, but my education and learning had to begin topside.

# **Topside Pressures**

Before we enter the water, we may be carrying around a whole bag of pressures and distractions. I have never completely developed my 'sea legs', and if it's rough I can become nervous at the thought of being seasick. There are numerous reasons why we feel apprehensive at times, and this regularly accounts for why cameras are deliberately left behind on board the dive boat.

Have you ever had that instinctive feeling just before you enter the water that maybe you should leave your camera behind? We are all prone to being apprehensive at times. In these situations, photography will invariably come low in our order of physiological needs and priorities. By instinct, very few of us could abandon these priorities for the sake of a few pictures. We can only begin to concentrate if we identify our own distractions and take steps to minimize them.

## Concentration when you are Underwater

How efficiently are you able to concentrate on your photography whilst underwater?

Do you have a photographic task in mind and as soon as you are breathing from compressed air a couple of metres below the surface, your brain turns to mush and your mind goes blank?

Do you enter the water with a certain shot to take and once there, forget how to set your camera up to achieve it?

Something stops working on your camera. You know for certain that you can fix it, but for some odd reason you seem unable to apply your mind and concentration to the job.



FIG. 5.4 'Where's my buddy?' 'Is my flash firing?' 'Where is the dive guide?'

I work with many underwater photographers who recognize they have a problem with their ability to concentrate underwater. My first question is this:

'What is distracting you?'

Often it's hard to put a finger on it, so I give them a slate and ask them to write down (*whilst underwater*) the reasons they find themselves unable to think clearly.

The most common (in no particular order) are:

- Paranoia about cameras and strobes flooding.
- Problems in keeping up with the rest of your dive group.
- A dive mask continually fogging-up.
- Feeling the cold.
- Swimming off in the wrong direction.
- Fear of becoming separated from their buddy.

Some of my own distractions and solutions may interest you. The clarity of my dive mask glass is paramount. A fogged mask is the ultimate annoyance. I produce little quality work when diving in a strong current. I just go out to enjoy the dive in these circumstances. Cold, rough seas and sea swell distract me. I wear socks beneath my bootees, which prevent chaffing.

I produce my best work in shallow water, whilst diving with a buddy who shares my attitudes. We are able to dive together, but in such a way that allows us to place less emphasis on each other's immediate well-being and more on our photographic aims.

#### **My Tips**

Whilst I believe that our powers of concentration are fundamental to consistent underwater photography, I also appreciate that in a variety of situations underwater, photography will come low in the order of our physiological needs and priorities. No one should abandon these priorities for the sake of taking good underwater photographs.

# Subject Selection, Potential and Negative Space

Two of my favourite underwater photos of all time depict a branch of kelp (seaweed) lit by flash with a black background and the second shot, a wave, breaking over a coral reef in shallow water. They were taken by two individual underwater photographers from the USA in the mid 1980s.

What is so significant about these two pictures is the subject matter. Kelp and a breaking wave! It's difficult to think of anything in the sea more commonplace than a wave and a piece of seaweed, yet these two images, to my eyes, were and still are perfection. Many years ago these two pictures got me thinking. In that, if a piece of kelp and a breaking wave could be made to look so good, anything in the sea must be a credible subject.

Think about this. Kelp must be one of the most universal and familiar subjects found underwater. So how on earth can we begin to choose what to photograph and what to ignore? This is the concept behind subject selection.

A number of subjects are quite obviously great to photograph – dolphins, manta rays, and pygmy seahorses for example. But in certain locations, the less obvious type of subject may be in such profusion that we tend to ignore them as quite mundane and 'hardly worth the effort'. In my opinion, the potential of the subjects we choose to stop and photograph is the main factor that separates the best photographers from the rest. The best are skilled at spotting an opportunity, which the majority of us swim over without a thought; their inner-eye spots a photo opportunity and instinct takes over. For some it is an intuitive talent, but I know that it is a skill that can be developed with practice. The reason I know this is because I have done it!

## Training the Eye to Recognize Great Subjects

How can we train our underwater eye to recognize the potential in a commonplace subject? Let's start by looking at some scenarios which may *not* make a good subject.

- As already discussed, subjects which live on, in or close to the reef may be difficult to shoot by virtue of their inaccessibility. We can take a snapshot through branches of coral, but in general they have little potential by virtue of their location.
- Remember, it's not the subject at fault it's where or how the subject is located. It's not about what it is, it's all about where it is.
- Reefs that are horizontal and flat, however pristine or attractive they look, may have little potential for the same reason. It may be difficult, if not impossible to point the camera at any angle other than down, which is not the best way to compose subjects.
- Lying across corals to steady ourselves or disregarding the reef is totally unacceptable – don't do it.

## So how do photographers obtain those great shots in books and magazines, which we all aspire to?

This is precisely what subject selection is all about.

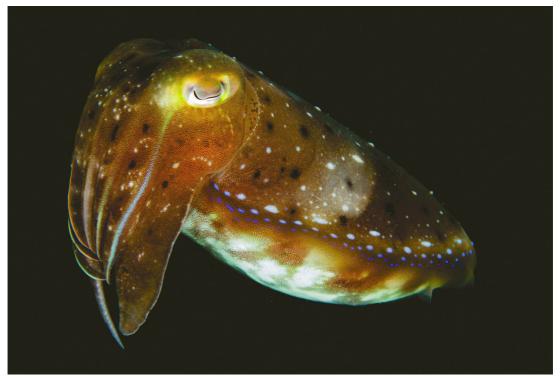
## **Start Looking**

- Look for an overhang or reef wall where it starts to drop away. You have a good chance of placing your pointer on a non-living part of the reef, holding steady and approaching a subject upwards or at eye level. From this angle, you have a great opportunity to eliminate a cluttered background.
- Shoot a bottom dweller whilst it is resting on plain sand instead of rocks and boulders. It's easier for you and will make a better picture.
- A great tip from the late great Jim Church is to shoot the strongest features of a dive site. A dive site may have a particular feature that is prominent to that particular location.

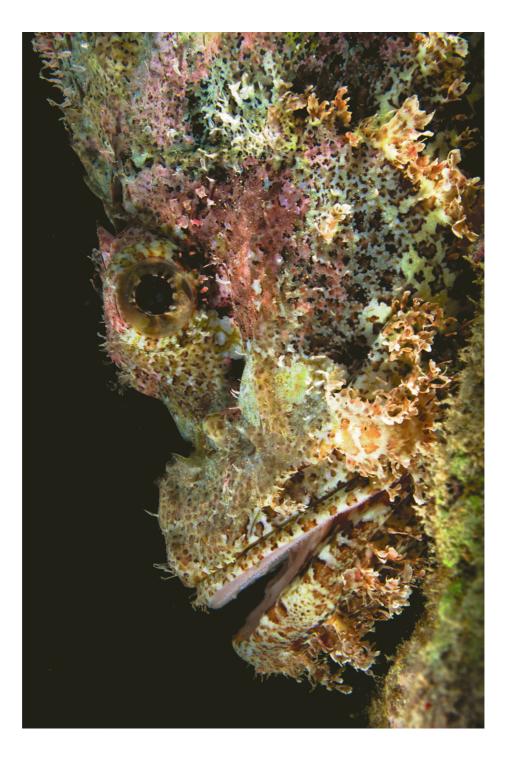


**FIG. 5.5** Colourful corals, fish life and blue water backgrounds are ideal. So remember that your opportunities don't need to be anything particularly exceptional. They don't have to be remarkable, unusual or rare, they just have to photograph well. Shoot subjects which you think will photograph well. Nikon D7200 with Nikon 10.5 mm fisheye lens, f8 at 1/200<sup>th</sup> ISO 400.

Ascertain the strongest features from other photographers and locals before you even enter the water. Because the feature is common to that dive site, you will have a far greater chance of finding an opportunity that is situated in the ideal place to make an excellent photograph.



**FIG. 5.6** In Indonesia I had two friendly cuttle fish who were very approachable. I was able to use a shutter speed of 1/250<sup>th</sup> sec with *f*11 at ISO 400. The cuttle was approachable and an ideal opportunity to make a strong image by virtue of the dark reef wall in the background. The second cuttle was out to play and whilst approachable was in a distracting area of negative space. Your background is everything, be it macro or wide angle. I chose the cuttle which was in the best place to make the best image.





**FIG. 5.8** Fan corals abound and they make great opportunities for all underwater photographers. You never know when or where the anchovies will appear, but when they do you can bet that they will bring the big fry with them. You have to find the correct side to shoot from and if you are facing either into the rising or setting sun make sure you take every advantage. This image is early morning and the action is present just behind the corals themselves. They didn't last for long, five minutes at the most and they were gone for good.

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FIG. 5.7 I rarely go looking for subjects to photograph, instead I go looking for great negative space and within that space I look for potential subjects. I'm very much a photographer who decides that 'it's not what the creature is, but all about where it is'. The stone fish above is quite ordinary but he was very easy and accessible to get close to, and at an angle which gave a great background, hence a striking image of an everyday subject.

## LCD Screen to Check the Condition

By using your LCD review screen you can make a critical review of the condition of your chosen subject. If it's a poor specimen, you may choose to select another close by.

## Negative Space. Everything in the Photograph Which is Not the Subject

In my own work, successful underwater photography is more about the negative space than about the subject itself. It determines whether or not I shoot the subject. A fish may be interesting and colourful, however, if it's against a poor background it will surely fail.

## **Negative Space in Land Photography**

A sports photographer at the Olympics will focus on a specific area of the running track, awaiting and anticipating a subject – an athlete – moving into that area so he can press the shutter. Skilful underwater photographers do the same – choose an area of outstanding negative space and wait for something to swim into it before they press the shutter.

If the background is poor and the subject is quite ordinary, I may not bother to take the shot at all. If it's a subject I have not seen before I will shoot it, but only enough frames to get a 'recording shot'. If the negative space is particularly good, then I will take more shots.

Dive guides are specialists at finding critters. However, more often than not what they find is laying or situated around cluttered or distracting negative space. That's not the guide's fault, they are there to find the subject and whilst it may be attractive, if the background is distracting, even the most experienced UW photographer would be hard pressed to improve it.

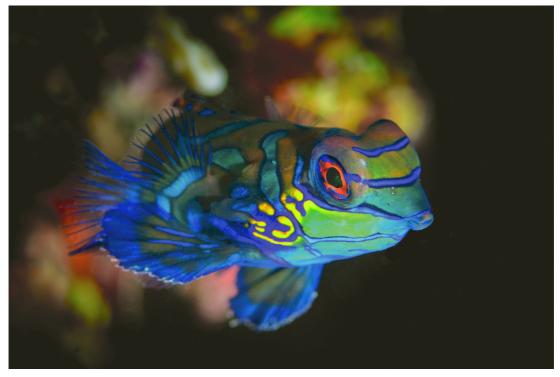
- Newcomers to underwater photography look for specific subjects.
- Experienced photographers look for good negative space and then make efforts to find simple subjects within their chosen negative space.
- My own favourite negative space is the water column which can be recorded in various shades between blue and black (in tropical climes).



FIG. 5.9 Some subjects offer even more interest. For example, this mantis shrimp is not only a great subject in its own rights but this one is carrying eggs. This makes it stand out from any other mantis shrimp. I took this shot because of this and the eyes had the potential to look directly at me with a clean black background. Patience was key as not only did the shrimp move constantly but its eyes moved independently too! This shot has all the elements coming together; the colours, the eyes, the framing of the hole and the eggs. Image by Stuart Gibson, D7200, ISO 200, 105 mm Nikon, f18, 1/125<sup>th</sup>.



**FIG. 5.10** Fish that swim at a distance from any background can also create good negative space. Here the fire goby darted around above the sand and rubble bottom allowing the shallow depth of field to blur the background, thus 'popping' the subject. Looking for these opportunities and choosing an appropriate shooting angle can give good results even though the background would not be suitable if the subject were closer to it. I worked this goby for at least 5 minutes. Image by Stuart Gibson, D7200, ISO 100, 105 mm Nikon, *f5.6*, 1/320<sup>th</sup>.



**FIG. 5.11** A combination of both ideas. Part of the background which is nicely out of focus together with the black negative space combine to create an image that gives a hint to the fish's habitat without distracting from the subject. These Mandarin fish move so quickly and erratically that setting the background first is often the only way to capture them. Trying to 'follow' them with the camera is extremely difficult. It takes much patience and tolerance. Image by Stuart Gibson, D7200, ISO 200, 105 mm Nikon, *f*9, 1/250<sup>th</sup>.

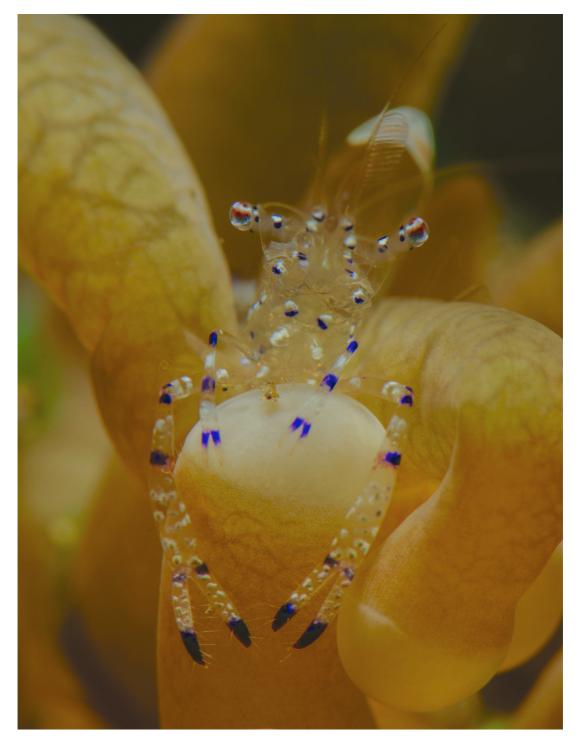


FIG. 5.12 In this shot the anemone provided a suitable contrast together with the darker back water to create a striking image. Animals often prefer environments that they can hide in, using camouflage of some sort. Look for contrasting colours like this which will allow the subject's environment to be included, which adds additional context to the image. I worked this opportunity for some time. Image by Stuart Gibson, D7200, ISO 400, 105 mm Nikon, *f*11, 1/320<sup>th</sup>

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FIG. 5.13 Here the shrimp's habitat is the majority of the background, again, chosen as it helps to isolate the creature, highlighting its features and colours against the tentacles. These creatures spend their time hopping around their home and it's almost impossible to avoid getting their habitat in the shot, so making it a feature is the best approach. In this shot the shrimp took up a perfect position. I spent at least 10 minutes working this subject, trying different angles and wet lenses.

Image by Stuart Gibson, D7200, ISO 200, 105 mm Nikon, f25, 1/250th, +5 subsea close-up lens.





**FIG. 5.14** Perseverance is key. If the shot has potential, then waiting for all the elements to come together may take a while. Be patient and try different angles and you should be rewarded. Here the anemone was moving erratically in the swell of the water and the clownfish were equally random in their movement.



**FIG. 5.15** Being patient and giving the opportunity some time to develop is worth every second. Eventually the elements fell into place and the two fish were in front of the tentacles which were also less erratic offering this far more pleasing image. Image by Stuart Gibson, D7200, ISO 200, 10–17 mm Tokina, *f*13, 1/320th.

## **Determine the Potential of the Subject**

You have found a subject with good negative space situated in an ideal position for you to photograph. How many shots are you going to take? How long are you going to stick with this opportunity? Could this be a really good shot?

FIGS. 5.16 and 5.17 On the left the shot was all but complete. Overall composition, lighting and focus were in place. Unlike the previous scenario the clownfish were swimming in a repetitive cycle around the anemone. Having observed this, I set all the other elements up and waited for the right moment to maximize the chances of a pleasing, dynamic shot.

All I had to do was wait for the clown fish to cycle round and into the correct position to get the final touch. I knew this was a great subject but had to work it for quite a while. From the time I first noticed this opportunity to finishing this particular shot took about 10 minutes and 20 shots. Images by Stuart Gibson, D7200, ISO 200, 105 mm Nikon, f13, 1/320<sup>th</sup>.



Consideration of the potential is necessary, so ask yourself:

- how good the potential could be?
- how long should you stay in that spot and shoot?
- how many shots might it take to get one that really works?
- is the potential just OK or excellent?

There are no hard and fast rules. Only the photographer can make these decisions.







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FIG. 5.18 The local village jetty was festooned with lion fish for some reason or another. They were particularly friendly to UW photographers and helped in creating some interest in and around the jetty. I took plenty of shots below the jetty, perhaps too many to be honest. On day three we visited the same site (no more than 3 m deep) and I noticed the gaps beneath where the sun and clouds were visible, which in turn provided plenty of image depth. Notice how the lion fish is mirroring the shape of the hole in the pier. Composition should always be in your mind whilst shooting underwater.

FIG. 5.19 Somewhere in the wilds of Indonesia, we came across this small cave festooned with corals. My dive guide was happy to pose for me so gratefully I set him to work. Uppermost in my composition was to keep the fans (which you see to your left side) within the shadow of the left side of the cave entrance. What this did was to create depth throughout the image, in particular for the eye of the viewer on the left side of the image to see through into the cave entrance using his dive light as an important feature.

#### **My Tips**

- Shoot the strongest feature of the dive site.
- Consider the accessibility of the subject. If it's awkward, then move on.
- Look for subjects against good negative space.
- Check the condition of subjects in the LCD.
- Ask yourself what the potential is of your chosen subject.
- Take a snapshot and look for potential in the LCD review. If it's not as good as you once thought then move on to something else. Don't waste time on something which won't work.

## **Evaluation of Potential**

Before the digital age of underwater photography, the uncertainty of whether we had considered best potential was forever in our mind. For 20 years now, we have been able to review, check and make instant decisions underwater before we even return to the boat. By careful evaluation of the LCD we should be able to decide that we have enough shots and move on, or if we need to revisit and reshoot certain opportunities.

Consider your favourite underwater photographer in the world at this time: How do you think your underwater photography would improve if they could choose subjects for you to photograph? So when you're next underwater take a moment to think and consider what they might choose to shoot if they were in your fins!





**FIG. 5.21** This cave shot was difficult to photograph because of the substrate. There were fan corals all around and the group had to use their buoyancy skills to hover above. Long before the background diver was required we all chose our favourite angle of view. After that it was just a matter of balance around the entrance to the cave giving equal weight to the blue in the distance. I managed to compose Sylvia without including other divers beside me, but if I was to shoot this cave with a diver again I would have preferred her a tad left of centre. Nikon 7000, ISO 400, aperture *f*11 at 1/60<sup>th</sup> sec. Tokina 10–17 mm on the 10 end. Two Inon 220 strobes on ¾ power.

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FIG. 5.20 On my workshops in the Red Sea I have used this location many times in order to train my students to practice directing their buddies. The idea, with the use of hand signals, is to position the diver precisely within the crack of the cave in the far background. As well as it being a strong image in itself, it's great practice.

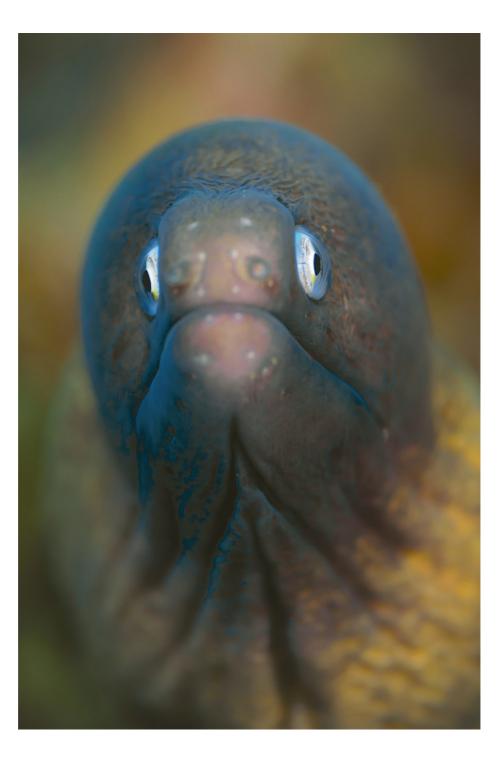




FIG. 5.23 This iconic location is Boo Windows near to Misool Eco Resort Raja Ampat. It's a place I take my students to. The learning is to avoid placing the red soft coral over the window which provides the depth. In this way the distant diver with torch looks 'far off' which is what I envisaged.

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FIG. 5.22 Moray eels photograph particularly well in numerous circumstances and I take the view that they are often 'passed over' in search of more exotic subjects. Most often they are very accessible. My approach is to concentrate on the eye contact in an effort to achieve a sense of symmetry. This image is an out and out macro shot. Nikon 7000, ISO 200, aperture f16 at 1/320<sup>th</sup> sec. Nikon 60 mm macro. Two Inon 220 strobes on ¾ power.

### Approach

Together with my course participants, I work hard to improve their understanding and ability to get close to subjects. I know how frustrating it is when, without the help of the dive guide, you spot a rare and exotic subject just posing for you, waiting to have its photo taken, then for some unknown reason it's gone. It could be a shrimp, a hawk fish or a small blenny on some whip coral. In fact, anything that could potentially disappear is relevant to the technique of 'approach'.

You get closer, and closer, aim the camera, and 'pop' you have the shot, or do you?

The concept of 'approach' as part of the TC System is at its most crucial between your eye spotting the subject and your brain making the decision to move closer and your finger pressing the shutter.

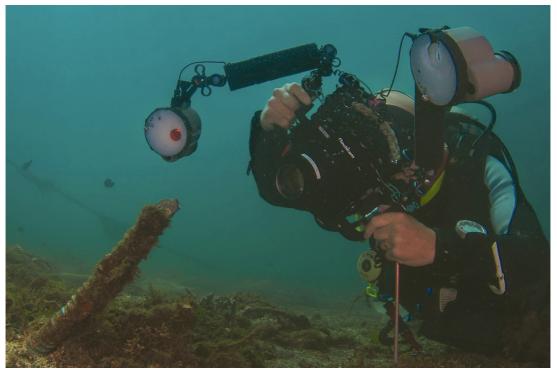


FIG. 5.24 Notwithstanding the fact that I intend to shoot a small fish. I am approaching this opportunity as though it was gold dust. Having checked for obvious marine life, I'm more than happy to lie on the substrate to approach and photograph. I have intentionally adjusted my strobes before I have moved in for the simple reason that I wanted as little movement as possible. Image taken by Sascha Janson.

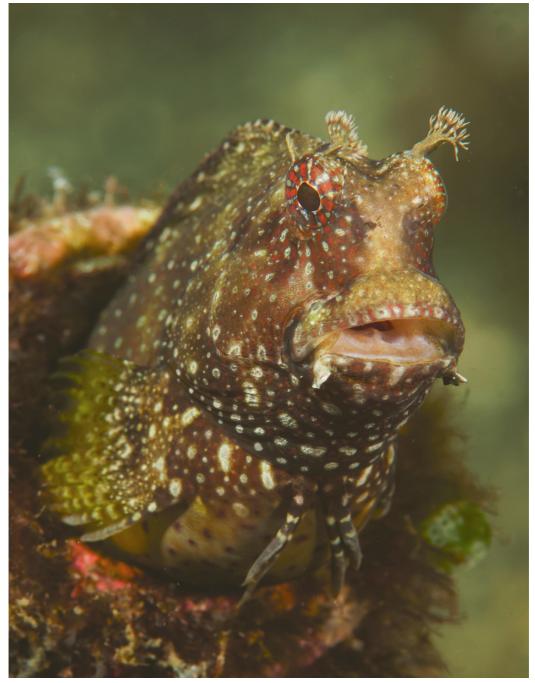


FIG. 5.25 The resulting image shot at ISO 200, *f*16 at 1/60<sup>th</sup> sec.

It's within this period of time that the decisions are made, and this is crucial to achieving success. In fact, what often happens is that the photographer spots the subject and, in the enthusiasm of the encounter, sometimes moves straight towards the subject, landing in a cloud of sand. Approaches at the wrong angle then realizes it is impossible to achieve a well composed image, or get to the subject before it's spooked, *now* finds a need to alter the camera controls because they weren't set up for the shot before approaching. More adjustments, more movements and more chance of backscatter, do you ever wonder why subjects swim away?

I recommend the following. Make all the adjustments you need but *not* too close to the subject. When we observe a creature and decide to take a photo, before approaching it, remember to *think approach*:

Make these decisions before you start your approach. If you make your adjustments in close proximity to shy and timid creatures, you will spook them. So what you must try and do is to approach slowly, carefully and methodically. Your adjustments will be minimal, and you will have a greater chance of getting close. It is the movements and handling of the camera that cause the majority of approach problems.

## A Word About your Strobe Positions

Be aware that if you choose to position your strobe in front of your housing and beyond your port, towards the creature, then you run the risk of it being spooked. Not by your presence or your housing, but by the intrusion of your strobe into its comfort zone.

The fish swims away, you become frustrated and you blame your powers of stealth, when all the time it was simply the close proximity of your strobe to the subject. Don't just swim straight in regardless, give it some thought beforehand. Remember. think and consider.

If you are approaching a shy bottom-dwelling subject:

- Set your strobe, exposure and camera orientation.
- Simulate the opportunity by shooting a test shot along the sand to determine whether your strobes are placed correctly.
- Do this at a distance away from the subject. It will only take a moment.
- When you then move in on the real thing, you can be confident that your lighting techniques are sound.

Very important! When you take a shot, there is an overwhelming desire to view the LCD after every frame. Try not to, it can become a habit.

#### **My Tips**

- Set-up your lighting and your composition.
- If the action is occurring, keep your eye on the viewfinder.
- Trust your trigger finger and resist the temptation to review the LCD after
- every single shot.

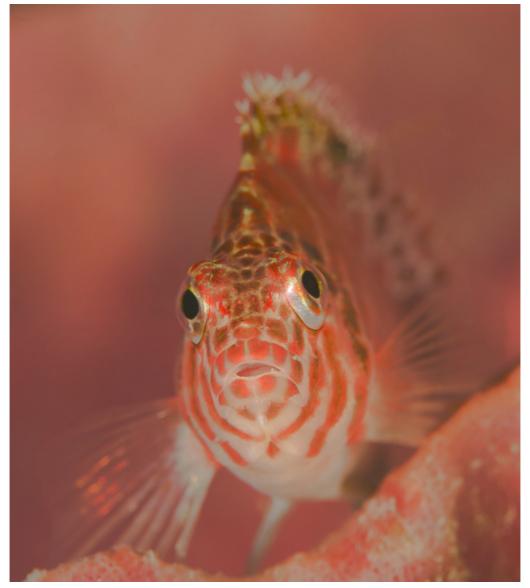


FIG. 5.26 Hawkfish are plentiful in the Red Sea and make colourful images but they are very skittish and frustrate the most patient photographer. My tip is to consider your approach. Position your strobe before you move in and keep your eye on the subject. Resist the temptation to review your LCD as any sudden movement will spook them. For every twenty, which I approach, I may get this close once or twice. I doubt that I would have been able to compose this tightly using a 60 mm macro lens. The soft pastel background sponge was very lucky and makes this shot a winner. I have used an aperture of f5.6 to soften the bokeh effect within the sponge. I took at least 20 frames, looking for the two eye contact which really makes this image sing! Nikon 7200, 105 mm Nikon. Aperture f5.6. Shutter speed 1/250<sup>th</sup> sec, ISO 400.

#### **My Tips**

- Set up your strobes and if the action is occurring keep your eye on the viewfinder.
- Consider the angle of approach. From which direction does the subject look best? Consider the very best angle of view.
- Trust your trigger finger and resist the temptation to review the LCD after every single shot. You don't need to.
- Look at your surroundings. If you cannot approach without threatening the fragility of the reef don't take the shot. Back off and find another creature in another location where you feel comfortable.
- Backscatter and buoyancy control are fundamentally linked. They can ruin many opportunities.

You know exactly how the shot will look, but curiosity gets the better of you and you take a peek. I often see the camera being lifted from the eye and moved forward 20 cm or so to take a comfortable look at the LCD. The action of moving the housing in this manner and the direction of movement is thrusting your rig directly in the face of the subject. I see so many subjects spooked by this action. I still forget and do it, even though I know I am pushing my housing towards the creature, which I'm trying so hard not to disturb!

If, like me, you are prone to this then affix a sticker to the back of your housing with a prompt you will remember. Also, notice your buddy will do the same thing. The LCD review is like a magnet to our eye. I know I encourage constant review but spooky subjects are not the time and the place.

You will find that when the action is fast, every other seven to ten shots for review may suffice and satisfy your curiosity. I fully appreciate this is a very subjective observation, and whilst I do not intend to be prescriptive, it may just give you the edge the next time you are shooting a skittish subject.

## Lighting for the TC System

Lighting underwater photographs is a huge topic. As in the Fourth edition, I have devoted an extensive section to discuss the techniques of:

- Natural/ambient light from the sun.
- Artificial light from our strobes.
- A combination of each when we choose to blend them both together, a technique which is often referred to as 'balanced light fill-in flash'.

But how do we decide how much light to use and in what circumstances?

- Do certain subjects work better with a certain quality of light?
- How can we determine this?
- Where do we place our strobes?
- How many strobes should we use, one or two?

One thing is certain – there is no right or wrong way of using light underwater. But by taking notice of the light conditions for any particular photo dive and asking yourself questions on which types of light you may prefer, you can begin to enable options for your own style and taste instead of being a slave to both your camera and strobe.

#### It's time to take control. Turn to Chapter 6 to learn how.



**FIG. 5.27** Light comes from two sources; Natural light from the sun and artificial light from our strobes. In this image both are used to maximum effect. The sun creates pleasing beams from behind the diver and the strobe light on the feather star has lit it extremely well. In Chapter 6 we will discuss the many techniques used to balance both of these light sources to create strong images.

## **Composition for the TC System**

Deciding what goes where in a photograph is called composition and good composition is key to taking great pictures. Essentially it's an editing process. We alone decide what to leave in and what to leave out of the frame. Those elements we leave in, we have to decide where about to place them within the frame. There are no hard and fast rules, a good composition is one that is simply 'pleasing to the eye'.

Land based photographers have a much easier time with composition than underwater shooters. On land we experiment with composition and try all the tips, techniques and guiding principles we've learnt. Underwater, however, there is a major difference.

The problem underwater is developing the concentration necessary to apply these guidelines. Remembering that scuba diving is classed as a hazardous sport, the ability to concentrate on the viewfinder, what to leave in, what to leave out can often be challenging. I have dived with many competent photographers who have a sound working knowledge of compositional technique but once submerged and diving on scuba, simple compositional guidelines disappear into thin air.

Composition for the TC system is not about compositional technique. That comes later in Chapter 7. How the TC system works is concerned with how to apply compositional guidelines underwater.

- Initially we have to remember what those simple compositional guidelines are.
- Next, we have to determine how can we educate ourselves to apply them underwater.
- Discussing them over a beer with your photo friends is fine but thinking and applying this underwater is the main issue.

When coaching, my intention first and foremost is to enable students to think of as many compositional guidelines as possible. I'm not concerned how well they apply those guidelines, as long as they are remembered. When the mindset is working towards this aim, then we can begin to look at the decision making process of what goes where, what to leave out of the frame and how to balance the elements. When my concentration is heightened and I am in 'the zone', I am able to imagine that the image is being projected onto a screen in a darkened room. I ask myself, do I like what I have taken? And, more importantly, how can I improve on it?

This type of mindful consideration of composition underwater will improve the chance of getting what you want in camera without extra work in Photoshop.

Composition is discussed extensively in Chapter 7.



**FIG. 5.28** Who says that the rules of composition are flawed in 2020? The fishes eye works well surrounded by the sweepers. Notice bottom left and the balance with top right, not to mention the classic rule of thirds. Yes! The compositional elements are as important today as they ever were.



**FIG. 5.29** However, the Think and Consider system is just that. Think and consider how breaking the very rules of composition can create a striking image, as seen above. We will discuss in far more detail the complexities and opportunities that both traditional and rule-breaking composition has to offer. But for now, let's start with the basics.

Image by Stuart Gibson. 60 mm Nikon Macro lens, f18, 1/320<sup>th</sup> ISO 200.

## Visualisation

Visualisation is the ability that allows everyone to form a picture in the mind. We all use this skill on numerous occasions each and every day. We constantly project our mind into the future. We plan our day and visualise a meeting, lunch with a friend, how we intend to spend the evening, etc. We do this subconsciously, and if we stop to think about our plans for tomorrow, we've probably visualised parts of the day already.

Including visualisation as a feature of the TC system, I'd like you to:

- consider the elements that make up the picture opportunity;
- visualise the picture you would like to obtain;
- · learn to see the colour that will be recorded, and
- attempt to transfer that vision into your camera

On land we can see colour, but underwater it's filtered out at shallow depths. Therefore, it is very important to develop the ability of learning to see in pictures, learning to see in colour, and to take into account the background as well as the subject matter.

### Why Bother? You May Ask

Colour of the water, the angle of the lens, composition, lighting angles, can all be confirmed and vindicated in the time it takes your eye to observe and evaluate the LCD. I take the view that the ability to visualise is still important. My reasons are that both above and below water, there are many who neglect to take proper care with framing, composition, lighting, etc.

The beauty of instant review and unlimited frames continues the tendency to make some users a little sloppy. We all do it at some time. Does the following sound familiar?

- I'll crop the composition in the computer.
- I can adjust the lighting later.
- I will boost the colour using a saturation tool.
- No need to worry about backscatter, I will clone it out in Photoshop.

#### My Tip

I know you've heard this countless times before, but it's good to get the best possible result in camera and resist the attitude just to snap away and do all the corrections on computer at a later date.



**FIG. 5.30** Under a pier at twilight, the sun was setting very quickly. Before I knew it, it was almost dark. I was shooting my Nikon D700 with my 10–17 mm at the 10 mm end. *F*-stop was *f*11 at 1/20<sup>th</sup> sec, ISO 800. I visualised some fun with very slow shutter speeds and got lucky on this occasion. Motion blur techniques had recently come into vogue and I was keen to experiment with it. Blur is now a very popular genre with underwater photographers the world over. This is a useful technique to practice when other subjects are limited.

## Patience

The three Ps:

- Patience in preparing your camera and housing.
- Patience in your approach.
- Patience in waiting for peak of the action.



FIG. 5.31 You are diving a muck site in Lembeh Indonesia. Blue snake eels are very popular. You approach one but he disappears into his hole. How long are you going to wait for him to re-appear? It's your call. One minute, two minutes? Five minutes? Ten minutes? No one can guide you, you have to be patient in these circumstances. Ask yourself where you will go to find another snake eel. Have you got good images of snake eels in the past? In circumstances such as this you have to think, consider and ask yourself questions. You are diving an excellent macro photo site. Colourful whip corals are growing from the seabed. You find a number of blennies moving up and down the branches. You frame one in your viewfinder, but it moves out of shot. There's another and another! But after a couple of seconds they move again. You need to be patient in these circumstances, but how long for? How long do you persist?

A colourful mantis shrimp disappears into its burrow. You have a couple of shots in the bag and they look OK in the LCD, but you feel the composition could be improved. How long should you wait?

In these scenarios, you have a conscious decision to make regarding the amount of time you are prepared to spend in your efforts to take the photograph. Ask yourself, whilst you are underwater, at the time: 'Does the potential of this shot justify the patience and time required to stick around?' Only you can make this decision but remember, you have to consider this at the time, underwater. It's no use when you're back on the boat, heading off to another dive site.

Patience is essential within the TC system, not only for shooting marine life but also when you relate it to other features – such as potential, subject selection and peak of the action. Now is the time for you to retrace a mental path through the features of the TC system and consider the potential of the opportunity. Have you already taken shots like this, or is it a one-off, excellent opportunity?

The Think and Consider structure is a means of prompting you to think and consider various options underwater. Once TC is habitual, passing over an opportunity will no longer be because of forgetfulness or the 'I never gave it a thought' attitude. In life, we make hundreds of instant decisions every day. The TC system is no different.

## **Peak of the Action**

'A definitive moment in time when you choose to press the shutter and stop the action of the underwater world in your lens.'

The concept of 'The Decisive Moment' was first introduced to photography by one of the all-time masters, Henri Cartier-Bresson. It's also referred to as 'the kodak moment' but I have always taught it as 'Peak of the Action'. It's the bread and butter of sport photographers and often the reason why a picture sells. Think of the examples from the Olympic games, tennis, boxing and cricket. Moments in time which the photographer has anticipated and frozen the action.

In underwater photography, to capture action and speed of this nature is rare. We recognise the obvious – dolphins swimming in formation, sharks taking a fish, sea-lion pups playing in the waves – but less obvious examples are often neglected. Consider the word 'action' to be a loose definition, and ask yourself:

- Is the subject capable of moving, or has it any moving parts? For instance, these may be the tentacles of a sea anemone or the polyps of certain corals, which open and close to feed.
- If it has moving parts, is there a certain moment in time when pressing the shutter may achieve a better, more pleasing picture?

It does not have to be fast action or any action at all, however, consider the following situations and see the difference that stopping the action at the correct moment in time can make.

- Clown fish in a sea anemone. The tentacles can often sway from side to side. Press at the wrong time and the clown fish can be obscured. If you consider the peak of the action, you may improve the composition by shooting when the tentacles appear balanced in the frame.
- A turtle swimming in blue water. If you neglect to consider the peak of the action, it's easy to obscure its facial features because its fin is in the way.
- Visualise a cleaning station with fish queuing to have parasites removed. As the mouth or gills open and the 'cleaner' pops inside could be the moment in time that will make a better picture.

#### My Tip

Before pressing the shutter, look at your subject. If any part is capable of movement then consider, is there a definitive moment in that movement that will make for a more pleasing picture? If there is, then compose, wait for the peak and press the shutter. Now may be a good time to revisit the section on patience.



**FIGS. 5.32 and 5.33** I noticed this goby in shallow water no more than 5 m deep. It was resting on a whip coal close to the substrate. This provided an excellent opportunity for me to settle down beside and shoot upwards slightly towards the blue water background. I adjusted my Nikon 7200 camera settings to read ISO 200, f16 aperture and 1/320<sup>th</sup> shutter speed with two Inon 220 strobes on short arms. Within a few seconds the goby jumped off the whip and in doing so opened its mouth and yawned right in front of my camera. I pressed my shutter instinctively and caught the 'yawn' of the goby. I got lucky! The eye was in sharp focus and very well lit. My shutter speed on this occasion was perfect. I could not have wished for a better outcome. A classic example of 'Peak of the Action'.

> Where does 'Peak of the Action' fit into composition? The first thing is not to confuse the two. Composition, in short, is the arrangement of the subject matter in the frame, whilst peak of the action is when to press the shutter and 'stop' the action of the subject. Composing a distant diver within the frame is an element of composition; however, waiting for the diver to exhale a plume of bubbles may be the peak of the action that will enhance the photograph.



### **Evaluation**

Review the LCD to determine:

- Have you captured the peak of the action?
- Does it work, is it relevant?
- Can the picture be improved?
- Do you need to shoot more frames or can you move on in search of other subjects?



# Working the Subject, Shoot and Evaluate by Stuart Gibson

Imagine you have found a pygmy seahorse with good access and a usable background. There is no current and there's plenty of dive time. You've perfected the exposure, experimented with various compositions and remembered to consider 'Peak of the Action'. The shot must surely be in the 'can' just waiting for the most suitable competition to enter. What can go wrong? As it happens a lot can, and in this case the pygmy just wouldn't look at me. As a result this was the best shot of the dive but was not quite what I'd hoped for.

FIG. 5.34 The Pygmy was tucked in the coral and continually turned away as I tried to get a head on shot with both its eyes. With the subject being so small it can get frustrating when you are so near yet so far from the shot you want. After the dive I reviewed the pictures I had and I became even less content with my efforts the more I looked at them. It should have been enough, but I knew a better shot was possible. Nikon D7200, 105 mm, ISO 200, f19, 1/250<sup>th</sup>. Image by Stuart Gibson.



The next dive was being planned and it was decision time, do I go with the crowd and enjoy a new dive site or revisit the pygmy with no guarantee of a better shot? Decision made, I went back to the pygmy and it paid off. With all the camera settings still fresh in my mind and finding the pygmy in a far more accessible place I was rewarded with a full-on stare for no more than a couple of seconds. During this brief moment I was able to take three shots and capture the image I had hoped for. My perseverance paid off (on this occasion).



FIG. 5.35 The shot I had hoped for and had seen in many books and articles. Well worth the effort and patience. Nikon D7200, 105 mm, ISO 200, f19, 1/250<sup>th</sup>. Image by Stuart Gibson. Stuart's story raises the age old question, why take underwater photographs? What is your motivation?

It's often worthwhile to consider what stage of the entire underwater photographic experience you like the best – is it actually taking the pictures underwater, or seeing your results on the laptop after the dive? Is it enhancing your endeavours in Photoshop, or perhaps pleasing your friends or posting to social media? You walk a fine line when you try to please everyone – yourself, your loved ones, your peers, the public and, in competitions, the judges. The vast majority of people take underwater photographs for a hobby, therefore enjoy.

## In Conclusion

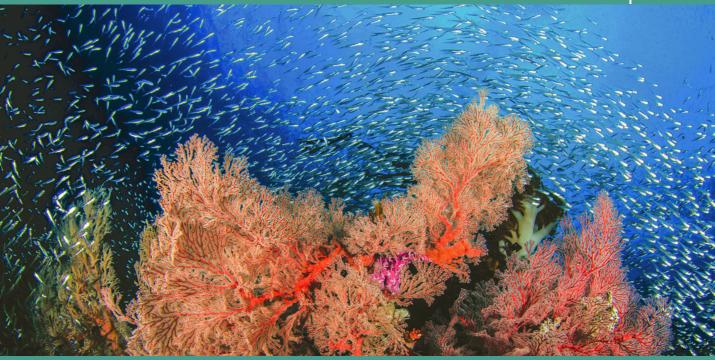
Everyone has personal opinions, personal likes and dislikes. I find it very difficult to please everyone with my work. I used to try, but I found frustration would take over, and I soon realised that I was putting myself under unnecessary pressures for no reason. Personally, I have always taken pictures for me – no one else. No one can take blame for my failures. My attitude has taken away numerous pressures, but I still seek perfection. It's what stops me getting bored. I never seem to get everything right. There's a moment when I look at the LCD and I can see that things have worked out well. I just hope that it will look as good on my laptop.

As I'm sitting at my home-computer, writing about the TC System, I'm very much aware that currently, little of what I'm shooting for myself, my own pleasure, my ego is good enough, it may seem OK, it's what I was after, the composition is sound, exposure and sharpness is exact on but there is always something wrong,

- A small reef fish in the wrong place.
- Diver model at the wrong angle.
- Not enough personality or recognition from a fish portrait.
- Even silly things like the sand being the wrong colour.

#### Remember:

Accept that there's no failure, just feedback. Keep that thrill of underwater photography alive, look, learn and move on. Remember, 'experience is the name every one gives to their mistakes' (Oscar Wilde).



# **All About Lighting**

# Light in the Sea

Over the next sections my intention is to cover topics of:

- natural light
- using strobes
- blending them together
- inward lighting

In underwater photography, lighting is by far the biggest and possibly the most complex topic there is. No matter how methodically I attempt to cover this in both words and pictures, it can never be complete. As an essential element of all photography and a fundamental part of the TC system, it should be considered as a feature to *think* and *consider* before you press the shutter.

But how do we decide whether to light a subject with either one strobe or two? How can we tell if it's best to use just natural light alone or whether

to blend it with a combination of the two? To these questions, there are no right or wrong answers, no formulas or blueprints to guide us. It's a case of trial and error, personal preferences, inclination, and most of all self-experimentation.

My objective is to encourage you to experiment, play, amuse yourself and have fun with the light in any and every way you wish. In underwater photo circles I am known as a 'light photographer' in much the same way as a wedding photographer. Once underwater I take great pleasure in approaching the light as a toy. Some would say that the light is my hobby most likely because I am totally fascinated with it.

The next five sections contain techniques, ideas and many of my own studies about the light in the sea and the way in which I use the light to achieve the style I'm after. I never get tired of this quote from photographer Derek Doeffinger from 1984. It's a fitting way to begin this chapter!

Teaser of texture, molder of form, bearer of colour instigator of sight – light makes photography. Embrace light. Admire it. Love it. But above all, study it. Glory in the fists of light exploding from a cloud covering the sun. Swing through the amber light of morning. Glide through the blue strata of twilight. Soar through the crystalline sky after a thunderstorm. See how one moment's light chisels lines clean and purges colour pure and the next moment light buries detail in shadow. Know light. Know light for all you are worth, and you will know the key to photography.

## **Natural Light**

Before we get under way with lighting I must point out that Chapter 6 has images within the text, which were taken in artificial light in order for the reader to immediately see the difference between the two – i.e. *natural* light and *strobe* light.

Natural light is also referred to as ambient light, available light or existing light. You will hear all three expressions used. They all mean the same thing, light provided by the sun and not by the photographer. With a clear blue sky when the surface of the water is glass calm it pervades the surface in the form of sunbeams. On a cloudy day this light is flat and diffused. As the sun arcs across the sky from dawn to dusk, the effects change. The position of the sun in the sky, the time of day, the clarity of water and your depth will vary, and this affects the appearance of the light.

Study the wide angles in your underwater photo books. Notice how often blue water features in the background. Consider the wide-angle images you most admire. What is it about these that attract you? On many occasions, it will be the way in which the photographer has captured and used the light. There are no hidden methods to this, as long as you are informed on how it is done. So with this end in mind, let us take a look at some specific forms of underwater light and how anyone (with a wide-angle lens) can achieve these effects for themselves.

## Shooting into Blue Water Using Shutter Speed Control

- If you are unfamiliar with these techniques then try this exercise. At a depth of 10 m with the sun high in the sky, using ISO 200 with a wide-angle lens, turn your strobes OFF and switch your camera into manual exposure mode so that you can select both the aperture and shutter speed value for yourself.
- Point your camera horizontally towards the blue (or green) water column. Conducting this exercise on a drop-off, looking out into clear blue water, is ideal. If you can also position yourself with the sun behind your back, then even better.
- In blue water, set your aperture to f16 or f11.
- Using your shutter speed, take a series of frames from 1/1000<sup>th</sup> sec through 1/500<sup>th</sup> sec through 1/250<sup>th</sup> sec, 1/125<sup>th</sup> sec, 1/60<sup>th</sup> sec, 1/30<sup>th</sup> sec, 1/15<sup>th</sup> sec, 1/8<sup>th</sup> sec etc.
- Review all these settings in your LCD.
- 1/000<sup>th</sup> sec will usually turn out black.
- 1/500<sup>th</sup> sec should depict a dark blue water colour background.
- 1/250<sup>th</sup> sec, a little brighter background.
- 1/125<sup>th</sup> sec, brighter still.
- Continue this through 1/60<sup>th</sup> sec, 1/30<sup>th</sup> sec, 1/15<sup>th</sup> sec.

Now review the results underwater at your depth of shooting. You should see a distinct difference in brightness between the blue water taken at 1000<sup>th</sup> sec, (very dark blue if not black) to that taken at 1/15<sup>th</sup> sec (very bright blue if not over exposed).

This is the way in which I and a vast majority of underwater photographers go about setting shutter speeds in the sea. With both macro and wide angle we use the shutter speed to determine the brightness and darkness of the background water colour. When you review these frames for the first time, study the colour and make a personal choice over which brightness of blue you like the best. It's as simple as that!

#### **FIG. 6.1** Shutter speed of 1/1000<sup>th</sup> sec at *f*11, ISO 200.

#### **FIG. 6.2** Shutter speed of 1/500<sup>th</sup> sec at *f*11, ISO 200.

#### **FIG. 6.3** Shutter speed of 1/250<sup>th</sup> sec at *f*11, ISO 200.

#### **FIG. 6.4** Shutter speed of 1/125<sup>th</sup> sec at *f*11, ISO 200.







**FIG. 6.6** Shutter speed of 1/30<sup>th</sup> sec at *f*11, ISO 200.



**FIG. 6.7** Shutter speed of 1/15<sup>th</sup> sec at *f*11, ISO 200.

Which shade of blue water do you prefer? This is your decision! Black or very dark blue can increase the impact when combined with a colourful foreground. On the other hand, exposing for the blue water has seen by the human eye provides a sense of depth perspective and locates a subject in its surroundings.

## **General Rule of Thumb: In Blue Water**

Using an SLR at a depth of 10 m in the Red Sea in very clear water, I have found that a combination of ISO 200 and  $1/125^{\text{th}}$  at *f*11 or *f*16 produces a colour of blue water, realistic to human vision.

It's about having a choice. Colour preference in relation to the shade in which blue water is recorded is very subjective and at the end of the day it's your choice, your inclination, it's what you like. So, refer back to your favourite underwater photo books. Work to develop an awareness of the wide angle water colour which you favour and go photo diving to replicate it. If you don't have a foreground subject then just play and have fun. Take pictures of the blue water until you're able to duplicate this tone for yourself at will. Make the water lighter, make it darker, but above all learn to control the brightness via the various shutter speeds on your camera. Remember that the shutter speed controls the colour of the water background!

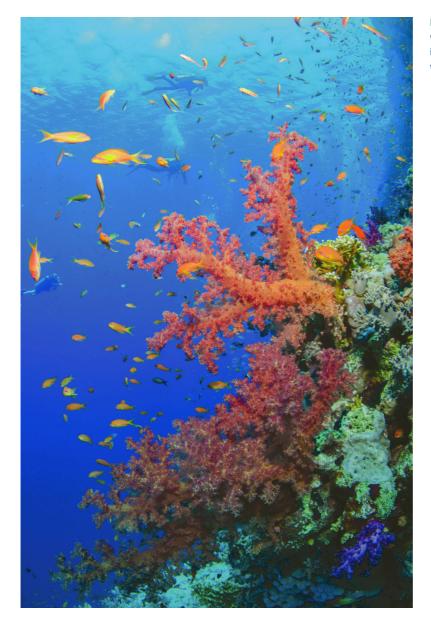
#### **Blue Water Camera Angles**

My own preferred tone of blue water is taken pointing my camera with the sun directly behind my back to the location of the sun in the sky. I also like to shoot into the sun but this angle is more orientated to capture various moods of the sunlight, which I'll discuss later on. Shooting the blue water towards the sun can sometimes result in a milky blue, which can on occasions lack vibrancy and contrast. A shooting angle which can produce some moody effects is often referred to as 'across the light', which is 90° to the direction of the sun. Experiment, play with the light and study the wide angle work of other photographers.

FIG. 6.8 For myself and my own particular taste, this colour of blue is most pleasing to my eye. On this occasion my settings were f11 at 1/125<sup>th</sup> sec, ISO 200. My depth if I recall was about 10 m in the southern red sea with the sun slightly behind my back at around 2 pm.



# All About Lighting



**FIG. 6.9** A typical Red Sea UW vista where the colour of the blue water is very similar to how the human eye would see it.

FIG. 6.10 Grand Cayman shot from
30 m depth. I looked up to see the boat
together with the colorful sponges
directly in front of me. My intension
was to compose, illuminate and place
the sponge into the shadow of the
dark reef to the left side with the
depth of the boat in the far distance.
10 shots taken before I pulled it off.
Tokina 10–17 m lens on the 10 mm end.
1/320<sup>th</sup> sec shutter speed, *f*10, ISO 200.





# All About Lighting

FIG. 6.11 Similar to the previous image, the sunlight is coming from behind my back in 10 m water. I noticed the yellow sponges in very good condition and composed by getting low so that I could place the colour against the reef just behind, with the blue water working as a canvas. After that it was all about directing my wife Sylvia into a pleasing backdrop. *F*11, 1/200<sup>th</sup> sec shutter speed, ISO 200.



**FIG. 6.12** Late afternoon dapple light dive in the shallows at Misool Eco Resort, Indonesia. Beautiful corals, great visibility and striking sunbeams. Whilst I'm facing the sun I'm keeping the sunball out of the frame so that I can control the sunbeams. There is a big difference between the sunball and sunbeams. I'm quite shallow, no more than 3–4 m and the shallow depth together with the light has allowed the corals to flourish. *F*11, 1/100<sup>th</sup> sec, ISO 400, natural light. No strobe.



FIG. 6.13 A predictable wide angle setting of f11 at 1/125<sup>th</sup> shutter speed at ISO 200. Natural light in shallow water of 3–4 metres with the sun just behind my back illuminating the sweet lips. No strobe.



**FIG. 6.14** Whilst the sun was just out of the frame I shot towards the general direction of the afternoon light. Tokina 10–17 mm at the 10 mm end. This took some time. The shape of the cave was ideal and it was very much a joint venture. Sylvia reacted to my hand directions by making slight adjustments to the angle of her body. *F*11 at 1/60<sup>th</sup> sec. ISO 200. 15 shots to get what I wanted. Natural light.

FIG. 6.15 A similar idea in Grand Cayman. After spotting a very tidy fan coral with the afternoon sunball clearly in shot, the only option to avoid 'burnout' was for me to direct Sylvia to place herself in front of the sunball by using my left hand to direct her movements and position. 10 or more shots to achieve this composition. *F*11 at 1/320<sup>th</sup> sec, ISO 100. Natural light.



## Exercise: Shooting Into The Sunburst Using Shutter Speeds

This exercise is very similar to the exercise on the previous pages but now we are aiming our wide angle lens upwards directly towards the sunburst!

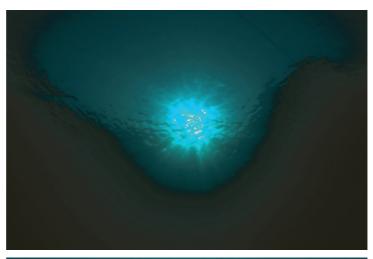
- At a depth of 10 m with the sun high in the sky, using ISO 200 with a wide-angle lens, turn your strobes off and switch your camera into manual exposure mode.
- Set your aperture to *f*11 or *f*16.
- Set your shutter speed to 1/500<sup>th</sup> sec. Look up towards the sun and take a series of frames from 1/500<sup>th</sup> down to 1/250<sup>th</sup> sec, 1/125<sup>th</sup> sec and so on, to 1/8<sup>th</sup> sec.
- The sunburst at 1/500<sup>th</sup> may record quite small, with a rapid graduation from white, close to the centre of the sunburst to a dark blue or black towards the edge of your frame. As you open the shutter speed through 1/250<sup>th</sup>, 1/125<sup>th</sup>, 1/60<sup>th</sup>, 1/30<sup>th</sup>, 1/15<sup>th</sup>, 1/8<sup>th</sup> sec taking a shot at each value, the pool of light emanating from the sunburst will increase and more than likely blow out your image frame altogether.
- Apertures of *f*16 and *f*22 have a tendency to sharpen the rays of light but this effect diminishes and at *f*8 it is hardly noticeable.

You now have settings for your shutter speed for shooting upwards to record the sunburst.

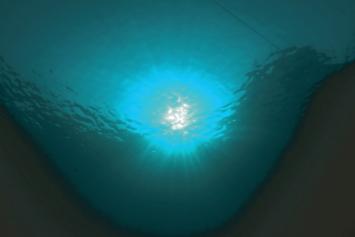
**Rule of thumb:** As your depth increases, you need to open the shutter to compensate. A general rule is 1 EV for every 5 m. The effect is that a pleasing sunburst taken at 1/250<sup>th</sup> sec at 10 m will require 1/125<sup>th</sup> sec at 15 m and 1/60<sup>th</sup> sec at 20 m.

#### My Tip

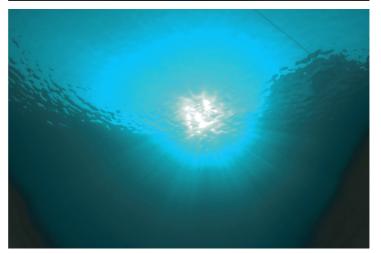
If possible, capture the rays of the sun but leave the sunball itself out of the frame. I see so many wide angle sunburst photographs fail because the sunball overpowers the main theme despite the efforts of the author to compose the most photogenic and aesthetically pleasing subject. **FIG. 6.16** Midday, 5 m deep, 1/1000<sup>th</sup> sec, *f*16 at ISO 200.



**FIG. 6.17** Midday, 5 m deep, 1/500<sup>th</sup> sec, *f*16 at ISO 200.



**FIG. 6.18** Midday, 5 m deep, 1/250<sup>th</sup> sec, *f*16 at ISO 200.





**FIG. 6.19** Midday, 5 m deep, 1/125<sup>th</sup> sec, *f*16 at ISO 200.

**FIG. 6.20** Midday, 5 m deep, 1/60<sup>th</sup> sec, *f*16 at ISO 200.





**FIG. 6.21** Midday, 5 m deep, 1/30<sup>th</sup> sec, *f*16 at ISO 200.

## **Dappled Light**

There is a wonderful quality of natural light present underwater, which I believe is very misunderstood. I and many other photographers refer to it as 'dapple light'. Just after sunrise or towards twilight time the sunbeams entering the surface of the sea are at the most acute angle by virtue of the low angle of sun and surface. These sunbeams produce a golden hue and this effect is amplified into strong golden shafts of light as the beams pervade the surface. Underwater photographers have been using this quality of light as a dramatic backdrop to their photographs for as long as I can remember. David Doubilet's wide angles from his photo books *Light in the Sea* and *Water Light Time* are superb examples.

To catch the light, you have to enter the water just before sunrise and just before sunset. Day boat underwater photographers regularly miss out as they often miss the morning light and have to head back to base long before the afternoon light is at its best. Not a problem for someone who just wants to go diving but for a dedicated underwater photographer, missing these dapple light opportunities is a great shame.

On my photo workshops I always set a number of early morning and late afternoon photo dives aside to conduct a guided 'light tour'. I do this to dismiss any misunderstandings about dapple light and knowing how to shoot it. You see, the effect is only noticeable in shallow water, in my experience between 1 and 3 m. You must ascertain as soon as possible the depth at which the beams are most dramatic. If the sea is glass calm the effect is heightened. You have to work quickly though to find a subject at the best depth to photograph against the sunlight. Remember, the sun sets rapidly in tropical locations and all too soon the effect of the sunbeams fade. The main reason why underwater photographers fail to recognize the light is because they descend past the optimal depth and the optimal depth is determined by how low the sun is to the horizon.

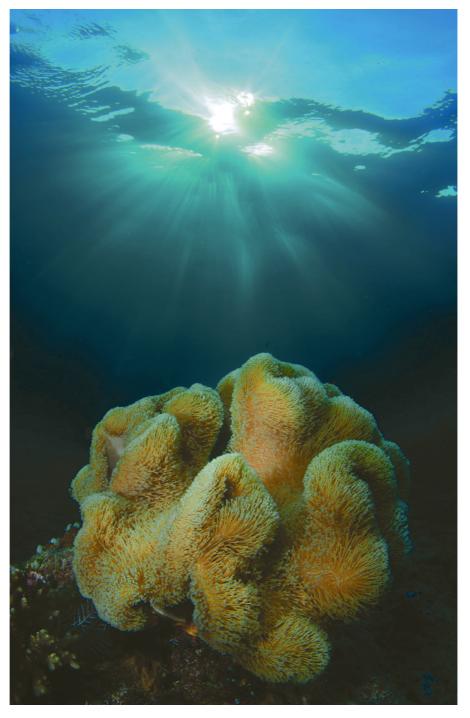


FIG. 6.22 We planned our evening dive to enter the water in plenty of time to catch the light as the sun dropped onto the horizon. The diver is at a depth of about 2 m. I'm at about 1.5 m checking out the effect of the sunlight on the hard corals. My settings were f11 at 1/250<sup>th</sup> sec, Nikon 10.5 mm fisheye, ISO 200, Nikon D300. I have lit the top of the reef with a touch of strobe on low power – Inon Z240.



**FIG. 6.23** The effects of dapple light when you shoot too deep. In this case, 5 m was enough to diminish the effect. Nikon D200, 10.5 mm fisheye, *f*8 at 1/250<sup>th</sup> sec, strobe fill using one Inon Z220 on low power.

FIG. 6.24 This is how the beams of dapple light should look when shot at an ideal depth, around 3–4 m or so. Notice that I have left space for the sunbeams to spread and not get blocked out by the corals in the foreground. *F*11, 1/60<sup>th</sup> sec, ISO 400. Twin Inon strobes on low power. Nikon 7200 with my Tokina 10–17 mm on 10 mm end.



## **Cathedral Light**

Cathedral light and Radial light are terms often used to describe the same effect. Cathedral light takes its name from the effect of sunlight bursting through high stained-glass windows in a diagonal orientation. The camera remains in a shaded area whilst observing the shafts of light from close by. An example of cathedral light is when you see the light penetrate a shallow cave system. The sunbeams contrast dramatically with the dark walls. If you point your camera into the sunbeams towards the surface, you cannot help but include the sun ball. An important tip is to move yourself out of the light and remain in the shade but aim your camera back towards the light.



FIG. 6.25 | love to shoot this dramatic light and my favourite photo-dive site for this is Dangerous Reef, St John's in the Southern Red Sea. There is a 2–3 hour window of awesome opportunities between the hours of 11 am and 2 pm when the sun is high enough to capture cathedral light in all its glory. Unlike dapple light, cathedral is not depth or time dependent. The sandy floors of these 'swim through's are between 6 m and 10 m. Take no notice of the name 'Dangerous'. These are not caves as such but narrow shallow passages which are quite open. F4 at 1/250<sup>th</sup> sec, ISO 500, natural light, 10.5 mm fisheye.



**FIG. 6.26** A processing tip! To remove the blue colour cast, I just de-saturate the image slightly to portray the colour tone which my eye originally perceived at the time. This is not quite mono or colour but it's accurate to my eye. Nikon D300, 10.5 mm fisheye, *f*4.8 at 1/30<sup>th</sup> sec, ISO 200, natural light. Image by Stuart Gibson.



**FIG. 6.27** Radial light is when the surface of the water is flat calm and the sun is quite high in the sky. The sunburst effect has tremendous potential because of the way the rays penetrate the water in a spherical pattern. These characteristics of natural light are very much about beams of light as opposed to the large round sun ball in the sky. Also, you need to be close – and I mean *really* close. I was fortunate that this particular turtle allowed me into its space, which presented an opportunity to silhouette a dynamic shape. *F*22 at 1/250<sup>th</sup> sec, ISO 100. Strobes were turned off very quickly to allow a natural light image.



FIG. 6.28 The exposure for Silhouettes and this type of light is taken in exactly the same way as you would with the sunburst exercise, which you have just read about. I seldom take light readings! I just hold my left hand palm in front of my dome port to block out the sun ball, which creates an instant silhouette. I check my settings, i.e shutter and aperture. I then take a quick snap of my palm obscuring the sun ball and get an indication of the brightness levels shooting at that extreme upward angle.

### **Capturing Silhouettes**

To shoot a silhouette, you place a subject between the lens and the sunlight. The closer the subject is to the lens, the darker the subject is recorded. The more pleasing the silhouette!

This is a relatively easy shot to take. A wide-angle lens is preferable because it will allow you to get closer to the subject and fill the frame. If you do not place the subject close to the lens, the contrast will not be as effective and the particulates in the water column between lens and subject will diminish both quality and sharpness.

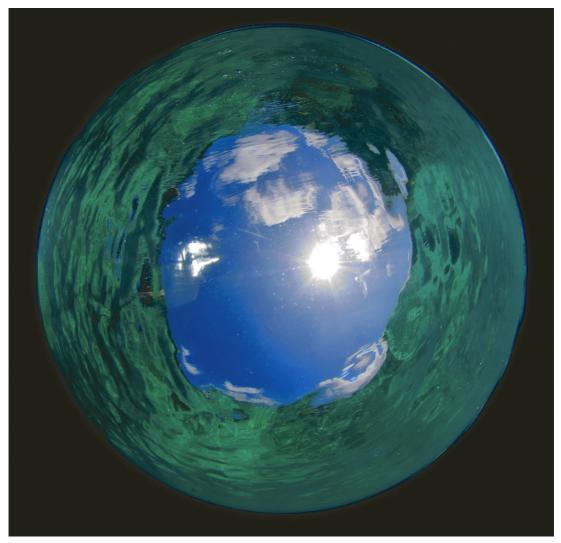
Ensure that the exposure is not too dark. If the corners of the frame are reduced to dark blue with only the sun's rays in the middle, then the edges of the silhouetted subject will be hardly visible. The water needs to be bright all around the silhouette, but not so bright that it is over exposed and burnt out. If you are lucky enough to have smooth flat water with clear visibility, then take advantage of these conditions. Shooting silhouettes in this light will result in your subject blocking out the sun, with sharp sunbeams radiating out in all directions. A faster shutter speed in the region of 1/250<sup>th</sup> or 1/500<sup>th</sup> sec will emphasise these beams to great effect, but again, ensure the corners are not too dark.

### **Snell's Window**

'Snell's Window' was named after the Dutch mathematician, Willebrod Van Roigen Snell, who lived between 1580 and 1662. A professor of mathematics at Leiden University, he discovered the law of refraction known today as 'Snell's law'.

In underwater photography, Snell's Window is portrayed as an arc or a circle through which the sky is visible. The area around the circle is a reflection of the seascape, and as such is much darker than the sky. Many newcomers often claim never to have noticed it. Here's how you do it:

- As you descend, look back towards the surface through a wide-angle lens; it's important to keep your vision directed in this way.
- You will see an arc or, depending on your depth, a half-circle.
- This window, arc or circle, call it what you may, is your only visual access to the world above.
- If the visibility is good and the surface is flat, you will clearly see the sky through the water.
- You don't need to be in the sea to see Snell's Window; it's clearly visible through the surface of a swimming pool.
- The best conditions are when the surface of the sea is glass calm and the sky is blue with (to be very pernickety) white fluffy clouds.



**FIG. 6.29** In order to explain the science of Snell's Window in the most understandable way I can think of, you have to view this image above as wide as you possibly can. Many years ago in the early 1990s I was foolish to believe that if I dived deep enough I would be able to see the entire circle of Snells Window in all its glory.

It is in fact only possible to see the whole of Snell's Window when using a super wide lens (such as a Sigma 4.5 mm Circular Fisheye Lens mounted on a Nikon 7000) which enables me to illustrate the science of it all. Snell's Window also called Snell's Circle or optical man hole, is a phenomenon by which an underwater viewer sees everything above the surface through a cone of light the width of about 96°. This phenomenon is caused by refraction of light entering the water, and is governed by what we tend to refer to as 'Snells Law'. The area outside Snell's Window will be either very dark or show a reflection of underwater objects. Underwater photographers the world over use Snell to compose images from below so that their subjects fall inside Snell's Window, which backlights and focuses attention on the subjects.

I now use the Snell effect when I'm in shallow water in order to connect to the surface what may be in play just above and below.

## All About Lighting

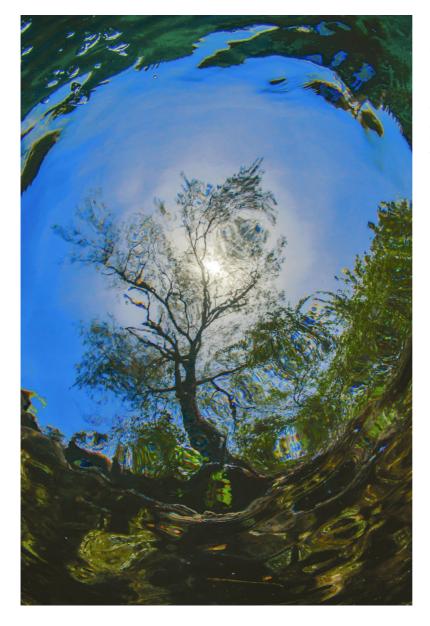


FIG. 6.30 1/000<sup>th</sup> sec. f16. ISO 200. Natural light. 10 mm Nikon Lens. I find that shooting into Snell's Window is most productive in shallow water when numerous outside influences come into play. In this way we shoot the below water portion of the composition to allow the depth perspective to continue through the surface towards the sky, the clouds and the sun. Natural light. FIG. 6.31 Same technique looking above the mangroves in no more than 1.5 m. I used one strobe to give a delicate hint of light on the back of the floating leaf. ISO 400, *f*16, 1/320<sup>th</sup> sec. Tokina 10–17 mm on the 10 mm end. Natural light.

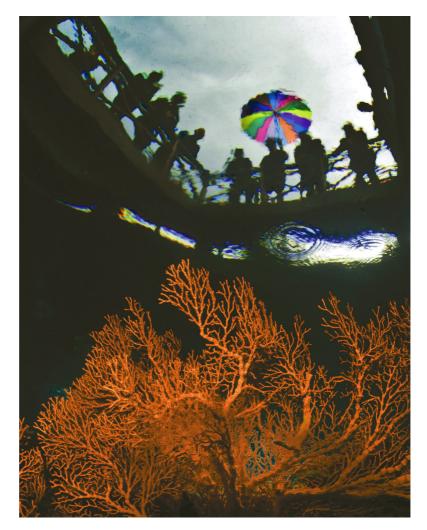


# All About Lighting



FIG. 6.32 Using natural light I have silhouetted the bat fish and fired more than five times to get it well composed and lit. Notice the subtle curve of Snell's Window towards the bottom of the frame.

FIG. 6.33 Those who have visited Kunkungan Bay Resort in Lembeh Straits may be familiar with the 'dive dock pier'. Three quarters along is a viewing platform and over the years, colourful fan corals have colonised the bommie in no more than 2 m of water. I was all set up for a photo dive around the dock when the heavens opened. Not our UK drizzle but a proper tropical deluge! Whilst disappointed with the light more than anything else, l was fascinated with the effects of the downpour in such shallow water. Using my Tokina 10–17 on the 10 mm end I played around with the aperture and shutter speed to achieve a sense of a 'raining downpour'. Twenty shots taken and looking up I had another idea to include those sheltering from the rain beneath an umbrella to look down from the platform. It worked well both with the umbrellas and without.



# All About Lighting



**FIG. 6.34** You choose. Umbrellas with a state of calm? Or the heavens deluge.

#### Natural light with Magic Filters

Finally in this Natural light chapter, I want to look at filters for blue water photography and in particular Magic Filters designed by the UK underwater photographer and marine biologist Dr Alex Mustard.

Seascape shots are not the easiest to achieve. This is due to the filtration effect of the blue water column, which in turn results to a blue/cyan cast in the picture. Some years ago Mustard applied his photographic skills and knowledge of water filtration issues in order to solve this problem. As a result he produced a set of filters designed to remove this blue/cyan cast, which restores the available light to its natural colour of how our eyes perceive it to be. In short: These filters don't add any colour, they subtract it. In essence, they restore natural colour by removing the unwanted blue/cyan and green. In natural light, remember for magic filters you do not use flash.

#### Getting the Best From Your Magic Filter (MF)

Here are my own key findings:

- You must shoot in a direction where the sun is directly behind you. Point at any direction remotely near to the sunlight and you can get a red/pink colour cast.
- I strongly recommend that you shoot at a downward angle. 45° is ideal.
- The filter will work in water from only 1 m deep down to about 17 m. I found that the positive effect of the filter began to diminish past 19 m.
- Choose ideas where the subject (coral reef) extends away from the lens. In this way you will see natural colour 10 m or more behind the closest subject. This effect is nothing short of amazing when you remember that light from a strobe falls off so rapidly.
- The MF is designed to work with the camera's white balance (WB). You
  will have to learn how to set your camera's 'custom/preset' WB and to
  remember how to set/calibrate it underwater at the time. So practice and
  more practice.
- Most important of all: set/calibrate your white balance at the same depth and place you are going to shoot from. If you have table coral in the foreground – preset your WB as close as you can and onto the table coral without casting your own shadow, ensure that the table coral fills most of the frame. Shoot the table coral at this depth. For example, do not ascend from 10 m to 8 m to take the table coral composition.
- Don't set your white balance in one direction and then shoot in another. It won't work.
- If you change your depth by more than 1–1.5 m then re-calibrate the WB.
- 95 per cent of the time I calibrated off the subjects (corals) which I was shooting and this worked well.
- Do not calibrate your WB off the blue open water. This doesn't work.

Yes, I know – many of the above are in the instructions, but I cannot emphasise enough that by following these guidelines, you will get the most out of the MF. The mistakes I have made in the past were to set my white balance off the palm of my left hand at one depth and then to move into the subject for composition perhaps 2–3 m deeper to actually take the photo. *Shooting Magic* is an instructional DVD, presented by Alex Mustard in the Red Sea, where he demonstrates and describes the unique techniques of available underwater photography with the magic filters.



FIG. 6.35 Front mount attachment.

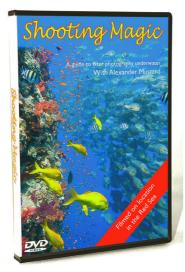


FIG. 6.37 Shooting Magic: DVD on how to get the best from your magic filter.\* \* For more information on the DVD Shooting Magic, contact: Peter Rowlands, PR Productions, 020 8399 5709, www.magic-filters.com





FIG. 6.38 USS Kittiwake wreck dive and snorkel. By Alex Mustard.

# All About Lighting



FIG. 6.39 Magic filters in Grand Cayman. By Alex Mustard.

## **Using Strobes**

In my experience the majority of newcomers to UW photography tend to start out using just one strobe to complement their new camera housing. I have always taken the view that to understand when, where and how to use two strobes you should try everything at first with just one. You can read as many books or magazines as you like but there is no way in which to determine when it's good to use two strobes, where to place two, the effects of two, what power levels to set until you have shot a few hundred frames with just one strobe. To this end, and if you are new to underwater photography, here is a 'quick start' using a single strobe.

I recommend the following:

- Position your strobe on a small arm about 20 cm to 30 cm above the housing so it's pointing out towards your subject. I emphasize, above your housing. Not above your housing port!
- It is very important to make sure that your strobe is not too far forward of your camera housing. Level with the front of your housing body is ideal.
   I often see shooters with their strobe positioned at the very end of their port. In my opinion, too far forward. Not good!
- When shooting close-up and macro, if your strobe protrudes in front of your macro port you run the risk of alarming a timid subject. The photographer will believe it's just bad luck when all along the strobe is just too close to the subject.
- My advice to newcomers would be to keep your strobe in position and move it only when you change the orientation of the housing, for example changing from a landscape composition into a portrait composition.

In my role as teacher I endeavour to explore as much about underwater photography as I possibly can. My quick-start (above) with one strobe is ideal for beginners so I would like to offer advice. Not all photographers use two!



**FIG. 6.40** Using a single strobe and strobe arm with the camera housing in an horizontal format is an ideal starting point for beginners. Remember to keep the front of the strobe level with the back of the camera housing. If the strobe is too far forward then numerous issues can come into play and thwart a complete beginner. If we rotate the housing into a verticle format then likewise, remember to reposition the single strobe above the housing once again. Once we introduce twin strobes into our set up we have more control over our lighting.

#### **Advanced Single Strobe Techniques**

When you become familiar with strobe and strobe arms, my own method using one strobe is to look at my chosen subject and the way in which it is orientated. I consciously consider which side of my housing to place my single strobe, either on top or right side or left side etc. I'm looking to position it at an angle which I believe will most flatter the subject. I reiterate: I'm looking to place my single strobe at an angle which I believe will most flatter the subject! I then compose and shoot. I try hard to avoid pushing my housing forward in order to view my last exposure on the screen at the back of my housing, but it is such an easy mistake to make. Over time I have learnt to glance towards my LCD screen, only moving my head and not pushing the housing forward, particularly if it's a shy subject I'm shooting. I will study the facial features, in particular the position and orientation of the eyes and mouth. I'm also looking for obstructions (however small) which may create shadows over more important features. I use techniques such as these when I'm teaching single strobe techniques in swimming pools during my Bournmouth UK tuition sessions.

#### Using Twin Strobes with Alex Mustard

In his excellent book 'Underwater Photography Masterclass', Alex Mustard recommends that UW photographers refer to common strobe positions by the positions on a clock face. For example, two guns either side of the housing are the standard 9 o'clock and 3 o'clock position or 9–3. The standard 9–3 becomes 12–6 when shooting verticles. Such a simple idea of explaining strobe position technique. It is consistent, reliable, it works underwater and most of all for the reader it is easy to understand in words. I'm grateful to Alex M for allowing me to put my own stamp on his strobe positions ideas.

#### **Using Twin Strobe Positions**

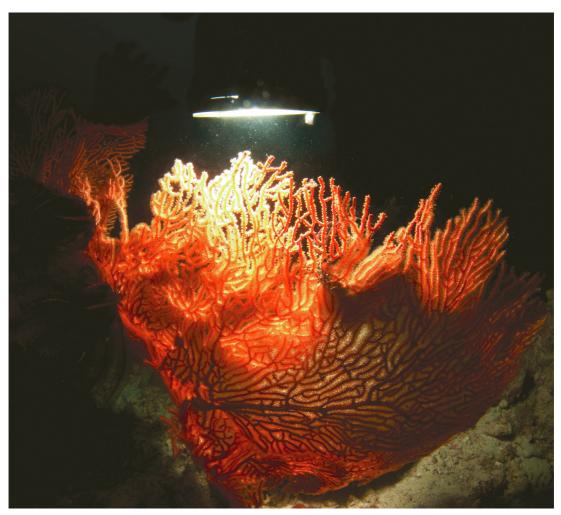
- At the beginning of each and every photo dive I would advise you to take time to set up your strobe lighting positions to your own satisfaction.
   Make sure they are not too far forward. I position my lnons level with my eyes behind the viewfinder of my housing.
- During the dive, the main adjustment which I will make to my strobes is moving them in and out from the body of the camera housing.
- When you are close to the subject your strobes need to be close to your housing. When you are further away from your subject your strobes need to be further away from your housing.
- I reiterate again and again to avoid positioning your strobes too far forward of the housing. I always endeavour to keep the front of my lnons level with my eyes behind the viewfinder of my housing.

#### Strobe Arms For Wide-Angle

Alex Mustard recommends positioning strobes in relation to how close the wide angle subject is. The further away you are, the further your strobe arms need to be away from the wide angle port in order to light the subject. As we move closer to the subject we can begin to pull the strobe arms closer in to the lens. If we are shooting (for example) close focus wide angle at close distance, we should re-position our strobe beside but behind the dome port.

#### A Theory Of Mine

When a strobe is triggered underwater, a 'hot-spot' is visible immediately in front. *Martin Edge* 



**FIG. 6.41** This hotspot eminating from the strobe has the appearance of backscatter. The hotspot cannot be completely eliminated; no matter what angle you place it at; however, it can be controlled.

Try this exercise regarding 'Hotspots':

- In a swimming pool or a calm sea using the widest angle of lens you have available together with one strobe mounted onto a strobe arm, switch it to 'On' and position the front of the strobe just enough so that it's visible to your eye just inside the viewfinder on your camera housing.
- Select ISO 200, set f11 on your camera, and the fastest shutter speed that will synchronise with the strobe. For instance I would set 1/250<sup>th</sup> or 1/320<sup>th</sup> sec. Set the strobe to manual full power and take a shot.
- Now review the LCD.
- If you have placed things in this way, you will see in the LCD the end of your strobe together with the appearance of flare immediately in front of the strobe. Whilst still leaving your strobe visible in your viewfinder, position it at an angle at which, in theory, you would not expect to see backscatter.
- Take another shot and review the LCD.
- The strobe must be visible in the LCD for you to see the effect clearly. I suspect this hotspot is still visible!
- Try once again, but change the aperture on your camera to *f*16 and see how the hotspot diminishes slightly. Now set it to *f*5.6 and notice it increase.



FIG. 6.42 The fan coral is 1 m wide. It was taken in clear water on a drop-off in the Maldives. I used my Tokina 10–17 mm fisheye zoom on the 10 mm end. I have intentionally positioned each of my Inon Z220 strobes inside the image frame. I have triggered both strobes so that you can clearly see the hotspots emanating from the strobe.

## All About Lighting

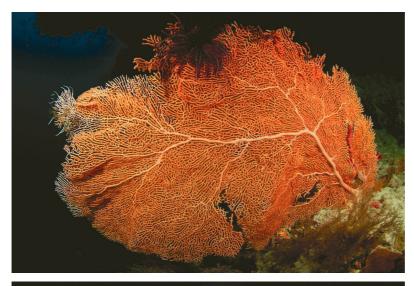


FIG. 6.43 I have now moved the strobes 30 cm further away from the fan coral but maintained the same angle. The hotpots from both are no longer visible and the edge of the frame is clean. Backscatter or this hotspot theory of my own is so often caused by the strobe being too close to the picture area as opposed to being at the wrong angle or in the wrong position.

FIG. 6.44 The particles are in the middle of the beam. Notice how clean the edge of the beam is in this image.



This is the reason why we angle strobes outwards to light subjects in this way. The strobe used for these illustrations was an Inon Z220 with a diffuser, which provides a beam angle close to 180°. Notice how clean the edge of the beam angle is. Many underwater photographers call this method of strobe illumination 'edge lighting'. Useful as it is to have my name connected to lighting techniques, it is purely coincidental that it appears to have been christened in this way!

#### My tips

- Shooting wide angle, position your strobe so the light emitted comes from behind the dome port where there is some shade construction.
- In order to prevent the hotspot from becoming visible to the eye, keep the front of the strobe well back and out of the picture area.
- If using one strobe, position it from above when shooting either a landscape or a portrait composition. This simulates light from the sun and produces shadows where human vision is used to seeing them.
- The idea is to avoid lighting the water column in between the lens and the subject. This reduces the effects of particles and creates images that are cleaner, sharper and more colourful.
- If I want to strobe fill over a large area such as a wreck or a reef I will spread both strobes out and away from my housing accordingly in order to do the job. Upper most in my mind is to keep my strobes back behind the housing! Level with my ears whilst close to my Nauticam viewfinder.

I use two strobes for wide angle all the time, particularly when I want to:

- Reduce harsh shadows caused by the use of one strobe, perhaps when shooting macro and close-up.
- Increase and enhance the quality of light and achieve effects that appear to 'wrap around' a subject, making it 'glow' from within. This is a style that appeals to me, but it's not for everyone.
- Increase the area of coverage for wide-angle photography, particularly when using a fisheye lens where the subject spreads large across the frame.
- Dismiss the notion that you have to illuminate all corners of your wide angle lens. The only times I do this, is when I have interesting reflectivity throughout the width and length of my image frame. For example inside ship wrecks.

## **Balancing Strobe Exposure**

My way of doing this is to consider the shape and orientation of the subject (both close-up and wide angle) and where the shadows will fall in relation to the shooting angle. It's not my intention to eliminate the shadows completely, just to reduce and soften them.

Another misconception is that the fill-flash should be positioned further away from the subject than the first strobe in order to create the softness. This is a very general guideline. It all depends on the make, size and output of the two units. It also depends on your preference as to how you want the shadows to appear. 20 per cent of the time I tend to adjust the strobe power settings instead of repositioning them. The other 80 per cent of the time, I'll just move my left hand and if required also my right hand onto my Inon and push the strobes a little closer to the subject. I find it much easier and faster!

## Diffusers

A diffuser is an accessory that fits over the front of a strobe in order to achieve two things:

- Expansion of the beam angle. This is an advantage when using a wideangle lens, particularly a fisheye.
- 'Softening' of the light. Many photographers including myself use them as a matter of course because we prefer the soft quality of light produced. With close-up and macro, some subjects may be highly reflective when lit by strobe. Diffusers spread the light and reduce reflections. I use diffusers on all my lnons except when I have to remove them for other reasons such as attaching a snoot etc.

## **Strobe Arms**

These are essential prerequisites for producing superior and consistent images. The primary requirements are flexibility, strength and buoyancy. There is a need to be able to move the strobes to the precise position of your choice, easily, quickly and quietly. The most flexible arms I have used are the ball-joint articulated types from Nauticam. Strobe arm clamps do such good work, which often goes unseen but if you find yourself wrestling with them it's likely that they have worn and are in need of maintainence or replacement. Clamps don't last forever remember!

I receive more questions regarding strobe positioning than perhaps anything else. With the help of underwater photographer Sascha Janson I used the Lembeh Resort swimming pool in order to demonstrate my take on strobe positioning. Lets start with macro and close-up.



FIG. 6.45 A typical set up for a 60 mm macro position with the strobes just in front of my right hand on the handle. By Sascha Janson.





FIG. 6.46 Photographed by Sascha Janson. My strobe posititions for long arm wide angle. For a typical 'top down' approach I would tilt my Inon strobes downwards slightly. See above. I have found that for my own style and approach I don't need anything longer than about 60 cm in total. I can use much less than that, depending on my intended choice of subjects on a given photo dive. The full 60 cm consists of the clamps, the arms and the strobes. There is nothing more cumbersome and arduous than arms which are too long, but please be aware that I am forever experimenting, testing, exploring – It's what I do! Remember! Do not confuse the hot spot from your strobe with that of particles in the water column such as backscatter. Backscatter will occur when the water is plagued by plankton or poor visability. Strobe Hot Spots are caused by your strobe being too far forward. Throughout this book I will remind you to 'keep them back'!

**FIG. 6.47** I am always awear of keeping my strobes back behind the housing when shooting wide angle to avoid the 'hot spot'. This particular position would be ideal for a wide angle horizontal opportunity.

# All About Lighting

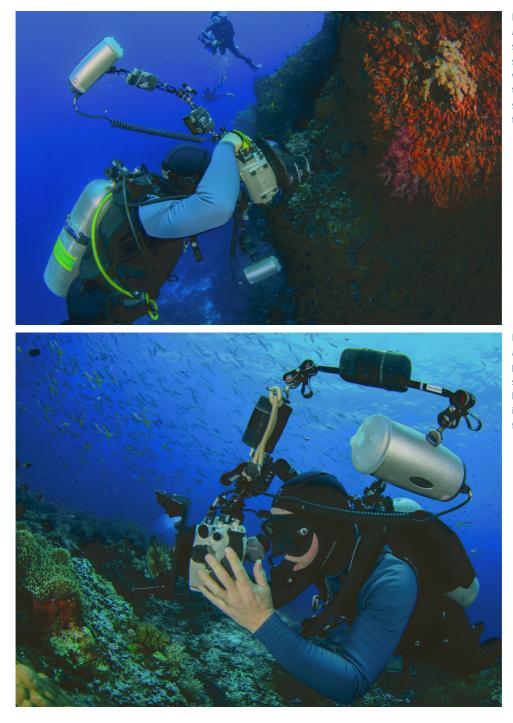


FIG. 6.48a Alex Mustard shooting long strobe arms for wide angle. Notice the position of his strobes for a verticle format opportunity.

FIG. 6.48b Also notice the position of Alex's strobes in a landscape format, in particular, how far back they are.



**FIG. 6.49a** Whenever I have an opportunity to photograph fish, my first thought is to decide which side to shoot them from. I'm aways aware of the position of the sun in the sky and I will do my best to try and get the sun behind my back. In this way I'm able to shoot up towards the surface without having the sun burning out. Often it's not possible to switch but if I have an opportunity I will always do my best to get into position.



**FIG. 6.49b** Not a lot I could do with this opportunity. I tried to swim beneath the bat fish to reach the other side (with the sun at my back) only to find my group gesticulating me to move out of the way. Notice how bright the surface is. On this occasion I had no choice, I was shooting towards the sun.

## **Inward Lighting**

The conception of this lighting technique came about some years in Bali when I was shooting wide angle and had very little to show for my efforts. To be honest, I was a little bored with the dive. It's on days like these that I have a tendency to have random fun with my photography and I often find myself experimenting with ridiculous camera settings and impossible strobe positions set at outrageous angles. I tour the reef without aiming or composing, shooting blind with my housing upside down. Nothing is beyond me on days like these and for most of the time I leave the water with very little to show for my experimentation. However, this particular day was different. Towards the end of the dive as the sun was falling towards the horizon I swam over a formation of two particular table corals, one in the foreground and the other, a similar size and shape just behind, in the background. The late afternoon sun was setting at a perfect angle with the added bonus of a flat calm surface. It looked a very strong composition.

Instinctively I got to work, arranged my two Inon 220 strobes at a typical position for wide angle and took a few shots. The potential was strong but my strobes were lighting both foreground and background. The image I had in my mind's eye was to illuminate the foreground coral and leave the background coral as a black silhouette. I had plenty of air and time, the potential before me was inspiring and my imagination 'kicked in' with this absurd idea to position both my strobes in totally the opposite direction, pointing them back towards me and aiming towards my head. I shot, checked my LCD, expecting to see a stark silhouette in the background with a colorful strobe lit table coral in the foreground. My strobe had caught a slice of the foreground coral, which gave me the enthusiasm to continue until the sunset. I reached over to each strobe with the idea of turning both strobes in on themselves, pointing in the direction of my face in an effort to catch the very edge of the light beam from my twin Inon 220s onto the foreground without spilling light on the background coral behind. To my absolute astonishment it worked and the idea and inspiration of 'inward lighting' was born.



**FIG. 6.50** The finished image with a colourful strobe lit coral in the foreground and the stark black contrast of the unlit coral in the background. The birth of the technique, which I have christened 'inward lighting'.

The concept of inward lighting is a technique where your strobes on each side of your camera housing are turned around and pointing back towards your face. The objective is to bring into play the very edge of the strobe beam to cut just in front of your intended foreground subject so it's illuminated whilst everything else behind is unlit. It's an alternative strobe technique of lighting a subject whilst avoiding other jumble and cluttered backgrounds behind.

## Strobe Arms and Positions - Macro and Wide Angle

Inward lighting can be used for both macro and wide angle and over the years of experimenting with this concept I have found that both my strobe arms have to be long enough in order to correctly position the strobe. My macro strobe arms are made up of two joints and are a total of 40 cm each in length. My wide angle strobe arms are very similar and are made up of three joints and total 60 cm each in length. Both measurements include the length of both my strobes.

FIG. 6.51 Sascha Janson is photographing me setting up from above. Whilst I am behind my housing with twin Inon 220 strobes on a macro setting of f22, 1/320<sup>th</sup>, ISO 200. My subject is a small nudibranch directly in front of my macro port. Notice how 'turned in' my strobes are pointing towards my face. The idea is to illuminate the nudibranch using the very edge of the light from my two strobes, without lighting too much of the background.





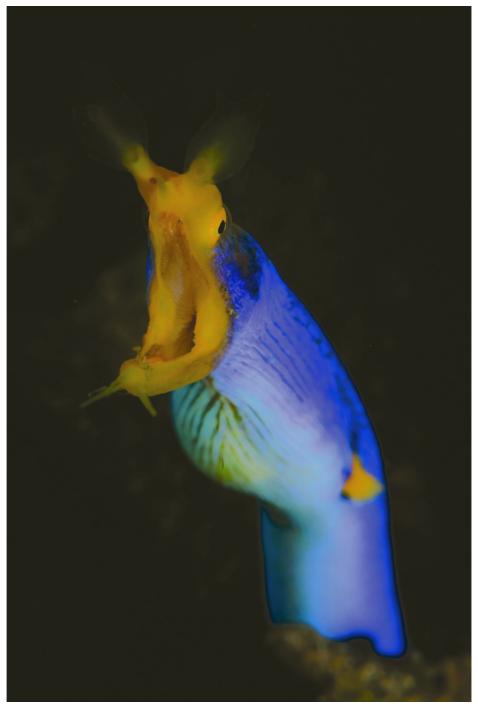
FIG. 6.52 This is how it turned out on the day. Inward lighting has caught the nudi without illuminating the background just behind it.



FIG. 6.53 I have never executed inward lighting of this nature in less than ten attempts and it is all about strobe placement, strobe power, patience, patience and more patience.



FIG. 6.54 Blue ribbon eel in its hole with a standard macro set up.



**FIG. 6.55** The same blue ribbon eel in its hole using inward lighting. It takes time, patience and more practice but when you get it working it's very satisfying. ISO 200, Shutter speed 1/320<sup>th</sup> sec, *f*11.

## Wide Angle Domes and Macro Ports

Both wide angle and macro ports are significant to inward lighting. Macro ports are useful in eliminating unwanted flare seeping into the camera lens because strobes can be positioned precisely in the shadow of the macro port. Take a shot, check the LCD for any flare, reposition and if necessary go again and again until you pull it off.

Shooting wide angle inward lighting is dependent on the position of your two strobes. First and foremost you need to position them in the shadow of your wide-angle dome port so that stray illumination cannot leak into your wide angle lens via your dome port. Be prepared to 'cross position' your strobes behind your housing pointing towards each side of your head. Alex Mustard refers to this position as 'cross strobes'. Trust it, experiment and tweak your positions and power settings and you will make it work.

I totally agree with Alex Mustard's views on page 122 and 152 of his book *Underwater Masterclass*:

- It's not what you shoot, but how it's positioned and how close you can approach.
- Illuminating the subject and not its surroundings is more easily achieved when the subject protrudes.
- Subjects that allow you to get very close repeatedly are ideal for this technique.
- The most common mistake is trying to use inward lighting on subjects, which are too far away from your dome port.

FIG. 6.56 I take every opportunity that I can to practice wide angle inward lighting. This vibrant fan coral was an ideal opportunity when I had little else to photograph. I isolated the colour and insured that the reef behind was in dark shadow. On this occasion the blue space at the top was for my buddy to swim into but unfortunately he swam away in the opposite direction!





**FIG. 6.57** Later in the day on a different dive site I was in time to isolate the colour with my buddy in the frame. ISO 400, *f*11, 1/320<sup>th</sup> sec shutter speed.

## All About Lighting



FIG. 6.58 A beautiful soft coral growing close to the wall of a shallow cave. It took me ten frames to isolate the wall using two long strobe arms directed back towards my face. Tokina lens on the 10 mm end.



FIG. 6.59 A carbon copy of the above but I have angled my composition to include a thin slice of blue water, which in my opinion adds depth to the composition. My settings were ISO 400, f8, Shutter speed at 1/100<sup>th</sup> sec in order to open up the blue water background. In an effort to explain inward lighting to the readers and with the help of my good friend Sascha Janson, we used the swimming pool at Lembeh Resort, Indonesia. I set up the positioning of my own two strobes and Sascha pressed the shutter.



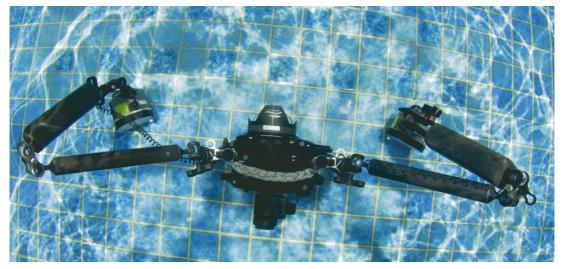
FIG. 6.60 It would have been easy to position them perfectly but underwater it doesn't work like that. Above is a credible example of strobe positioning whilst underwater.



**FIG. 6.61** Try to imagine that slice of light from the very edge of the two strobes, cutting across in front of the lens at 180°.



**FIG. 6.62** This time with a wide angle mini dome. The small black shades on all four corners are protecting the light from straying into the lens. Yes! It needs practice but this is what inward lighting is all about, both macro and close focus wide angle.



**FIG. 6.63** I often use long arms for both macro and wide angle inward lighting. It can be cumbersome but I want to be able to explore all eventualities on any one photo dive be it long arm wide angle or macro close-up. Notice above the strobes with diffusers! They have a beam angle of 180°. Yes, it's a weak beam but it was having fun one day with nothing to photograph, which first lead me down the road to inward lighting.

## **Patience and Perseverance**

You need plenty of both to master inward lighting and even then, it's not a technique I use on every photo dive. It's not even a technique which I use every day. It's simply an option to consider in order to isolate the light from your strobes. It's also fair to say that it's impossible to determine whether or not an image was taken using inward lighting. The most experienced photographer would simply put it down to 'black background' techniques or using a snoot. Remember, practicing at home is the key to inward lighting. Curtain drawn, lights down and off you go!



## LED Lights by Sascha Janson

In the past few years, LED technology has changed a lot. Less than 10 years ago, video lights were bulky and weak, the batteries didn't last very long and the lights were very expensive, all of which severely limited the number of people who tried to use them underwater. Today we can purchase very compact, powerful and affordable LED video lights, which are strong enough to shoot macro, stills and close-focus wide-angle (CFWA) subjects. This makes LED lights appealing to people who want to shoot videos and stills or for photographers who want to try something different.

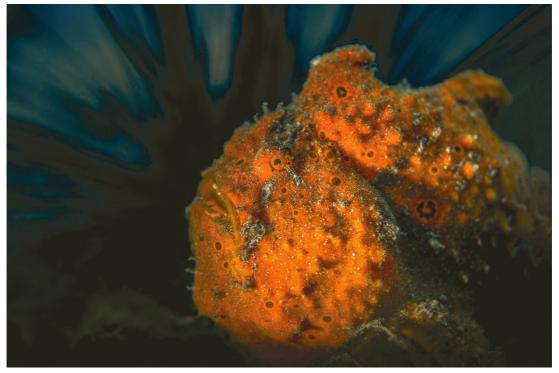
Some of these lights come with an incredible power output of 10,000 lumens or more, but that also comes with a hefty price tag. The affordably priced ones are in the 3000–5000 lumen range (at the time of writing). This is of course still a lot weaker than the average strobe, which is a big disadvantage (amongst many others), but shooting with continuous lighting comes with many advantages.

- We can see the light before we release the shutter and take the image so it's easier to change the position of our lights. There is no guessing! We can immediately see the effect of moving our lights around.
- The light meters on the camera suddenly work! When shooting macro with strobes, we usually don't pay attention to the light meters, but now the light meters work and when changing settings in camera we see the results right away.
- We can achieve a nice bokeh (out of focus background) without being limited by the maximum sync speed of the camera (many cameras can only synchronize with strobes to speeds up to 1/250sec, but when shooting with constant light we can shoot up to the maximum shutter speed of the camera). This means that we can achieve bokeh and/or black backgrounds on sunny days even at a wide open aperture.
- We can also achieve high-speed continuous shooting and capture the peak of the action without having to worry about recycle times from our strobes.
- Backlighting subjects is also much easier than with a strobe because we can see immediately if it looks good or not. These's no more flare in the image because the strobe was angled too much towards the lens.
- Perhaps the most obvious advantage is we can shoot video and stills on the same dive without having to carry both strobes and LED lights with us. There are actually some hybrids (strobe and LED light combined) around.
- Some LED lights also come with a spot function, which is very similar to using a 'snoot' on a strobe, but because we're able to see exactly where the light is before we release the shutter, it's easier to position the spot

on the exact place where we want it to be. Unlike with snoots, we won't need to trigger the strobe, which sometimes can be awkward because the cable is in the way or the trigger or the light sensor points in the wrong direction.

- The spot function of LED lights is my favourite. I use this all the time to isolate subjects from the background. I usually just have the lights attached to my BCD with a carabiner and then just place them in the sand to illuminate the subjects. This is especially helpful when subjects are not moving and it has the advantage that I can move around with my camera to get the subjects from different angles and the light stays in the right position.
- Some of the new LED lights on the market come with different colours of LEDs, which can be an advantage when we come to create different colour backgrounds or subjects in different colours.
- LED lights cannot completely replace strobes (yet) but they're an alternative for many underwater photographers. I mainly shoot video but I still like to shoot stills, that is why over the last few years LED lights have been my go-to light source for shooting underwater.

Here are some shots taken with LED video lights:



**FIG. 6.64** Sascha Janson with frog fish with a backlit sea urchin in the background. Sony A7R2 90 mm macro. *F2*.8, 1/800<sup>th</sup> sec, ISO 100. 1 × Light & Motion Sola 2100 S/ on spot (front), 1 × i-Torch C92 (back).





**FIG. 6.67** Starry blenny in a bottle – I placed my LED light (on spot) in the sand so that it just hit the opening of the bottle and waited for the blenny to stick its head out. Sony A7R2, 90 mm macro, *f*22, 1/60<sup>th</sup> sec. ISO 400, 1 Inon LF800-N.

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**FIG. 6.65** Sascha Janson. Black background at f2.8 - Hypselodoris trio in Lembeh. Canon 7d Mark 11. 60 mm macro, f2.8,  $1/4000^{th}$  sec, ISO 160,  $1 \times$  Sola 2100 S/F (on spot),  $1 \times$  FIT 2400 WSR (on spot).

FIG. 6.66 Sascha Janson: Backlit leaf scorpion fish – Sony A7R2. 90 mm macro, *f*9.0, 1/250<sup>th</sup> sec, ISO 640, 1 Light & Motion Sola 2100 S/F as a backlight.



**FIG. 6.68** Starry blenny in a bottle – I placed my LED light (on spot) in the sand so that it just hit the opening of the bottle and waited for the blenny to stick its head out. Sony A7R2, 90 mm macro, *f*22, 1/60<sup>th</sup> sec. ISO 400, 1 Inon LF800-N.

## **CHAPTER 7**



# **Composition Underwater**

# Introduction: These Guidelines are Made to Serve Us. Not the Other Way Round!

**S** imply put, composing an image underwater means arranging elements in a way which suits the idea or goal of your best work. It is so important that you recognise that composing an image underwater is so much harder than composing on land. There is so much more to think about, for example:

- Buoyancy control
- Buddy safety
- Time limits
- Depth
- Safety stops
- Mask fog-up, the list is endless

I know many who choose not to bother at all with composition whilst underwater, it's too distracting. They press the shutter whilst leaving plenty of space around the frame so they can build up the composition on a computer long after the dive is over. On a personal note, this is not my way of doing things, but if it works for you then so be it. Composition underwater can be a demanding topic to learn, and to be honest there will never be any objective standard to judge whether a particular picture is 'good' or 'bad'. Any composition, which conveys to the viewer the author's meaning has to be acceptable. Any composition which jumbles the meaning is not, and the evaluation is entirely subjective.

The 'rules' of composition are not really rules at all but guidelines. They have been derived because they describe specific patterns that have recurred in the works of many different artists in bygone days. This is why having an awareness of these guidelines is crucial, in order to develop an understanding. Understanding develops confidence and confidence will allow your creative talents to flourish. Composition is one aspect of photography, which usually separates the proficient from the enthusiastic beginner.

### The Work of Other Underwater Photographers

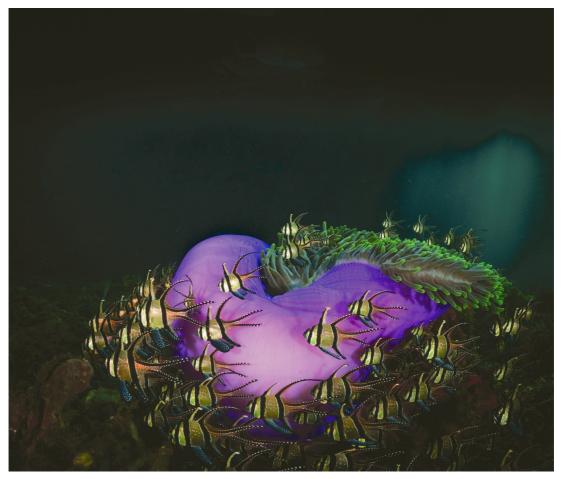
To enhance your understanding of composition underwater you must look at the work of successful underwater photographers. A good place to start is the UK's Underwater Photographer of the Year Competition and the USA's Ocean Art Competition. When you see images that amaze you, ask yourself what it is that you like about them. Identify the compositional elements that you may have used in your own favourite shots. Search the web for underwater competition winners; any of the above is a good place to start.

## **Decision Making Through the Viewfinder**

When I teach underwater composition my first priority is to keep it simple and to encourage decisions on what may or may not work:

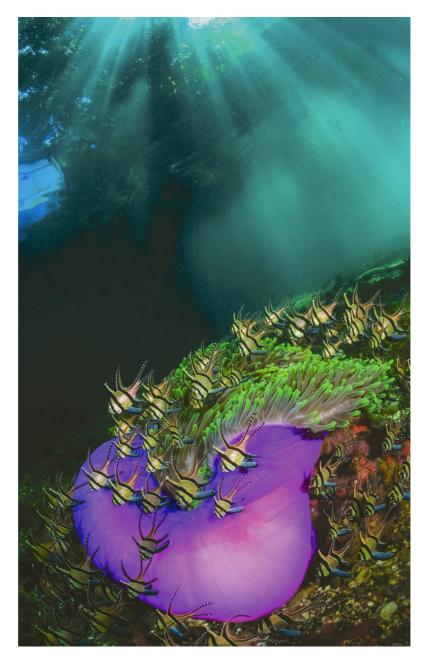
- Portrait or landscape format?
- What is the centre of interest?
- Where should the centre of interest be placed?

This is just the beginning, it matters not whether it's right or wrong, as long as you get into the habit of considering the compositional options before you take the photograph. Certain elements of composition may be an intuitive thought process, but others won't be intuitive. You personally will have to take down with you underwater a 'mental label' as a prompt to consider your compositional options and make choice's either way. Horizontal or vertical – landscape or portrait?



**FIG. 7.1** An early morning photo dive beneath Police Pier in Lembeh, Indonesia. My buddy was photographing a colourful sea anemone in a landscape orientation. So engrossed was he in the behaviour and colour, he never thought to look upwards towards the bigger picture. See Figure 7.2 overleaf.

**FIG. 7.2** Whilst both compositions are credible, the sun beams come out on top every time. Always consider the image frame orientation option before you shoot. *f*20, 1/320<sup>th</sup> sec shutter speed. Tokina 10–17 mm at 17 mm. ISO 1600, in low early morning light.



## Portrait and Landscape

We view a seascape through the viewfinder either horizontally (landscape) or vertically (portrait), but which one do you choose? Often the subject or scene will suggest one or the other. Consider the lines, shapes and orientation of the elements. The format will often jump out at you. If you cannot decide, then shoot both. Many professionals will suggest that, if you shoot for publication purposes, you should develop the habit of shooting both vertical and horizontal so the editor can choose one or the other. The guiding principle says that emphasising vertical lines adds tension and excitement to a vertical format, whilst the horizontal format is much more restful to look at because it suggests calm and, in land photography, echoes the horizon, hence it tends to be preferred by landscape photographers.

When shooting wide angle I believe there are more portrait opportunities in the sea than landscape. The reason for this is limited to the underwater world, and it is because of the colour of the water and the way in which blue water (or green), graduates in brightness from the top of the frame to the bottom.

A vertical wide angle blue water shot can graduate from a very light tone of blue, through the blue spectrum to almost black. The feeling of depth that this creates is a powerful tool in creating wide angles with impact.

## Focal Point: Attract the Eye of the Viewer

When composing a picture, one of my own priorities is the focal point or centre of interest. The focal point is where the eye of the viewer first lands. My challenge is to unite what I intend to be the focal point and what the viewer is first drawn to. An excellent example is the eye. It's human nature that the viewer will seek out the eyes, we do it all the time. We make eye contact with others. With auto-focus being the norm, our instinct is to use the central focus area in the viewer would seek out. Another golden guideline of composition, and one that I agree with more often than not, is to place the focal point off to one side instead of in the centre of the frame. An image will fail if the viewer cannot find anything of interest to look at. Eyes seek a resting place.



**FIG. 7.3** Make sure you have the eyes symmetrical before you swim away looking for other opportunities. You must check your LCD playback. The number of times I have been certain that everything is ok only to discover later in the day that the eye contact is slightly off. Look closely at the eyes. You can get away with many other traits, but underwater eyes have to be flawless.



**FIG. 7.4** This particular schooling fish portrait has strong eye contact, but above all (in my opinion) it requires a little more balance. In my opinion the three fish at top centre don't seem to belong with all the others. I could have cloned them out, but I decided to leave them in so you can decide for yourself if they belong in the composition.

## Golden Rules Law of Thirds

FIG. 7.5 Colourful scorpion fish on a night dive. The crop is of my own choosing with a small space to the right for the inclusion of the tail. Notice the gap at bottom right and the amount of dead space. Do you think it's too much? The eye is in the middle but on the top third's intersection. All we have left is the space for the fish to move into. When I'm cropping an image such as this, most of all I'm looking for a sense of balance. A basic guideline of composition, and one that is used to create a visually balanced image is known as 'the law of thirds'. I place significant importance on this principle. It proposes dividing up the viewfinder into an imaginary grid, using two horizontal and two vertical lines and the focal point is then placed on or near any one of the four intersection points created by the lines. It gives a feeling of tension, energy, balance and harmony, preventing the focal point from occupying the middle of the frame. Nearly all Micro 4/3rds, mirrorless and SLRs together with compact system cameras have the option to preset a 'thirds grid' within the viewfinder via the camera custom menu. Artists frequently use this guideline. The next time you visit a gallery, notice the style of compositions. I guarantee that you will find numerous paintings and photographs with their focal points situated on or around these intersection points.





**FIG. 7.6** I'm shooting directly downwards on the larger clownfish who kept eye contact almost throughout. I took more than 25 frames, waiting to press the shutter when I had two eyed contact with the larger clown. I got lucky with the balance of the two juveniles at the top. Camera details Nikon 40 mm macro, 1/320<sup>th</sup> sec shutter speed, *f*16, ISO 200.

# The Underwater Photographer

FIG. 7.7 This octopus was just too near to my lens and I was unable to retreat on the sandy sea floor without kicking up lots of silt. Remember to leave some space for yourself in front of you like I should have done!





**FIG. 7.8** I was able to settle down on the substrate with an upward angle and pick off these two gobies. I've cropped the composition to introduce the eye contact which places the subjects on the thirds intersection. Notice the space for them to move into.



**FIG. 7.9** Composition so often goes hand in hand with patience and this particular scorpion fish was always in residence and easy to find. However, how to isolate the immediate background clutter was a different story. Accessibility was reasonable, I was able to lie low on the sandy bottom and take a couple of shots of what may be possible. I composed a vertical format with the eyes across the top thirds and used a little 'inward lighting' from each of my strobes. I invested some time in how to isolate and got lucky as he moved slightly into the open towards me. *f*16, 1/320<sup>th</sup>, ISO 400, Tokina at 17 mm end. Two Inon 220s level with my eyes behind my viewfinder and close to my camera housing.

FIG. 7.10 A memorable encounter with a turtle at Bunaken Oasis Resort, Indonesia. He appeared from a small crack beneath an under hang and just sat and watched me set up to take his picture. Perfect eye contact, no distractions in the background. I backed right off for a minute to replace my settings of ISO 200, 716, 1/60<sup>th</sup> sec. Tokina lens on 17 mm end. I used both my right and left hand to bring my strobes in much closer to my housing and level with my ears. He gave me perfect eye contact against a black water background.

#### Bull's Eye Approach: Centring the Subject

There is a well-known guideline that says the focal point of the picture should not be placed in the middle of the frame unless it enhances the composition. The theory is that the 'bull's-eye' effect can leave it looking flat and boring. The eye will lead into the picture, stay in the centre of the frame looking at the focal point, and will not move around to enjoy other aspects.

We want the viewer to look at our pictures, to enjoy them. Whilst I agree with this generalisation, there will be occasions when placing the focal point in the centre is pleasing to the eye.

From a personal point of view, when shooting extreme macro, where depth of field is minute I tend to place the focal point in the middle to ensure pin sharp focus. I leave a little room around the frame to crop later in the computer (when I can clearly see what I am doing) in order to improve the dynamics of the picture. This technique has little to do with composition but more about my failing eyesight.



#### Holding Your Camera Housing: Orientation

Hold your camera housing in a landscape format. Now turn it 90° into a portrait. Which way did you turn it? Clockwise or anticlockwise? It matters not, but we all have a preference. I turn my housing anticlockwise most of the time. Why does this matter? If you have a strobe mounted on the left side of your camera, as with the majority of designs, you will notice the flash is now underneath the camera and knocking against your knees.

Orientation of this nature is a personal thing, but you have to consider strobe placement. If using one strobe, I usually have it attached to the right-hand side of my housing so that when I turn into a vertical it is still positioned above the camera. It's just the same if it was the other way around but once again, it's something to consider. For this reason I have a strobe shoe on each of the four corners of my housing to provide flexibility of strobe placement in either format. The preferred compositional format can change in an instant, particularly with a moving subject; that's why it's essential to configure your housing to cope with instant alterations of format. I notice with some the habit to shoot only in landscape format. This occurs because camera housings are comfortable to hold and ergonomically designed to be held in a landscape format.

One participant of a photo workshop had difficulty using his housing/camera in a vertical/portrait format. Whenever I forced a 'vertical format' upon him, he would soon lapse back into a horizontal grip. There was nothing else I could do except to remove the right-hand side hand-grip from his housing. Whilst extreme, it did the trick and he quickly had to find a way of holding the camera differently. The problem was solved in no time by holding it vertically, with one finger on the shutter and both hands cupped around the housing body. I re-attached the grip to his housing for the next dive!

#### **Dramatic Diagonals**

There are very few straight lines in nature and even less underwater. Vertical and horizontal lines often cut a picture in half, but the diagonal line is strong and dynamic. It's an excellent tool for the underwater photographer.

Diagonal lines contrast strongly with horizontal and vertical elements, carrying your eye through the entire scene. By suggesting perspective, they also add depth to an image.

Lines leading from bottom left to top right are considered to work best, because that's the natural way for the eye to travel. This direction happens to be the way in which we read in the Western world, left to right.

Converging lines created by reef walls, corals and wreckage are ideal for adding a strong sense of depth, scale and perspective, due to the way they rush away to the horizon and seem to move closer together with distance.

The dynamic diagonal will often lead the viewer's eye to the focal point.

#### **Tilting the Camera**

Underwater, I seldom hold my camera in either a rigid vertical or horizontal format. In fact I actually tilt my camera between portrait and landscape more than 90 per cent of the time. It's a technique that would seldom work on land, by virtue of our conditioning to a horizon that is straight. You see, on land we hold our cameras in either one format or the other because tilting the composition on land would inevitably disturb the eye of the viewer for countless reasons.

The horizon is level. Trees, buildings and people stand tall. Land photography is orderly, and the viewer recognises the orientation of subjects. Underwater, the visual clues that determine orientation are not as strong. If there are no visual clues to the horizon, the viewer is unable to determine the original orientation of the subject. The reason for tilting my macro and close-up subjects is to achieve a strong, diagonally orientated composition in the viewfinder.

I frequently tilt wide angles for the same reason – to achieve dynamic diagonal lines. More often than not I'll get away with this disruption to the eye of the viewer because underwater our topside 'horizon line' is all but absent. When you work very close to the surface, for example when shooting wide angle 2 m deep you have to remember to keep the horizon line horizontal or else the viewer's eye is disrupted just a little too much.

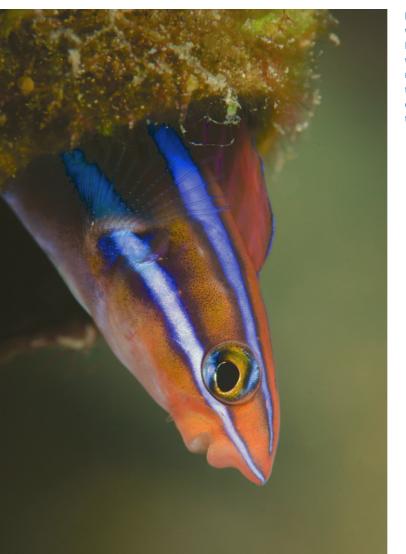


FIG. 7.11 A macro vertical format with a soft sympathetic background. It was sticking up out of some pipe work in Lembeh Straits. Back at the resort in Lightroom, I rotated it back to front and upside down to find which compositional angle of view I preferred the most.



**FIG. 7.12** So many layers of interest. From a compositional point of view let us look from the top down. The surface water line (with the reflection) is on the top thirds just above and between the schooling anchovies. They create their own dynamic line across and between the darker water. The three coral bommies lead you into the foreground on the bottom right hand side. To finish off this wonderful view, in the very foreground, 'crinkle' reflections dance over the sandy reef floor. When I first viewed this shallow scene I really did not know where to begin. What to leave out, what to leave in. This is my finished composition and I was pleased with my square format crop.

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**FIG. 7.13** This natural light image taken in Jackfish Alley, near to Sharm in the Northern Red Sea is a good example of what I call 'Compositional Enclosure'. I take great care and whenever possible I avoid the bright areas near to the edge of the frame to escape. Notice how the strong sun shafts are enclosed. To my eye there is nothing more distracting than highlights leading the viewer's eye out of the composition. Often it's unavoidable, but where possible, enclose the edges. Nikon D200, 10.5 mm fisheye lens, f8 at 1/6<sup>th</sup> sec, ISO 400, natural light.

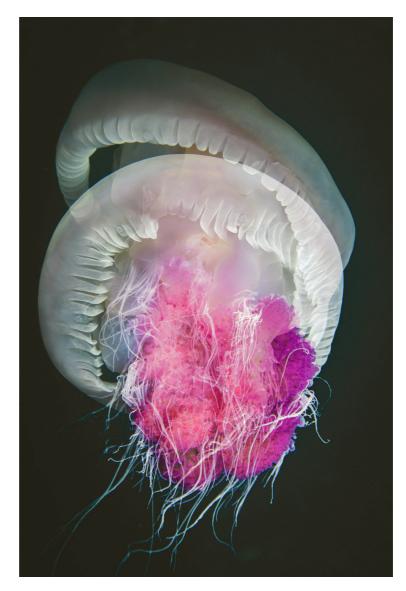
#### **Compositional Enclosure**

This is my own expression, and it's all to do with the edge of the picture frame and the way that the eye of the viewer can unintentionally be encouraged to leave the page too early. Compositional guidelines will advise that you to check around the edge of the frame for distractions, which lead the eye away. One huge distraction for me underwater is extreme brightness around the edge of a composition. First and foremost, you have to become aware of it in the first place.



#### **Curves and Circles**

Lines that curve through a composition lead the eye in a similar way that a shoreline, river or winding road would. The circle is made up of a continuous curve, and its movement keeps the eye in the picture frame whilst leading it around the composition. An excellent example of this is 'Snell's window', which is a powerful tool in wide angle. The circular curve of Snell also makes a soft frame in which to include the main centre of interest.



**FIG. 7.14** Curves and circles lead the eye of the viewer around the jellyfish again and again. The black background makes the delicate colours pop. 60 mm macro, *f*8, 1/320<sup>th</sup> sec ISO 200. Tokina 10–17 mm on the 17 mm end.

#### **Horizon Line**

The discussion of horizon lines in underwater photography seems totally irrelevant, but there is a reason for me to include it. The Collins English Dictionary defines the term 'horizon' as 'the apparent line that divides the earth and the sky'. Underwater there are numerous examples of what I term 'implied horizons', and we should be aware that the presence of an implied horizon line in seascapes can also divide a picture in half, often to the detriment of the composition. On land, there is a guideline that advises against placing the horizon in the middle of the frame for the same reason. The viewer may not always recognise the photographer's intentions, so where we place the implied horizon within the frame helps to define and emphasise the strength of the composition. Less obvious examples may be the top of a coral reef against a blue water background, or perhaps the line of a sunken wreck silhouetted against the blue. The old adage and general rule of thumb in land composition is 'avoid placing the horizon across the middle of the frame'. This technique only serves to give equal emphasis to both foreground and background, which can result in a weak and static composition.

FIG. 7.15 Break the rules by all means – I do! The slice of blue water cuts straight across both the reef and the reflection but in my opinion it works. f11, ISO 400, 1/200<sup>th</sup> sec. Tokina 10–17 mm on the 10 mm end.



The principle of implied horizon lines is simple to understand once illustrated but it is a subtlety of underwater composition that often goes unnoticed. The moral is to build this awareness into your repertoire and use it to emphasise the content of your pictures. Question – how will you remember to think of this underwater the next time you are shooting?

A photographer who aspires to take more than a casual snapshot cannot hope to produce a standard of excellence without first understanding and seeking to master the art of composition. The rewards for this entire endeavour are certainly worthwhile.

#### **Depth Perspective**

Depth perspective (or image depth, as it is also called) is the technique of creating a sense of depth within a picture. Take the analogy of the paintings inside the tombs of the Ancient Egyptians. For some reason, they had no sense of depth perspective. Their figures were always placed side by side to each other as if everything was the same distance away. They had a sense of height and width, but not of depth; their pictures were two-dimensional, not three. It can be confusing to talk about creating depth or a third dimension, because the sensor is flat. The only sense of depth that can be achieved is the perspective, which is conjured up for the viewer. This can be achieved by using the foreground, middle ground and background.

#### **Complementary Colours**

Different colours produce different emotional responses in a person. Red and orange evoke feelings of enthusiasm, warmth and power. Blue creates a sense of peace, calm and coolness. Underwater we have the primary colour of blue, which surrounds us on a tropical dive. Blue is a colour that signifies the sky, the sea and much more. I have yet to meet a diver who is not drawn to the colour blue. Comments abound regarding the colour of the sea. The intense blue.

We associate blue with the colour of the sky and fine weather. Blue is one of the primary colours and on a standard colour wheel its opposite numbers are yellow and orange.

Underwater, the combinations of these colours work dynamically together. You will see excellent underwater images of yellow schooling fish against an intense blue water background. In my own photography I am constantly looking to exploit this combination. When I see a yellow or orange subject, I immediately consider how to combine it with a blue water background.



**FIG. 7.16** Perfect complementary colours. However, at the time I so wished I had composed them so that they did not merge into each other. I was too concentrated on their eye contact and did not notice.

Go into a newsagent, stand 3 m from the stands and look at the magazines. Which colours do you see? You will find it is the reds and yellows. Yellow is also an excellent colour to combine with blue, and you will see many vibrant photos from the Red Sea in particular where the clear blue sea is mixed with a splash of red or yellow from the vibrant soft corals.



**FIG. 7.17** The colours of the sea found in and around Indonesia are spectacular. This is a view from 1 m beneath the jetty at Misool. I must admit that I found colour composition a little overwhelming, but in a good way. The colours set off with the shallow blue water in the background, which lays the stage for the yellow and pinks in the foreground. Nikon 7200, Tokina 10–17 mm on the 10 mm end. ISO 400 at *f*11.

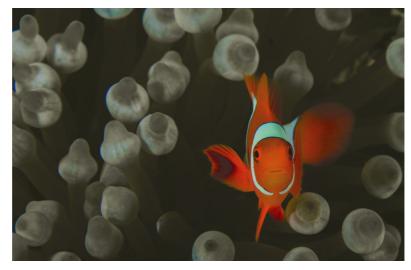
#### **Compositional Balance**

The balance of a composition is more of a feeling than anything else. In my early days, balance in my own work was more after the fact. I only looked for balance after I had taken the shot and viewed the results on a light box. Now I ask myself, before pressing the shutter, 'does this picture look good? Is it balanced?' I can check for a sense of balance within an instant of pressing the shutter but think to consider composition before you press. Look through the viewfinder to see what is included in the frame. Notice the direction and manner in which your eye travels across the frame as you scan the scene. Look in all four corners and pay attention. Are there any distractions towards the edges of the frame? Do you like the way you have placed the subject? Is it 'balanced'?

When my concentration is heightened and I am 'in the zone', I am able to imagine that the image in the viewfinder is projected onto a huge screen in a darkened room. Do I like what I see? If the answer is yes, I press the shutter. I may take six, ten or even twenty more frames depending on the potential of the opportunity before I make a point of reviewing the LCD on my housing. I ask myself many questions. 'How can I improve on what I have taken?' 'How long shall I stay? Ten minutes, twenty minutes?' 'What is it worth?' 'What is the potential of this opportunity? How good could it be?'

This is how I think and consider in the water, when I'm in the zone, when I am shooting for myself and no one else.

FIG. 7.18 A standard clown fish shot with strong eye contact. The de-saturated tentacles make for a technique called 'colour popping'. This image would also work in a vertical orientation by slicing it down the middle and using the right-hand side of the composition. See below.



**FIG. 7.19** Look out for such compositional opportunities when you are reviewing your work topside. You will find plentiful opportunities to experiment with.





FIG. 7.20 I've composed just enough base beneath the bottom of the frame to give some context. Too much base will be interpreted as 'wasted space or dead space'. Nikon D7200, f16 at 1/250<sup>th</sup> sec, ISO 200, two Inon strobes placed each side of my macro port to illuminate both sides of the cuttle fish as it moved around whilst I was shooting. This image above was the precise composition I was trying to achieve. I remember trying to make sure to keep both the tentacles within the bottom frame. This doesn't mean it's a great picture, but it means that I achieved exactly what I was after. Tokina 10–17 mm lens on the 17 mm end.

#### **Baseline**

This element of composition is about the importance of giving subjects a 'base'. Here, let us think of 'base' as 'the bottom or supporting part of a subject'. There are many subjects in the sea that are anchored to the reef in some way. How much of the base we include can make or break the composition. If we do not consider the base of the subject before we press the shutter, it may appear that it has been 'cut off'. The eye often has a need to see the base of a subject to give it context. On the other hand, if we include too much 'base' it will impact on the viewer as wasted space.

With a recognisable subject on land, such as a person, animal or motor car, if part of the subject is cut off our 'inner eye' subconsciously attempts to complete the part that is missing – we effectively 'fill in' the person's legs or the rear end of the motor car because we know what to expect. Where a subject is not so instantly recognisable, our 'inner eye' has trouble filling in these missing parts.

#### **Compositional Merger**

A compositional merger is where one subject blends into another. I find them most noticeable when shooting silhouettes. A distant diver can often merge into a background and/or foreground reef. My tip is to ensure the silhouette is completely surrounded by blue water or a colour that will not merge into another shape.



**FIG. 7.21** You only need the smallest part of a subject to merge into another part when you are shooting silhouettes for an idea to fail, as in this example.



FIG. 7.22 I realised my mistake soon after Figure 7.21 above was merging. I pulled away to allow more space for the diver to explore. Notice the difference between the two. A very easy mistake to make, but one to look out for in your own photography.

#### Amputations

When shooting divers, fish and other identifiable subjects, there is an element of composition to consider called 'amputation'. In land photography there are guidelines, which advise that you don't crop a portrait of a person across the neck, just below the elbow or just above the wrist. If you want an upper body shot, it is usually best to stop at the waist with the hands and arms included. If you crop lower, it appears that the subject's legs have been cut off. It's no different underwater. Just remember the TC system – think and consider. If you are shooting a fish portrait, consider what to include or to leave out. If in doubt, include a little more than you think – it can be cropped later in the computer.

FIG. 7.23 There is so much learning in these images. The photographer has chosen some colourful soft corals. He's close, and he is shooting upwards which is always a good sign.



what he has photographed just a second ago. This is where subject selection comes in. How is my lighting? How is my composition? How does it look? Shall I stay and work the subject, or shall I move on? This is what the underwater photographer needs to think and consider more than anything else and ask those silent questions 'How good could this opportunity be? What is the potential?'

FIG. 7.24 Most of all, he is studying



**FIG. 7.25** An excellent image by my good friend Shannon Conway from Australia. For those keen eyed among you it's an image from the Cenotes in Yucatan. Notice how Shannon has compositionally closed off the cave at the top in order to keep the eye of the viewer focused within the pool of light and the sunbeams. Superb compositional technique.

## **Eye Contact**

When the viewer looks at a picture of a living person or animal, the focus of their attention will be directed towards the eye. Eye contact from a diver to a subject, for instance, is an excellent tool in order to guide the viewer's eye to the main focal point or, if the diver is the main subject of the picture, to a secondary point of interest. If the diver is looking towards the camera lens with a blank stare, the image says very little other than 'I am a diver'. Even when the main feature of the shot may have been a wreck, reef or coral formation, the eye of the diver will always dominate.

Use the eye of a diver to lead the viewer to the focal point of the picture. If possible, include the subject in the frame. Good communication between the photographer and model is important and necessary. When Sylvia is modelling and my strobes can illuminate her facial features, I place her eyes on one of the 'thirds' intersections and the direction of her gaze will direct the viewer to the main focal point. It can be used just as effectively with fish and other marine creatures that have the appearance of eyes. The viewer will focus their attention on the eye of the fish and with careful composition the direction of the eye may lead the viewer to other parts of the frame. One thing to bear in mind is that the eye must be in sharp focus, whether it is a diver or a shrimp. If the eye is soft, the picture will fail.

## Something to Swim Into

Another popular topside guideline is to allow space for your subject to swim or move into. A picture of a moving subject, a fish or diver just about to swim out of the frame, has the effect of 'leaving the viewer behind'. The effect is unbalanced, and often results in a loss of interest.

With all aspects of compositions, there are exceptions, which add tension and conflict. This guideline is one of them.

FACING PAGE

FIG. 7.27 I composed this vertical composition knowing that our dive guide would soon appear in the top left corner of the frame.

FIG. 7.28 I looked at my camera for a moment only to find that our guide had compositionally 'passed the point of no return'. In my opinion he was too far forward of centre for the image to work. Remember to give some thought to your own compositions. Has the diver swum too far? Do you find the composition unbalanced?



**FIG. 7.26** All lined up and in position. I have composed this image with enough space for them to move into. I had spent ten minutes with them in the hope that I could create a balanced image. I took at least ten shots with this particular composition showing them off at their best.



#### **Simplicity Itself**

It's about the isolation of a subject and providing a simple, single theme to photograph. Simplicity is an area of my own photography that I am very aware of and constantly attempting to develop and improve. Keep the composition simple.

Choose a single theme and isolate that theme. The viewer should be in no doubt what the theme of the picture is.

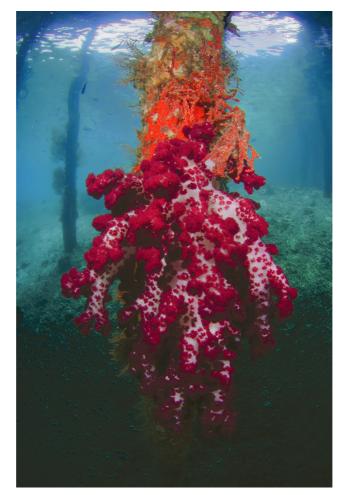


FIG. 7.29a Arborek Jetty in Raja Ampat is famed for its soft corals but when we arrived one early morning the light was dull, lacklustre and the corals were drooping. I swam around the jetty quite aimlessly for about 30 minutes hoping the early sun would break through and be kind. Having learned how to handle early morning light I put everything into this particular opportunity.



FIG. 7.29b We got lucky! The light began to break through above the jetty and I waited for this particular soft coral to open up. My eyes explored all around the entire frame. Notice the hint of sunbeams just trying to get through at top middle. I made sure to leave a space for beams to dwell.

## **Big is Not Better**

A tendency of my own is to shoot the widest, tallest and biggest fan coral, gorgonian or soft coral I can find. I have the 'big is better' syndrome, but it doesn't work.

When looking for subjects, our eye is instinctively drawn to the largest specimen but there is a problem with this. Some subjects are too big! Which means:

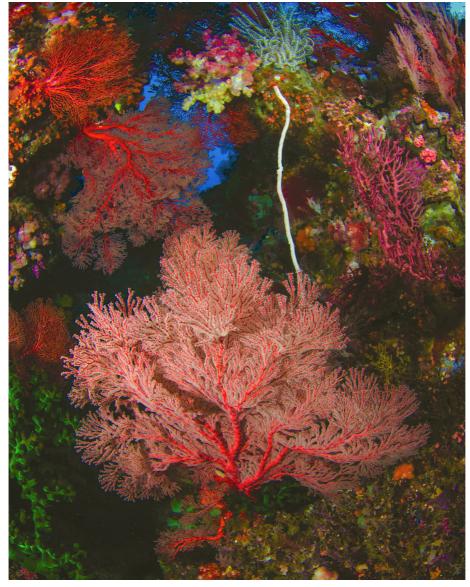
- we have to back-off further to get everything in the frame;
- there's more water between lens and subject;
- strobe illumination has further to travel, and
- sharpness and colour are diminished.

FIG. 7.30 In Lembeh Strait there is a very photogenic cave which you seldom ever see in dive magazines. Towards the back of the cave there is a colourful fan coral. The compositional idea is to balance the dive guide at the entrance to the cave and compose the fan towards the right-hand side with a blue water space in the background. Once I had set up and was ready to shoot I indicated to the dive guide to occupy the blue water space. It's such a tight shot. On this occasion I thought I had everything just how I wanted, but once back at the resort I realised that I had clipped the top of the fan coral.

FIG. 7.31 We went back in the afternoon and repeated the dive. On this occasion I made sure not to clip the top of the fan coral. Once again, our guide placed himself in a perfect position.







**FIG. 7.32** On a wide angle lens small objects can be made to look three or four times the size that it looks to the human eye underwater. Hence the huge advantage of using a wide angle lens to make these images possible. However, to create this distortion you have to get very close with a wide lens, such as my own Tokina 10–17 mm wide angle lens set to the 10 mm end. ISO 400, *f*11, shutter speed 1/125<sup>th</sup> sec. Two Inon strobes close into the housing but positioned in a way to illuminate the coral without illuminating the reef behind. Compositionally, I wanted to fill the frame with a sense of balance. The very top right-hand corner has a tiny slice of blue water, which was a small but unwanted distraction. Do you think it detracts?



**FIG. 7.33** Every so often we have encounters with marine life. Batfish in particular are quite common opportunities and for a fleeting moment they can often school into a pattern. This occurred quite out of the blue early one morning in Raja Ampat. They appeared at ease, swam beside me and moved into this remarkable pattern for no more than 3 or 4 seconds. I knew immediately that I had the shot, but it seemed to take ages to confirm that all eyes were in focus. ISO 500, Tokina 10–17 mm at the 17 mm end, f11, at 1/125<sup>th</sup> sec. Nikon 7200.



FIG. 7.34 Composition underwater can be quite dynamic. We can become so engaged with an opportunity that we miss the obvious. I was swimming behind the turtle and never once gave any thought to the composition of his front flippers, which were moving below him. I took a very quick peak at my LCD and realised my error.



**FIG. 7.35** Ten seconds later and what a difference! But you have to be aware to think of things like the turtle flippers being in the wrong position to make a strong image. That way of thinking must happen underwater at the time.

#### Which Way to View

With macro and close-up, there is rarely ever a 'right way up'. Images such as these should be considered and viewed in every format before deciding which orientation is the most flattering. Some of my own favourite images were actually shot upside down but underwater there is rarely a horizon to form a perspective of up or down.

There are eight different ways to view a picture. Using a program like Lightroom, open a selection of close-up photos. Rotate them sideways, upside down and back to front. I'm sure you'll find images that pop out even more when an alternative perspective is considered.

## **Breaking the Rules**

Just as there are times when guidelines are helpful, there are times when they can be adapted or ignored altogether. Knowing when to ignore the guidelines requires some experience, but the results can be quite dramatic and cause a particular image to shine above the crowd. Some underwater photographers are able to blend their understanding of composition with personal style, interpretation, and technical experimentation. For others, this can be demanding. There are no formulas for achieving this creative ability; I believe it comes from understanding, practice and lots of experimentation. It's up to you to decide when to stick to the guidelines and when to break them. I have always taken the view that you cannot break or follow the guidelines unless you know what they are. There are photographers who do not concern themselves with composition guidelines at all. If they can produce solid images doing so, then so be it. The rest of us often need a little help, and guidelines are like having a photo coach in the water with you. They gently suggest and guide, but they do not, and should not determine your photography.



**FIG. 7.36** One of the most important lessons I learnt photographing the whale sharks of Djibouti was the position of the sun in the sky in relation to their pass. My single strobe has illuminated the eye and inside the mouth but the sun in the sky has handled everything else. The sun is directly behind my back and this is why the under-surface texture along the top of the frame has not 'blown' out. If I was on the other side of the shark the sun would have blown out on the surface. When you are photographing in very shallow water try to put the sun at your back whenever possible.

## In Conclusion

All the above guidelines represent those elements of composition, which I think are relevant to underwater photography. I appreciate that it's a tough order to go diving tomorrow and take them all with you. Some are more important than others, so here are my Tips.

#### **My Tips**

In my view the six most relevant compositional guidelines to go photodiving are:

- Horizontal or vertical landscape or portrait;
- Focal point: attract the eye of the viewer;
- Golden rules: law of thirds;
- Dramatic diagonals;
- Tilting the camera, and
- Unwanted distractions near to or on the edge of the image frame.

If you already use these intuitively then choose some others from this chapter. If not, you need to find a method of remembering to think and consider them when your eye is behind the viewfinder and your forefinger is on the trigger in 10–20 m of water. Recalling them when you're out of the water is not the idea. Over the years, I've learnt them. Others I know affix them to their housing or a slate. Try and take a new idea down with you each day. Whatever camera and housing you use, ensure your viewfinder is clear and large enough to see what you are doing. If it's a challenge to see through it, it will be a greater challenge to compose in the way you'd like to.

UK underwater photographer Paul Colley has published *Winning Images*, a book all about Underwater Composition, I highly recommend it.



# **Close-Up, Macro and Super Macro**

## **Close-Up**

The best way to shoot close-up and macro is to let your strobe light the entire image. In other words – if the flash fails to trigger, the picture will turn out black.

- Use a 40 mm, 60 mm or a 105 mm macro lens, or mirrorless, 4/3rds or a compact camera.
- Turn your camera from auto to manual exposure mode.
- Select an ISO of 200.
- Select a shutter speed of 1/250<sup>th</sup> sec.
- Select an aperture of *f*22 or *f*16 with an SLR.
- f8 equivilent for compact, mirrorless, Micro 4/3<sup>rds</sup> and other systems.

FIG. 8.1 Two lizard fish, Lembeh Resort, Sulawesi. ISO 200, Nikon 60 mm macro lens, f16 at 1/320<sup>th</sup> sec. Two Inon 220 strobes each side of my housing level with my Nauticam handles.



My reason for these settings are as follows:

- Remember that at depth the colour of subjects rapidly diminishes. That's why we need to use a strobe to restore colour.
- Macro lenses provide very little depth of field (D of F) when focused close so you need to maximise D of F as much as possible to achieve sharp focus within the frame.
- Small apertures (high *f*-numbers) enable this, but the trade off is light.
- Using small apertures provides little light, that's where your strobe comes into play and illuminates the subject.
- A low ISO ( i.e. ISO 200) achieves very good quality, reducing digital noise to a minimum.
- 1/250<sup>th</sup> sec is a fast enough shutter speed to prevent camera shake.
- Position your strobe above and over the camera housing pointing outwards. If you use two stobes place them each side of your camera housing.
- Make every effort to choose subjects which you can approach from either eye level or below.
- Shoot upwards towards the water background.
- Get close, focus your lens, compose the subject and press the shutter.

Using this method you will have the best possible chance of achieving sharp focus. The position of your strobe will minimise backscatter and illuminate the subject evenly. Your low angle of view will enhance the impact of the subject and if you are able to find a subject with blue water behind, this will create a contrasting background and make your subject pop even more.



FIG. 8.2 All I remember was looking inside a can on the substrate of Lembeh, Indonesia and watching this octopus crawl out. I only had time for one shot. When I looked back to my LCD I was pleased with my strobe reflection inside the tin can makeshift home. ISO 200, Nikon 60 mm macro lens, f16 at 1/250<sup>th</sup> sec. Two Inon 220 strobes each side of my housing level with my Nauticam handles.



FIG. 8.3 Same octopus, different tin can! I spent 35 minutes watching the octopus making a home. My objective was a 'two eyed' contact with the viewer. It became all about the eyes. If one looked one way then I couldn't see the other eye. When I had two eye contact for a few moments the tentacles would disappear out of view at the bottom. My composition was the position of the tin can. There was no way I was ever going to compromise the tin can. Some twenty shots later I had it all. Tin can in the frame, tentacles in the forward frame and two-eyed contact. ISO 400, Nikon 40 mm macro lens, f16 at 1/200<sup>th</sup> sec. My two Inon strobes each side of my housing in a vertical format.

## **Blue Water Close-Up**

Whilst black backgrounds in close-up and macro are very effective they can be repetitive in our own macro collections. So how can we expand our repertoire of these techniques? One idea to jazz up your macro is what I can call 'blue water macro'. Like so many other underwater photographic techniques, the concept of blue water macro is closely related to our selection of negative space.

#### Step-by-Step

- Set a low ISO such as 200. Using your manual exposure mode, set an aperture with sufficient depth of field for a macro or close-up subject, let's say f16 with a DSLR and f5.6 or f8 with a compact system camera.
- Place your strobe about 8 cm above the housing pointing straight out. You don't have to tilt it downwards towards the subject. The spread of the strobe beam will provide sufficient light. Remember, the key to this close-up technique is to select a subject, which is situated against a blue (or green) seawater background, hence the term blue water macro.
- Select a shutter speed of 1/250th sec and press the shutter. Your strobes
  will illuminate your macro subject with the blue water in the background
  appearing quite dark. We are now going to change the appearance of the
  background by changing the shutter speed as opposed to the aperture or
  the ISO.
- Open the shutter to record a slower speed. Try 1/30th then 1/15th, 1/8th and 1/4th.
- Check your LCD monitor on the back of your camera and you will notice that the water background has changed from black to blue (or green) as the shutter has been slowed down to allow more light to reach the sensor.
- Go ahead and experiment to achieve which background colour looks best against your foreground subject but don't forget to shoot whatever you have chosen against the water column. Shooting towards the direction of the reef won't work unless the reef is some way away. You need to face and shoot towards the water column to ensure you have a clean background.
- If this technique is new to you then experiment and practice this first without a subject in the frame at all. Just point your camera towards the seawater column during daylight hours and bracket your shutter speed from 1/500<sup>th</sup> sec through 1/250<sup>th</sup>, 1/125<sup>th</sup>, 1/60<sup>th</sup>, 1/30<sup>th</sup>, 1/15<sup>th</sup>, 1/8<sup>th</sup>, 1/4, 1/2, and 1 sec.
- You will clearly be able to see a difference in the increments above.



FIG. 8.4 Instead of using a fast shutter speed of 1/250<sup>th</sup> sec, the technique for blue water macro is to decrease the shutter speed, let us say to 1/15<sup>th</sup> sec which has the effect of bringing the blue water into play. A shutter speed of 1/30<sup>th</sup> sec would darken the water. A shutter of ¼ sec would brighten the water. The choice is all yours to play with whatever water colour you prefer, from black to a very bright blue.

# Question: How do we prevent shutter shake at these slow shutter speeds?

You can't. Shutter shake will occur to some degree in the slower shutter speeds. However, the duration of light emitted from your strobe is in the region of 1/1,000<sup>th</sup> sec and this split second strobe burst has the effect of freezing any camera movements so that the subject is recorded sharp and in full colour against the blue (or green) background of the sea. It may take several attempts to achieve one that works so be patient when starting out. It's important to remember that you have to point your camera towards the water column for this to work, not towards the sand or the reef but into the plain blue (or green) water column. Different shutter speeds produce different colours of blue water. There's no right or wrong colour of blue, you select which one you prefer most.

#### **Blue Water Macro Examples**

These eight blue water macro examples were taken in the Red Sea at a depth of 10 m at 8.30am in the month of July.



**FIG. 8.5** An example of blue water backgrounds with a Nikon D7200, natural light only, ISO 200, Nikon 60 mm macro lens focused to 15 cm, f22 at 1/250<sup>th</sup> sec shutter speed. Remember there are no right or wrong colours. You pick the colour which suits your taste.



FIG. 8.6 At 1/125<sup>th</sup> sec.



FIG. 8.7 At 1/60<sup>th</sup> sec.



FIG. 8.9 At 1/15<sup>th</sup> sec.



FIG. 8.8 At 1/30<sup>th</sup> sec.



FIG. 8.10 At 1/8<sup>th</sup> sec.



**FIG. 8.11** At 1/8<sup>th</sup> sec shutter speed. The strobe has frozen the slow shutter speed with its output of 1/1000<sup>th</sup> sec plus.

# The Underwater Photographer

**FIG. 8.12** ISO 200, Nikon 105 mm lens, *f*16, 1/60<sup>th</sup> sec. Twin lnon strobes, once again on manual exposure, close in to my handles, level with my housing.





**FIG. 8.13** In shallow water there is more natural light. This Oceanic White Tip shark was hanging around in about 3 m of water making numerous 'swim bys' which gave ample opportunity to experiment with the blues. Nikon D7200, Tokina 10–17 mm at 17 mm, *f*10 at 1/200th. Image by Stuart Gibson.

## Bokeh

Bokeh is a Japanese term used in photography to define the aesthetic quality of out of focus areas of an image. The background is deliberately caused to be out of focus to reduce distractions and to emphasize the main subject and it's generally agreed that some lenses produce more pleasing out of focus areas that enhance the overall quality. The words bokeh and blur are synonymous with each other and I will use them both in the same way.

I discovered the attraction of bokeh in the late 1990s and I've continued to use it since then using all four of my macro lenses (40 mm, 60 mm, 105 mm and 200 mm) to achieve the pastel coloured bokeh backgrounds. It may feel risky to stop down to an aperture of f4 or f5.6 when we are so practiced at achieving the very best depth of field possible, but at f4 we can still obtain a precise point of sharpest focus – only this time with a greatly reduced depth of field. Not only does the negative space of the subject become a blur, often the entire subject does too.

#### How to Control and Use the Very Best Depth of Field

The very slender band of focus must be reserved for the main features. Without doubt, this will be the eye of the creature. If it's a still life study, then the area that in your opinion will be the main focal point of the picture is the key. When using large apertures such as f4 or f5.6, there is a need to control the amount of strobe illumination. The way in which I deal with this in my own work is to use manual strobe power settings. Overexposure can often occur with larger apertures of f5.6 or f4. So when this occurs I reduce my strobe settings to low power and if that is still too bright I position them on the same line but further away from the subject.

#### Using a 50 mm or 60 mm Macro Lens, Nikon or Canon

I find that an aperture of *f*5.6 produces a very photogenic quality of blur and when used around the magnification ratio of life size up to 1 to 3 (1:1–1:3) there is usually sufficient depth of field for the eyes to be captured pin-sharp. In my opinion, at *f*8 the out of focus areas look just a slight blur and it's as though a mistake has been made. At *f*2.8 the depth of field is miniscule. In the field I usually begin with *f*8 and bracket my exposures down to *f*4. The *f*5.6 shots are often successful and that is why I always start a bokeh session at either *f*11, *f*8 or *f*5.6. One huge error I find in the bokeh work of beginners is starting with an aperture which is just too wide, such as *f*4 or *f*2.5.



FIG. 8.14 In order to 'bokeh' this opportunity I used a Nikon 60 mm macro lens, ISO 200 at *f*5.6. My shutter was 1/60<sup>th</sup> sec. The 60 mm lens at *f*5.6 was enough for the bokeh to work, *f*4 was too much and the area behind the eyes was blurred. **FIG. 8.15** Another example with the settings of ISO 200 at *f*8. Nikon 105 mm macro lens, my shutter was 1/320<sup>th</sup> sec. On this occasion I got the eyes perfectly sharp as opposed to Figure 8.14 above. I tried my best at *f*4 but the eyes were blurred.



### 105 mm Macro Lens

An aperture of *f*11 or *f*16 is optimum for this lens. I have experimented with *f*8 and *f*5.6 but had a low success rate when shooting at a magnification rate close to life size.



**FIG. 8.16** I used my 105 mm macro lens at *f*11, 1/320<sup>th</sup> sec, ISO 200. The white sandy bottom was helpful in merging the subject into the background. Two Inon 220 strobes on ¼ power each side of my housing.

FIG. 8.17 The white fuzz is actually the white sandy bottom with a small rock in the background. ISO 200 with the Nikon 105 mm macro lens at f22 at 1/320<sup>th</sup> sec.



FIG. 8.18 Lucky shot! I was shooting bokeh and got distracted with the great eye contact of this fellow. When I viewed it back in my LCD I noticed a patch of green coral in the background. To this day I don't know where it came from. ISO 200, Nikon 60 mm macro lens, f11, 1/320<sup>th</sup> sec.



#### 200 mm Macro Lens

This gives great Bokeh at *f*11 and *f*8 and when shooting at close to life size, *f*16 can also work well but it's a heavy lens and I seldom ever use it these days.

Shooting blur/bokeh is great fun, challenging and a good discipline to learn but it takes patience and practice to develop.



**FIG. 8.19** Once again whilst shooting bokeh I shot off this one frame inadvertently which resulted in a pleasant green bokeh background. ISO 200, Nikon 60 mm macro lens, *f*8, 1/250<sup>th</sup> sec.



**FIG. 8.20** The next three frames go to show how the underwater photographer can influence the colour of blue water backgrounds. This scorpion fish was jutting out from a small ledge. With my Nikon 105 mm lens I set up with ISO 200, *f*16 at 1/320<sup>th</sup> sec and took one frame of the subject.

**FIG. 8.21** The second frame I took was ISO 200, *f*11, at 1/125<sup>th</sup> sec. I have illuminated the shadows from behind the scorpion fish by opening the shutter speed to 1/125<sup>th</sup> sec.



FIG. 8.22 The third frame I took was ISO 200, f16. I have illuminated the shadows from behind the scorpion fish by reducing the shutter speed to 1/10<sup>th</sup> sec. Most important I have had to hold my housing rock solid without compromising the shutter speed or else the features around the eyes and face would be blurred. FIG. 8.23 Bokeh also works for super macro so be sure you know what to focus on. With this image it was always about the rhinophore. You can always detect when the rhinophore has been compromised by heavy handling. They retract into a pocket beneath the skin. This specimen was out in the open. Notice how superb both are. ISO 200, 60 mm macro lens, f16 at 1/320<sup>th</sup> sec.



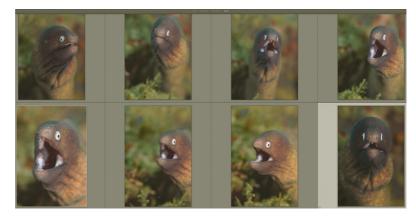


**FIG. 8.24** It's satisfying to get the eyes how you want them, together with the vertical line of the composition but it takes patience.

Close-Up, Macro and Super Macro

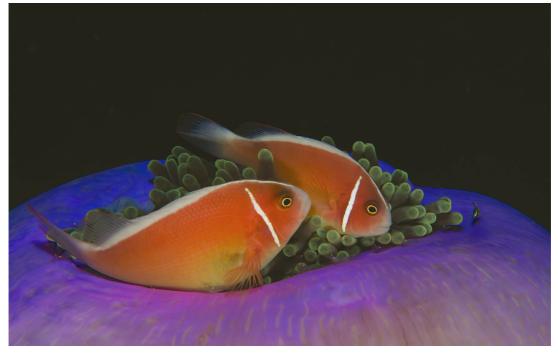
# The Underwater Photographer

**FIG. 8.25** A screen grab of Lightroom from my computer. I cannot overstate how many frames I shoot in order to get one or two usable images.



**FIG. 8.26** I had worked this opportunity realising it was the best I could do and moved on.





**FIG. 8.27** This was my best pick out of a total of 32 images. ISO 200, Nikon 60 mm macro lens, *f*16, 1/320<sup>th</sup> sec.

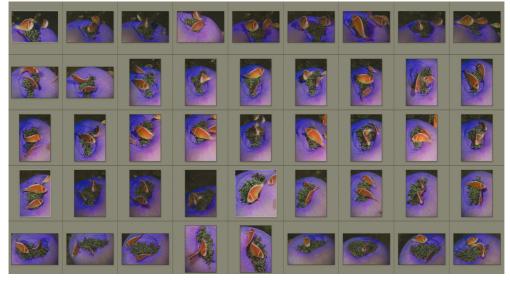


FIG. 8.28 A Lightroom screenshot view to show how much time you need to invest to achieve the shot you want.

## Shooting Fish Close-Up

When I set about photographing fish my objective is to show the character of that particular individual. I try to get personal as if to develop an almost silent connection. The side view of a fish, though well lit, can often look static and flat, with very little impact. This type of picture is ideal for identification purposes, but not much else and it's certainly not for me in anyway whatsoever.

The alternative is the fish portrait – an image approached and captured in such a way as to breathe life and character into the subject. To appreciate this concept in a positive way is the secret of success. The photographer sees the subject and is able to apply his or her own set of principles. Certain techniques, however, can help you to achieve your goal.

As soon as you see a potential subject stop and consider the following:

- The location of the subject.
- The image you would like to obtain.
- Possible lighting angles.
- Your angle of approach. Most important!

Remember that you are invading the fish's territory so your approach should be very gradual and slow. If possible, hold back and observe its routine. To obtain that better picture you need to anticipate behaviour. This can only occur over a period of time and requires a good deal of patience. If a subject does something interesting once, it will do it again provided that it is at ease with your intrusion into its territory. It's this behaviour that will help to capture a creature's personality, and make it stand out as a special picture. The 'peak of the action' may be a fraction of a second, a moment in time to anticipate that point of interest in order to turn a good picture into a special one. So, if at all possible, camera and flash positions should be made prior to your approach to avoid frightening the creature away. If this does occur, don't chase it – it's tempting, but it won't work. Given time, the creature will return and, once familiar with your presence, may provide you with the opportunity you require.

Various books describe how fish pictures should 'speak to you'. They should be face to face, close, and looking at the eyes and mouth. When applying the rules of conversation, you don't talk to a person while looking down or looking at the back of their heads. So why do it to a fish?

#### The Eyes

In any portrait, if the eyes of the subject are visible then that is what the viewer will see first. The eyes must be pin-sharp or the image will fail. Try to achieve sharpness in features in front of the eyes, such as the mouth. The depth of field usually takes care of this aspect of the picture. It matters not which features behind the eyes are soft, as long as the eyes are sharp. After a fair amount of practice, I believe that every fish has a definitive angle of view that provides the potential for a great shot. Given unlimited time, you could explore these angles to your ultimate satisfaction. Occasionally, when looking at a co-operative specimen through the viewfinder and thinking that you have obtained the correct angle, a slight deviation or perhaps a movement of its head will jump out as being just right, however, capturing that moment can be very challenging.

#### **Lighting Angles**

I use two strobes positioned each side of the camera housing. These angles frequently change but only slightly according to the subject's shape and features; however, I always attempt to achieve a catch light in the eye. This can make a tremendous difference in a portrait, as opposed to a lifeless eye, which blends into the head. As mentioned already, a fish picture should 'speak to you'. When a person speaks they open their mouth, and a fish elongating its jaws or opening its mouth (however slight) may be that 'peak of the action' that you've been waiting so patiently for.

If you can illuminate the mouth, then the picture really begins to talk, and you can appreciate the tremendous photographic potential you have before you. The American photographer, Richard Avedon, once wrote: 'A portrait is a photograph of a person who knows they are being photographed'. Apply this concept underwater. You will see many good fish pictures that reflect this attitude. Catch the mouth open and illuminate the eye with a catch-light, and you could have a winner!



**FIG. 8.29** When I'm shooting fish I have two objectives in mind. First, I'm looking for a plain and simple background and then I'm looking for accessibility. I want to be able to shoot without compromising the reef surroundings and move in and out of the way easily once I'm finished. The first sign of an awkward approach, I'm out.



FIG. 8.30 I will always start with the position of the eye and compose from there. I'm satisfied with a black water background or blue, but if the subject is up against a poor distracting background I will abort.



FIG. 8.31 Whilst the exposure works, the position of the fish is too tight. I was hoping for a portrait but all I achieved was a snapshot.



**FIG. 8.32** A moment later he turned and I had both the colour and the composition.



Close-Up, Macro and Super Macro

FIG. 8.33 If a fish likes to come close then make the most of the opportunity. The encounter lasted no more than 20 seconds. I managed to get a close opportunity but no time to change settings. 1/320<sup>th</sup> sec. ISO 400, *f*16, Nikon 105 mm lens.



FIG. 8.34 Butterfly fish abound in the Red Sea. Ideal for practice also.



**FIG. 8.35** I was playing with 'inward lighting' one day in Oasis Resort, Bunaken. My quest was to light the blenny with as little else as possible being illuminated. ISO 320, f22, 1/25<sup>th</sup> sec, Nikon 105 mm lens. I failed so many times, but I kept going.



**FIG. 8.36** Using two Inon Z 220 strobes. What you see is just the right eye being lit by a minute slice of light from one strobe. ISO 200, *f*22, *1*/25<sup>th</sup> sec, Nikon 105 mm lens.



**FIG. 8.37** Lizard fish against a dark water background. ISO 200, 105 mm lens, f20, 1/320<sup>th</sup> sec shutter speed.



**FIG. 8.38** A simple fish theme with a strong black background colour. Good negative space with very good eye contact. I worked this black background opportunity for at least 15 minutes and was more than pleased that my patience paid off. 105 mm lens, f20, 1/320<sup>th</sup> shutter speed.

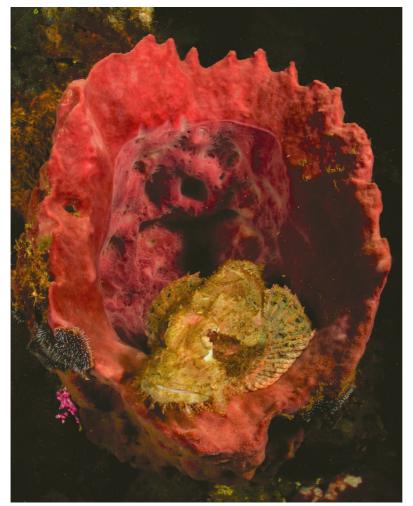


FIG. 8.39 I found the scorpion fish resting within the sponge during a shallow dive in Lembeh. I choose to use the sponge as a canvas, particularly with the vibrant colour. We revisited the dive site later that afternoon and he had not moved at all. Nikon 40 mm macro lens, ISO 200, *f*16, 1/320<sup>th</sup> sec shutter speed.



**FIG. 8.40** An excellent position to shoot close-up and macro. Notice that the torso of the photographer is off the sand whilst he is holding the housing. The position of both strobes is ideal, being a few inches behind the macro port.

## **Abstract Art**

Underwater abstract photography will present a recognizable subject in an unusual way.

Many of you who have followed the previous four editions of this book since 1995 will know I have an enthusiasm for abstract underwater photography. Now, I'm not attempting to convert all the sceptics amongst you but there are so many opportunities, wherever and whenever you photo dive to 'give it a go'. You may enjoy it.

Abstracts can fill the down time in your photo dive when you:

- cannot find anything to photograph;
- · are taking your deco stop on a shallow reef;
- have chosen the wrong lens for the dive site;
- are waiting for your buddy who's taking too long to finish shooting a subject;
- find that the dive site is devoid of anything worth shooting.

Underwater abstracts can also form a relevant part of your portfolio. Not only are abstracts popular in competitions, and they can be very profitable when presented for sale. I know several topside photographers who shoots abstracts for libraries and other outlets.

#### What Does it Mean?

To me an abstract image is not a recognizable representation of a subject. To abstract we 'take away' something and with abstract photography we take away the identity of the subject matter. This leaves more to the imagination and helps the photographer to concentrate on:

- Texture
- Line
- Shape
- Pattern
- Colour

You will recognise these elements as the fundamentals of visual design. When studying an abstract, the viewer is often too engrossed to figure out what exactly the subject is and when I shoot underwater abstracts I play on these emotional responses. I use my camera not to represent a specific subject but to create a feeling or sensation through the use of the design elements underlined above. I huge you to:

- get close and fill the frame;
- use lenses capable of focusing close;

- look for three different kinds of subjects, those which have *patterns*, subjects which are *colourful* and those with a sense of *texture*;
- use a strobe and choose a small aperture like *f*22 or *f*16, or turn it around and experiment with *f*5.6 or *f*8;
- experiment, throw caution to the wind and take plenty of shots;
- consider using the cropping tool to make a stronger composition on the computer.

Strobe positioning – this is essential. For abstract lighting your strobe positioning should be very close to your camera housing body pointing outwards towards the subjects themselves. Don't underlight your subjects. If in doubt, overexpose slightly and light the entire frame.



FIG. 8.41 In my mind's eye this is both shape, colour and texture. Notice the top right side with a slight intrusion which does not and should not belong at all. My lighting is flat with no shadows which I prefer (in my opinion). If you are new to shooting underwater abstracts start simple. It's important that you fill the frame. Avoid anything which is distracting and upsets the pattern. ISO 200, 60 mm macro, *f*22, 1/320<sup>th</sup> sec. Twin strobes on ¼ power positioned close to the lens.

# The Underwater Photographer

FIG. 8.42 A fish fin abstract but on this occasion the corners are clean. A huge lesson is to be aware of all four corners of the image frame.





Close-Up, Macro and Super Macro

FIG. 8.43 This example was frontally lit with two strobes which has eliminated any sense of shadow and depth which in my opinion looks flat but I like it this way. Don't be afraid of a little overexposure, it's what abstracts are all about. FIG. 8.44 A double exposure in camera by overlaying the inside of a clam. Two separate images of the same clam. ISO 200, 60 bmm lens, f16, 1/320<sup>th</sup> sec shutter speed.





**FIG. 8.45** Abstract or behaviour, or a little bit of both? I'm drawn to the interplay of colour and texture with the colourful rhinophores balancing the composition. ISO 200, 60 mm lens, *f*16, 1/320<sup>th</sup> sec shutter speed.



FIG. 8.46 Intentionally overexposed sea anemone. ISO 200, 105 mm Nikon close-up at 1/250<sup>th</sup> sec.



**FIG. 8.47** Pointing my camera downwards towards the coral with the white sand behind. ISO 200, 4 mm fisheye, *f*16, 1/250<sup>th</sup> sec. 4.5 m Sigma circular fisheye.

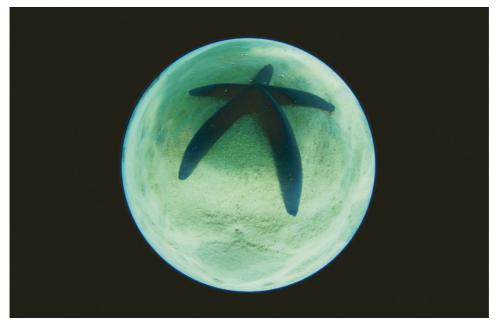


FIG. 8.48 Blue star fish lying on a sandy white background. Same settings.



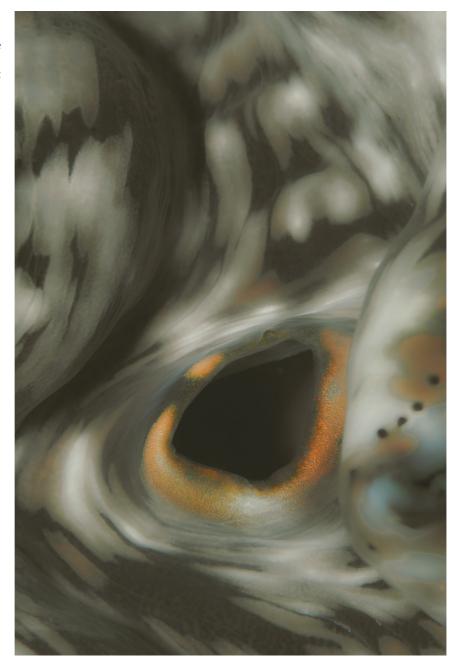
**FIG. 8.49** Intentionally overexposed sea anemone. ISO 200, 105 mm Nikon close-up at 1/250<sup>th</sup> sec. Five frames taken.



**FIG. 8.50** In order to give you an idea of how much I 'play' with abstracts out of the water with my computer. The image above is what the sea anemone actually looked like in my camera. Compare it with Figure 8.49. They are both the same but Figure 8.49 has been processed.

# The Underwater Photographer

FIG. 8.51 With this image I have used a technique called 'colour popping'. I have desaturated the tones in Lightroom and left just a hint of colour around the clam's syphon. ISO 200, Nikon 105 mm lens, f16 at 1/180<sup>th</sup> sec.



# Wide Angle Macro

Whenever I mention this technique to others, I find myself eagerly explaining the concept. To my knowledge Alex Mustard introduced this to underwater photographers some years ago but in my opinion wide angle macro does not get the recognition which it deserves. The idea of wide angle macro (or WAM) is to use a wide angle or fisheye lens to include a small sized subject in the foreground with the environment clearly visible in the background. It's a 'very near and far concept'. Underwater we need to use a wide angle lens combined with the greatest depth of field. I use either a Nikon 10.5 mm fisheye lens or a Tokina 10–17 mm fisheye. This WAM technique can be used with other types of UW camera systems and housings. One system I'm impressed with is the Olympus OMD-EM5 MK1, mini-dome port, Panasonic 8 mm f3.5 fisheye. Just contact your dealer for details.

# The Concept

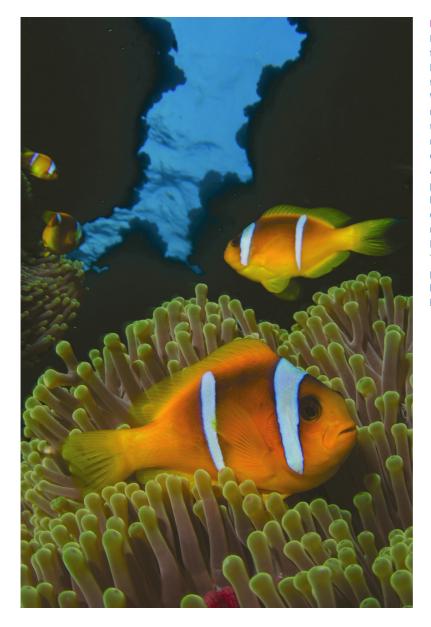
- Choose a small subject on the sand or the reef (one you would usually shoot with a macro lens).
- Position your wide angle lens up-close to the subject without touching it.
- In order to get the best close focusing out of the foreground subject it is the norm for an SLR user to fit a Kenko ×1.4 or similar teleconverter between the camera and the lens. This helps to magnify the near subject.
- Ensure that the teleconverter you choose is compatible with your own particular make of DSLR, i.e. Nikon or Canon.
- There are numerous options for non DSLR systems. Just get in touch with your stockist.
- A small wide angle dome is easier to handle and helps to get into those tight positions, however this does not mean that a large dome won't work. The consequence of using a large dome means it's likely that it will at one time or another come into contact with the substrate. Not good for the reef or your dome.
- Strobe illumination. When shooting WAM, place your two strobes close in to your wide angle port but ensure they are behind the port and not in front. Level with the back of your camera housing is ideal. If you only use one strobe then place this above your camera but once again – do not place it too far forward. Level with the front of your housing is ideal. Be aware of strobe over exposure, if the image in the back of your camera looks too bright then turn down the strobe power.

The most important point I have saved until last. You illuminate the foreground subject with your strobes, but you need to be able to see the distant environment clearly visible in the background. This is not a black background shot so it's crucial to use your shutter speed in order to manage your background exposure. If your background looks too dark for your taste then decrease the shutter speed until it looks lighter and brighter to your eye. For example, decrease your shutter from 1/250<sup>th</sup> sec to 1/60<sup>th</sup> sec. If the background is too bright then you need to increase your shutter from 1/125<sup>th</sup> sec to 1/250<sup>th</sup>. Of course you can also increase your ISO to balance ideal settings for both aperture and shutter speed.



**FIG. 8.52** My ×1.4 Kenko teleconverter for my particular Nikon camera.

# Close-Up, Macro and Super Macro



#### FIG. 8.53 At the entrance of

Dangerous Reef in the Southern Red Sea there is a sea anemone with clown fish. It is located in the most perfect position to achieve a wide angle macro keeper. What makes it especially photogenic is not the clown fish or the anemone but the background slice of surface water 5 m above, enclosed within the entrance of the cave. This combination of front and back is the type of opportunity to practice WAM techniques, but first you have to find the vision through your own eyes. Nikon 7000 with Nikon 10.5 mm lens, ×1.4 Kenko teleconverter, ISO 200, 1/60<sup>th</sup> sec shutter speed, *f*11. Two Inon 220 strobes set to half power, positioned close to my small dome port, level with the handles of my Nauticam housing.

FIG. 8.54 Whilst I'm fond of this image, I made a mistake in execution. I forgot to consider perspective. This frog fish was the size of a snooker ball and situated in a perfect position for me. I changed to a vertical perspective in order to include a sense of scale into my thought process. I thought that the background topped off with a slice of blue water (rare in Lembeh waters) would show off its small size against the reef background but as you can see, it does no such thing. However, to the right-hand side of froggy, just out of the frame is the dive guide hovering over the sand. Now that would have given an ideal sense of scale. A large black identifiable silhouetted diver in the distance, which I noticed but never thought to use. So near yet so far. We all make mistakes! Nikon D7200, Nikon 10.5 mm lens, ×1.4 Kenko teleconverter, ISO 200, mini dome, ISO 400, f20 at 1/40<sup>th</sup> sec shutter speed, decreased in order to manage the exposure of the background blue water and reef. Two Inon 220 strobes set to <sup>3</sup>/<sub>4</sub> power, positioned close to and each side of my small mini dome port, level with the handles of my Nauticam housing.



# Supermacro by Dr Alex Tattersall

#### Introduction

The discipline of underwater supermacro photography has developed at an immense rate since Keri Wilk, one of the founders of this technique, wrote on this topic in the previous edition of this book. Supermacro has arguably advanced more in the last 8 years than other aspects of underwater photography, due to the development of new and exciting tools along with increased relative accessibility to macro subject matter. From my own perspective, I think that the scope for originality is wider in macro because the photographer has creative control over more features in the frame and is less dependent on external conditions such as visibility, sunlight, other divers, water colour, than in wide angle photography. People who use underwater photography as an escape from the stresses and strains of life may also find that the all-encompassing, focused experience of supermacro photography provides them with the relaxation they seek.



#### Supermacro – A Workable Definition

In line with the ethos of the book, my aim is to give practical advice over in-depth theoretical discussion. I draw on my own experience of the supermacro approach and technique, which has been informed through a multitude of rich influences and I am well aware that I've benefitted from the input and work of too many people for them to be named individually. This input, whilst invaluable, cannot substitute the time spent underwater, improving diving technique, familiarising oneself with camera equipment, studying the habits and behaviours of subject matter and practising, practising, practising. When supermacro photography is discussed, it is most frequently understood as a level of magnification beyond 1:1 or life size. To understand this more easily, I like to think of the size of my camera sensor. If I am using a full frame camera with a sensor size of 35 mm wide, 1:1 magnification would mean I could fill my frame with a subject of 35 mm. With a smaller 'cropped' sensor DSLR and the majority of mirrorless cameras, the sensor size is less than 35 mm so we can fill the frame at 1:1 with subjects of smaller sizes. Going beyond this 1:1 ratio is commonly accepted as entering the domain of supermacro. Such magnification can be achieved in a number of ways, including using extension tubes and teleconverters, reversing certain lenses for reverse ring macro technique or most commonly, using wet mount close-up supermacro lenses attached to the outside of the front of the camera port. Increases in magnification however do come with some compromises. As magnification gets stronger, depth of field narrows, making critical focus all the more important. Magnification can also introduce and highlight aberrations in the image if attention is not paid to using optimum equipment.



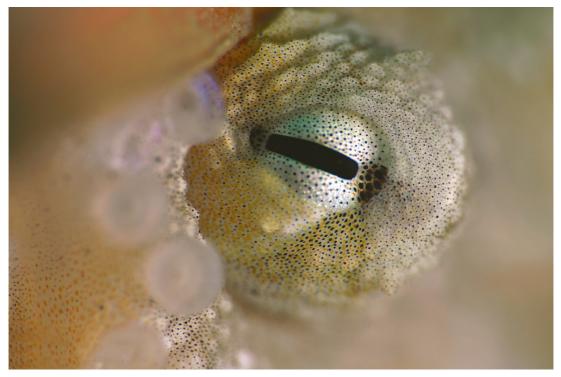
**FIG. 8.55** Hairy squat lobsters are charming little critters that reside in the folds of barrel sponges. This makes lighting a challenge and the photographer needs to select an accessible and relatively docile individual. I've always had more success on night dives, the critters seem less skittish, especially under a red constant focus light. This is a 1:1 (life size shot) on the Nikon D7200, 105 mm VR lens, f22, 1/200<sup>th</sup> sec, ISO 400.



**FIG. 8.56** Flipping down the Nauticam Supermacro Convertor1 (SMC-1) wet lens in front of my 105 mm Nikon macro lens, the eye detail and hair patterning of the animal becomes apparent and gives a very close-up insight into the features of this fascinating creature. Keeping both eyes on the very narrow depth of field inherent in high magnification photography is one of the challenges of supermacro photography. I closed down the aperture a little from the 1:1 shot previously to gain a little depth of field. Nikon D7200, 105 mm VR, Nauticam SMC-1, 1/200<sup>th</sup> sec, f32, ISO 400.







**FIGS. 8.57a–c** The Nauticam Supermacro Convertor 2 (SMC-2) can produce an eye-watering 4:1 reproduction ratio whilst maintaining very high image quality and minimal aberration. This series of three images demonstrates the level of magnification and image quality of an encounter with a curious juvenile coconut octopus residing in a cone shell. The first image shows my finger for scale, the second image uses the Nauticam Supermacro Convertor-1 (Nikon D500, 105 mm VR, SMC-1, *f29*, 1/200<sup>th</sup> sec, ISO 400), and the final image shows the Nauticam Supermacro Convertor-2 (Nikon D500, 105 mm VR, SMC-2, *f32*, 1/200<sup>th</sup> sec, ISO 400). All images are uncropped to showcase the potential of these wet lenses.

#### Supermacro Equipment

Supermacro photography was dealt with by a pioneer in this field at the time of publication of the previous edition of Martin's book, Keri Wilk. In his writings he discussed the use of teleconverters, extension tubes and reverse rings alongside his own groundbreaking product, the wet mount close-up dioptre, the Subsee.

Since this edition was published, I'd argue that the development of wet diopters has pushed teleconverters, extension tubes and reverse rings towards the periphery of supermacro technique and practice. Numerous manufacturers now produce close-up diopters of differing strengths, sizes, prices and performances, including Sagadive, FIT, i-Divesite, Subsee of course, and some of the larger housing manufacturers, Aquatica, Seacam and Nauticam among them.

FIG. 8.58 Numerous close-up diopters are on the market, with new products being developed continuously, offering higher quality images and increases in magnification. Photo Credit: Saeed Rashid.



Personally, I have not chosen to use teleconverters or extension tubes for my own supermacro photography as these require housing within the port system and there is no flexibility to remove them underwater. Teleconverters though do give more lens to subject distance which in certain cases is highly desirable, not just for more skittish subjects but also to prevent damage to the delicate underwater environment from excessive proximity to the subject. My own supermacro photography has been carried out using wet diopters attached to the front of my macro port. I have used a range of camera types, compacts, mirrorless and DSLR and each has its own strengths and weaknesses. In order to facilitate the use of wet diopters, some housing manufacturers have produced front ports with 67 mm threads, others produce bayonet mounts, which tend to be more practical underwater, others have developed magnetic dioptre holders or flip dioptre holders to facilitate the removal or placement of a wet diopter.



FIG. 8.59 The flip diopter holder is a useful addition to a supermacro setup. The hinged bracket allows the photographer to swing the wet magnifier lens away when not in use and back to the front of the camera port when required. This acts as a holder when not in use and prevents the requirement to screw the wet lens on and off underwater. Double and triple flip holders are available for multiple lenses, but some argue these can interfere with lighting positioning for certain shots. Besides the magnification lens, of absolute importance for the supermacro photographer is the ability to be able to see the frame that they are shooting. With DSLR and many mirrorless cameras, using the camera's viewfinder can be restrictive which is why enhanced 45° or 180° viewfinders have found much popularity. Compact cameras that require the use of the LCD screen for composition and focus are often compatible with LCD magnifiers to aid critical focus and composition.



FIG. 8.60 Viewfinder straight.



FIG. 8.61 Angled.

I find an angled viewfinder puts my head into a very comfortable position for supermacro photography and I wouldn't be able to work easily without it. It can be rotated as in the second image to enable portrait shooting. It takes a few dives to become used to the periscope effect of the viewfinder but once you get it, you'll never look back. Straight viewfinders are available from many manufacturers but my preference for supermacro is certainly the 45° version. Furthermore, bubbles are released on the side of the photographer's face rather than in front of the mask.



FIG. 8.62 The alternative to a viewfinder is the LCD screen. LCD magnifiers are available to enhance the view while also serving as a shade from sunlight. These are very helpful for supermacro composition and focus accuracy.

## **Subject Selection**

The beauty of supermacro for me is that it can render the seemingly banal and unphotogenic into extremely pleasing imagery. Supermacro is less dependent on external conditions such as sunshine, weather conditions, water colour, etc., than wide angle photography. That said, supermacro photography in a strong current or surge can be frustrating, although currents can bring benefits in that fish will line up more regularly and many species of coral will open their polyps to feed from the matter in the moving water. Macro subjects can be found anywhere and the photographer has more control over the way in which these subjects are presented. The increase of supermacro photography has produced some exceptional results and at times it becomes difficult to imagine new and original approaches. Subject selection is of great importance and certain subjects just ooze photogenic appeal. It is your job as the photographer to identify which of these subjects will produce such appeal, but you'll quickly find that the more attractive and photogenic have already been photographed extensively. As a result, producing an original image will continue to be more challenging. My mind goes to subjects such as the wonderful Bargabanti pygmy seahorse, the gloriously spotty Coleman shrimp on their fire urchin host and the very 'en-vogue' tiger shrimp, as examples of this.



FIG. 8.63 The tiger shrimp is a very impressive looking critter and sits in the wanted list of many macro photographers. Most I have photographed have brown eyes, but this individual shone out from the crowd with its shiny blue eyes (Nikon D7200, 105 mm VR, f22, 1/200<sup>th</sup> sec, ISO 400). FIG. 8.64 The porcelain crab is a widely photographed subject, often shot whilst performing its fascinating filter feeding 'dance'. In this photo, the subject was residing on a very attractive skirted anemone so rather than focus in on a tight crop on the subject, I chose to include the background as a key feature of the image. Sometimes pulling back from supermacro into standard macro can be a better choice. What's more, the formation of this beautiful anemone is an event that will never be repeated again, making this photo unique and not replicable ever again (Nikon D7100, 105 mm VR, f22, 1/200<sup>th</sup> sec, ISO 320).

#### **Negative Space**

One way that we can start to develop our own style is through our understanding of negative space in our images. Negative space can be defined as everything in the photograph which is not the subject.

Supermacro grants us the ability to find a good background and then look for a subject on that background. Many photogenic subjects are camouflaged in the most attractive negative space. The ugly head of ethics in supermacro cannot be ignored as the quest for originality and attractive photos results in movement of attractive subjects on unattractive backgrounds, into more photogenic positions for the photographer. This questionable practice seems to have become more commonplace as photographers strive for renown in a competitive photographic environment. From a personal perspective, I don't feel comfortable with excessive subject manipulation and rather than suggest an attractive subject be put onto an attractive background, I tend to use photographic technique (magnification, shallow depth of field, inward lighting, snoot lighting) in order to manage an unattractive background.



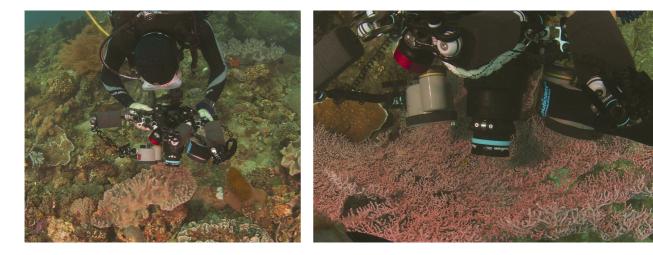
## **Diving Technique and Approaching your Subject**

For any underwater photography, not least supermacro, it is important that the photographer is comfortable in the water, diving within their comfort zone and able to control their approach towards the supermacro subject. Furthermore, I sometimes hear photographers saying 'the guide showed me something but I had no idea what it was and so I took a couple of shots of some weed and moved on'. If this sounds familiar, discussion with your guide about the subjects you want to photograph or a greater understanding of what you will expect to see on the dive would both be recommended. There are times when I and other experienced photographers will desist from photographing a subject due to poor placement or inappropriate camera setup, there is no shame in telling a dive guide that you would rather not shoot something.

If I decide that I would like to shoot a subject, let's say, a well positioned pygmy seahorse on its gorgonian fan coral, before I approach the subject I:

- find a background in the vicinity of a similar colour and reflectivity;
- take several shots on this background so I can optimise my camera and strobe settings for exposure before approaching the subject;
- gently approach the subject making a mental map of any features (for example, bright or dark patches on corals, large branching intersections) which may aid me to find my subject more easily;
- concentrate on the compositional aspects of my image;
- limit my shots to just a few to minimise any negative impact of my presence.

FIGS. 8.65a-b Before approaching the delicate fan coral, you can see me practising the shot on the pink sponges to make sure I'm happy with camera and strobe settings. By doing this, you will minimise the discomfort to the animal and maximise your chance of getting good shots before the subject retreats from your bubbles and your camera strobes. Photo credit: Sascha Janson.



#### Approach

In approaching supermacro subjects there are two 'top tips' I would recommend from the outset. First I want you to realise that there are 'players' and 'non-players', opportunities and non-opportunities. You must invest your time with subjects, which you think will photograph well. Don't waste your time with a subject which you consider will not photograph to your expectations and potential. Second, two eminently avoidable things seem to disturb most subjects more than any others, namely rapid/noisy exhalation of bubbles, and rapid/sharp movements of the diver.

Be aware of these in your approach to the subject. Move in gently and methodically, if your subject starts to retreat from you, stop, move back a little and wait for them to become more comfortable with your presence. Get to know your subject's personal space preference, which is often species, but sometimes individual, specific and if you expect to enter that personal space, do it calmly, slowly, gently and methodically. Some animals allow you to approach them more easily if you give them eye contact, others if you avoid eye contact and as silly as this may sound, I've found that some subjects become curious and more at ease when you make noises or sing a tune (or maybe I suffer from a lot of narcosis). Among your jobs is to find out the musical preference of your subject!

#### **Finding Your Subject in Your Viewfinder**

Supermacro subjects by definition are very small, and very often, for their own protection, highly camouflaged. So how do we find them in the viewfinder/LCD screen? Aside from ensuring you have the best equipment and an enhanced viewfinder or LCD magnifier, I can offer this top tip. Look around the subject for a noticeable mark. Is there a patch of different coloured coral at 90°, 3 cm from the subject? Is there a brightly coloured shell directly below where the subject is located? Is there a branching coral with a bright patch, which leads directly to the subject from an 8 o-clock position? If so, find this mark in your viewfinder and follow the direction to your subject. With a bit of luck, it will still be there. This tip works well for me.

A trained dive guide will also assist you in locating a subject by using a metal pointer and holding it pointing towards the subject. If you find the silver pointer and follow it along to the subject, this will assist greatly. If you find yourself getting frustrated at any point and losing your composure,

move away from the subject, take some breathing time and come back when you have calmed down as you may end up damaging the subject, the environment or yourself when frustration begins to mount. This frustration can often be fuelled by other photographers waiting for the same subject. Nothing takes you out of your peak performance supermacro 'zone' than hearing someone breathing noisily and impatiently just centimetres from where you are. Please be conscious of this when you are the photographer waiting, keep your distance, work a different subject while you are waiting, or use that waiting time at a distance to ensure all your camera and strobe settings are appropriate so you are ready to shoot once the other photographer has finished. Subject hogging does happen of course, and I've seen and experienced underwater 'rage' but I'd like to think that this is generally a civilised pursuit with sensible people. Nevertheless, consideration for others is all important.

## **Camera Settings**

As magnification increases, your depth of field will decrease so in the absence of a desire to be creative with shallow depth of field your aperture should be closed down to increase this depth of field, i.e. *f*22/*f*25. More depth of field will also be more forgiving when it comes to critical focus but with all supermacro, this slice of focus can be wafer thin.

In my earlier photography, I would stick to a fairly rigid set of camera settings with which I became very comfortable. On a DSLR, I would stay around f22/f25, on compact system camera at f20/f22 and on compacts usually at the most closed aperture setting. My early days were also characterised by black backgrounds, which were achieved with a combination of this closed aperture and a fast shutter speed (and low ISO of course). As I have become more comfortable in the water and have built up a portfolio of subjects with these settings, I have begun to experiment more with shallower depth of field and slow shutter speeds. I do however keep the above settings as a fallback if I see a new and interesting subject and want to play it safe creatively.



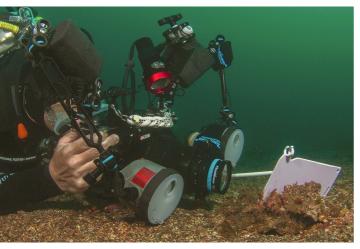
**FIG. 8.66** Here I have steered away from my usual aperture settings and opened up my aperture to *f*8 to produce a narrower depth of field and an interesting patterned bokeh from the colourful mushroom coral. The focus on the eye of the goby draws the viewer in to a sensual feast of colour and texture (Nikon D500, 105 mm VR, SMC-1, *f*8, 1/200<sup>th</sup> sec, ISO 400).



**FIG. 8.67** Once you have several shots of a subject in the bag, you can start to play around with camera settings to vary your portfolio. Slow shutter speeds can give a fresh perspective on a well-worn subject. Here the rapid undulating movement of this tiny juvenile sweet lips is captured through a slow shutter speed and a rear curtain flash setting (Nikon D7200, 105 mm VR, *f*11, 1/10<sup>th</sup> sec, ISO 100).

Alongside aperture, shutter speed and ISO settings, worth exploring in supermacro are our focus mode and assignment of focus. I am a strong proponent of the 'back button focus' method where a button on the rear of the camera is assigned as focus, at the same time removing focus from the half shutter press. The majority of compact system cameras and all DSLR cameras can be set up via camera menu for back button focus, in my opinion the usefulness of this focus technique for supermacro photography cannot be emphasised enough. In addition to these focus techniques, I will also use a continuous focus method, usually with tracking a moving subject of some sort.

How this works in practice is that once I've found a subject, I will decide what level of magnification I need and 'flip' down one of my supermacro wet lenses into position. I will then move to a coral head and pull the thumb lever and watch/feel the lens focus in and out. Once it is at approximately the magnification I require, I will then approach the subject. I will sometimes stabilize myself with my hand (and housing resting on the left forearm) if possible, with a sand spike if not. I then move the camera gently backwards and forwards until the subject comes into focus. If the magnification is appropriate, I won't touch the thumb lever again. If I want more or less magnification, I can gently pull the lever to make these changes. I am then free to make adjustments to composition and can pull the shutter without the focus operating again so in this way I have complete control over where I want to put my critical focus in the image.



**FIGS. 8.68a-b** Settling into a stable position that does not threaten the environment is all-important in supermacro photography. You can see in the head-on image my left hand is placed underneath the port and lens and I can use this as a pivot point to make the very tiny movements necessary to achieve critical focus on the desired parts of the image. You can also see me using the rear lever for back button focus in the profile photo (note the comfortable head position with the 45° viewfinder). Photo credit: Sascha Jansen.



#### Creating 'Wow' Shots

A final word as we are confined by space limitations. How do we make our images stand out from the crowd now we are in an era of saturation of extremely high quality imagery. Some decide they will actively intervene with the behaviours, locations and interactions of their subjects. I feel that is a poor strategy and should be discouraged at the highest level. How we can make our images stand out is to focus on original compositions, interesting natural negative space, rare and interesting subjects and natural behaviours, interspecies interactions, anthropomorphosis of our subjects, and storytelling narrative in our photos. We can also use new toys that regularly appear on the market which provide increasingly strong magnification, new ways of manipulating light, or new ways of viewing bioluminescence and other natural phenomena. As role models to new photographers, it is up to us to keep striving for originality while maintaining a strong ethical stance towards marine flora and fauna conservation.



FIG. 8.69 A wow subject in a beautiful natural coral frame makes this Xenia pipe horse stand out as an original and interesting image (Nikon D500, 105 mm VR, SMC-1, f22, 1/200<sup>th</sup> sec, ISO 400).



**FIG. 8.70** The hairy shrimp is a tiny subject, which requires very strong magnification and good control over depth of field. Here I have backlit the subject by placing an off-camera strobe behind the subject. This creates more depth in the image making it less flat (Nikon D7200, 105 mm VR, Nauticam SMC, Subsee +5, f32, 1/200<sup>th</sup> sec, ISO 320).





**FIG. 8.72** Using a white slate positioned behind this nudibranch, I am able to produce a nice high key image. Using this level of magnification meant I did not have to physically move the subject onto a white studio background, as others have done in the past and seem to be increasingly doing; to me a practice that should be strongly discouraged (Nikon D7200, 105 mm VR, Nauticam SMC, f29, 1/200<sup>th</sup> sec, ISO 400).

FIG. 8.71 Finding two pygmy yellow gobies residing in an intact coca cola can is a good example of a storytelling narrative that can be appreciated by the wider audience. The fishes' diminutive sizes, sad little faces and the poignancy of waste in our oceans at this time all combine to create a memorable image for the viewer (Nikon D850, 105 mm VR, f22, 1/200<sup>th</sup> sec, ISO 400).



# Snooting the Light by Stuart Gibson

#### Introduction

As the pursuit for more innovative images has increased over the last decade, so has the equipment we can use to take them with. One game-changer for macro lighting is the humble snoot. I was a relatively early adopter to snoots and had a love-hate relationship with the technique at first. However, as I persevered I started to really enjoy the challenge of this lighting method and the subtle, soft lighting it created. In this section we explore how snoots work, the different types available and how to use them.

Controlling light is perhaps the most important aspect of photography. In wide angle we use both our strobe and the available light. With macro we use strobe most of the time. We understand the techniques and camera settings to control these light sources, however one thing we cannot do with ease is control the area that the strobe illumination falls onto. This is a particular challenge in macro photography where our most important source of light is our strobe. Trying to isolate a macro subject in amongst its habitat is a huge challenge and we are often encouraged to move on in search of a critter with a more plain and contrasting background. One method of dealing with challenging backgrounds is to use the 'edge lighting' technique, described elsewhere in this book. Another method, which (in my opinion) is easier, is to use a 'snoot'. Snoots are not new, they've been around for some time now and the idea of them is to restrict the regular spill of light across the frame of the image. In topside studio photography snoots have been used for many years to isolate the beam of light emanating from the strobe to both shape and direct it towards a specific intensified area. This allows the photographer to control the direction and diameter of the beam thus creating striking light effects.



**FIG. 8.73** The subtle light from a snoot can isolate the subject and create appealing effects. This differs from the traditional 'fully lit' shot. Nikon D7200, 105 mm macro lens, ISO 200, *f*40, 1/250<sup>th</sup> sec.

Snoots for underwater photographers are a more recent application of this concept and come in all shapes and sizes. Some use the strobe directly and others use fibreoptic cables to transfer and intensify the light into a smaller area. They range in price from £10 to many £100s. I won't go into the pros and cons of the various types but will discuss the general considerations and techniques for using them.



FIG. 8.74 An early version of a dual fibre optic snoot designed to fit on the front of my Inon Z240 strobe and transfer the light along 6 mm fibre optic cables to the subject. The arms are made of flexible hoze-loc and a variety of ends can be fitted to adjust the size of the light beam. This is a useful system if two sources of light are needed.



FIG. 8.75 A far simpler 'home made' snoot using a rubber gater from a car CV joint. A cost effective solution and one of my favoured types.



FIG. 8.76 A more recent entry to the market, which addresses one of the challenging issues of aiming the snoot. The laser beam helps guide the positioning and aiming of the snoot onto the subject. The beam shuts off as the strobe fires to prevent it showing in the image.

### Are you Ready to Snoot?

You must have good buoyancy and control of your camera underwater to snoot the light with macro photography. Getting close to small critters with the ever-improving macro magnification lenses and additional equipment means our camera setups may be bigger and we become in danger of misjudging camera to subject distances. Some snoots are designed to be taken on and off, as and when you need them. This presents additional considerations underwater in terms of how to carry the snoot when not in immediate use and how much bother it is to take it on and off your strobe in the first place. If it's a hassle underwater it's fair to say that you are unlikely to use it. I'm not suggesting that a novice should not use a snoot, but they are by their very nature a more advanced lighting technique.

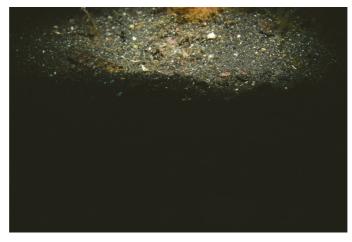
## **Understanding your Existing System**

Snooting for underwater photography can be most frustrating. Using a snoot is often an all-or-nothing experience, it either works out or it doesn't. The first consideration before using a snoot is whether you feel you understand your equipment well enough (especially your strobes) to further complicate your lighting set up. Snoots are unforgiving at the best of times. The fine positioning of the small beam of light is critical. It is often a trial and error process so, for example, if you haven't set the power high enough on your strobe the snoot may be correctly positioned but little or no light will be emitted. You will not know if it's the power setting or the snoot position that is the problem.

# **Aiming the Snoot**

By far the most challenging element of using a snoot is positioning the beam of light precisely onto the subject so that it creates a uniform, subtle effect. Not too harsh but soft and natural. This involves the snoot position relative to the subject and lens being accurate in three dimensions. If the camera moves in any direction then the snoot position will move also. One way to help with this is to detach the strobe complete with snoot from the housing and get your buddy to hold it over the subject. I find this to be very successful, but it does require good communication and co-ordination. If your buddy is also a keen UW photographer then they may not be happy holding your snoot all the time. It's very much 'give and take', particularly if you and your buddy work as a team.

FIGS. 8.77a-c These images demonstrate how tricky it can be to get the beam of light in the correct position. Not only must you know that the flash will register in the image at all, but the beam must be aligned to the subject too. A subtle change can move the light too far one way or the other. Be prepared for many shots like these before you get it right.









**FIG. 8.78** Getting it right can reward you with an interesting lighting effect that is unique to snooting. This hairy frog fish was a worthy subject for the snoot and is now an iconic image for this type of lighting. Nikon D7200, 60 mm macro, ISO 400, *f*16, 1/320<sup>th</sup> sec.

#### **Help with Aiming**

My first snoot was a double-arm fibre-optic type and I discovered that positioning this was immediately challenging. Trying to get the beam of light into the frame just to see which direction to adjust it to was a struggle in itself. I discussed this with my peers at the time and I suggested the use of a 'jig' to position the end of the snoot roughly in the correct position relative to the camera lens. This was countered with the valid comment that so often great effects and shots are achieved by accident, the view being that too much precision setting up the snoot would limit creativity. Five years later my tried and tested technique for the initial set-up of my snoot is a compromise of the views from those early discussions.

#### My Way

After trying a couple of options, my snoot of choice in 2020 is a homemade system. It's a cheap car component used on a driveshaft known as a 'CV boot', which can be purchased from eBay for around £10. They are made of rubber or plastic and are conical in shape. The large diameter pushes over the front of my Inon Z240 flash and can be taken on and off with ease. If I see a potential subject which I believe could snoot well (something reasonably static that will not disappear at the first flash of light) I will push snoot onto the front of my strobe and then judge the camera to subject distance to shoot at. With snoot attached, I put a finger of my left hand onto the end of the snoot. I then move the snoot to a distance I have anticipated to simulate the subject distance and pre focus on my hand (if you wear a ring on a finger use that to focus on). I then find a similar sized object or area nearby and practice with a test shot to confirm the setup in terms of snoot position and strobe beam intensity. Once I'm happy with this setup I move in on the real subject. The relationship between the snoot, the subject and the lens is broadly correct, so I am able to concentrate on fine tuning the image accordingly, experimenting with composition and small adjustments to my strobe power, rather than meddle with the snoot set-up. Once I achieve this reliable and repeatable set up I find similar subjects to take, but I'm not averse to resetting up again if the situation requires it. This technique can be practiced in a pool or, if your setup is light and compact, then practice on land. As mentioned previously some of the more expensive snoots on the market have a built-in red laser light so you can see the direction the snoot is pointing. I have little experience of these so I can't comment on the effectiveness of them.



**FIG. 8.79** Using my left hand to position the snoot in the viewfinder as a rough positioning aid. I pre-focus on my hand, which allows me to move onto the subject until it comes into focus. This way I'm confident the snoot light will be somewhere close in the frame. From here I can fine tune as required.



**FIG. 8.80** Using a finger or a ring to prefocus the camera relative to the snoot is a good method of getting it reasonably well set-up.



FIG. 8.81 For subjects that can move, testing the set-up on an area away from the subject, such as on this piece of brain coral, allows for some adjustment without disturbing the critter. Here I can see the end of the snoot in the top of the picture, which I can move gently, up out of the way, and test again.

### **Subject Selection**

Clearly a non or slow-moving subject is best considering the difficulties in positioning the snoot beam accurately. If you were starting out with a snoot I would certainly recommend a static subject that has easy access and offers some opportunities to experiment.

As experience develops you can try more challenging subjects such as nudibranchs and shrimps. Remember for a subject that can move it's worth setting up the lighting 'off-line' as described previously to avoid scaring the critter off.



FIG. 8.82 Once you are happy with the rough set-up you can approach the subject with the confidence that the camera and snoot are going to work well together. Here I am working on a slow moving nudibranch on black sand, which further helps isolate the creature from its surroundings.



**FIG. 8.83** The resultant shot with subtle lighting isolating the nudibranch and creating a pleasing effect. These shots, whilst challenging to achieve, are very rewarding.

FIG. 8.84 A modest cluster of tunicates make an ideal subject to start snooting with as they are static and semi translucent. The snooted light brings out details that could be lost with more traditional lighting. Nikon D7200, 105 mm macro, ISO 200, f18, 1/250<sup>th</sup> sec.

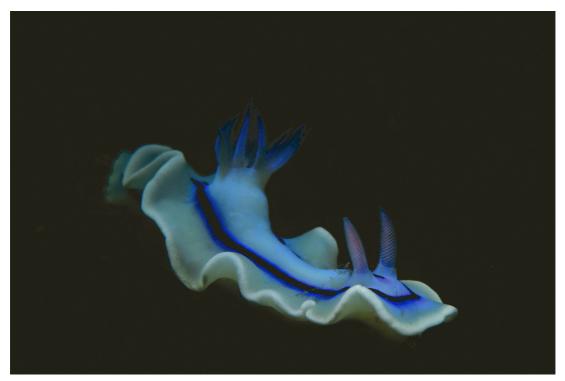


#### **Snoot Direction**

Snooting from above is a good all-round place to start and the setup described above works well for this. Single beam snoots mean that if you set up from the side of the subject then a shadow will be cast on the opposite side.



**FIG. 8.85** Hermit crabs can tolerate some close photographic attention. If you find an accommodating one then it is worth persevering as they can move quickly. This was lit using a dual fibre-optic snoot from above. Nikon D300S, 60 mm lens, ISO 200, *f*13, 1/320<sup>th</sup> sec.



**FIG. 8.86** A favourite for snooting are nudibranchs due to their vibrant colours and relatively slow speed. Here I found one already well isolated, so I was able to further highlight the critter creating an impression of floating through space. Nikon D7200, 105 mm macro lens, ISO 400, *f*18, 1/250<sup>th</sup> sec.

I've had reasonable success using a snoot pointed directly at a subject. Once again, the aim is to isolate the subject from its background. With twin snoots, either from twin arms from one strobe or two strobes (quite a challenge) it is possible to light a subject uniformly from both sides.



**FIG. 8.87** A favourite image of mine taken in Djibouti. I was experimenting with my dual fibre-optic snoot and aimed the two arms directly forward and slightly apart. I aimed the ends of the snoot towards the anemone and took several shots as the clown fish darted in and out of its home. In this image the light fell perfectly on the fish and some of the tentacles of the anemone. This, together with a pleasing composition, created an otherwise impossible shot. The subtly of the light gives this popular subject a completely new look. Nikon D3005, 60 mm macro lens, ISO 400, f14, 1/320<sup>th</sup> sec.

#### **Light Beam Size**

The diameter of the beam of light as it hits the subject is important. Too small and it won't cover the subject, too large and it will light too much of the surrounding background, which is what we are trying to avoid in the first place. Snoots with an adjustable hole can manage this or you can move the snoot closer or further away (being mindful to adjust other settings to compensate for this distance change). The method you choose will be dictated by the type of snoot you have. I like to keep it as simple as possible. It's also worth experimenting with the angle of the snoot relative to the subject. If the snoot is angled in relation to the subject the beam will become more oval. This can be useful for subjects whose dimensions are not equal, for example nudibranchs that are long and thin.



**FIG. 8.88** A small diameter beam relative to the subject size which lights very little of the surrounding habitat. I was tracking this nudibranch for a while when it started to climb up a small piece of reef, it then turned allowing me to frame tight and snoot it from above. Nikon D7200, 105 mm macro lens, ISO 200, *f*18, 1/320<sup>th</sup> sec.



FIG. 8.89 A larger diameter beam relative to the subject size which has lit an area of the background. Arguably the snoot light beam is too far back but, as discussed earlier, sometimes errors make for interesting images. This was a tiny nudibranch and the light creates a little more depth to the image. Nikon D7200, 105 mm macro lens, ISO 200, *f*20, *1*/320<sup>th</sup> sec.

Snoots are great fun and can be used to create very rewarding images. It's no secret that a snooting effect can be created relatively easily in post processing with Photoshop or Lightroom, however, the light is never quite the same and personally I like the challenge of getting it right in camera and overcoming all the challenges described in this section. Although snoots are widespread in the underwater photography scene many people are using them with varying degrees of success. They can be a substantial investment to add to your underwater setup so I would recommend either borrowing one, getting a cheap 'CV boot' type or trying another homemade solution to see if it's for you. The patience needed and adaptation of the techniques described here are not for everyone. But do give it a try if you can, you might be pleasantly surprised.





# Wide Angle

# Introduction to Wide Angle

Underwater wide angles are the most popular genre there is. This type of image seems to appeal to the young and old, both divers and non divers alike. Wide angles dominate the diving media and proliferate magazines the world over.

The most popular shooting techniques are:

- Wide angle
- Close focus wide angle
- Balanced light with fill in flash
- Motion blur by Nick More
- Shipwrecks by Nick Blake
- Split levels
- Working with a model

I intend to discuss them all later but first I would like to emphasise a particular fact and I cannot stress this enough that to take good underwater wide angle images, 'you must eliminate the column of water between the subject and the lens'.

Wide angle lenses allows us to do this to maximum effect. By reducing the distance, we reduce the amount of suspended particles in the water. The advantage of wide angle is the lenses we use. They all have one thing in common and that is they are all capable of focusing very close. This allows us to get nearer to the subject and reduce the column of water, but still include much larger subjects within the frame. It's a win-win situation. Always remember that wide angle lenses are capable of focusing close, but they are not a close-up lens.

#### Which Lenses to Use

For both Nikon and Canon SLRs together with the popular mirrorless and Micro 4/3<sup>rds</sup> systems and compact users there are a number of preferable wide angle lenses to consider. Remember that Dx SLR cameras are cropped sensors whilst Fx SLRs are full frame sensors. Let's start with Dx cameras first and in the order of popularity in my opinion.

- Tokina 10–17 mm zoom fisheye (Nikon or Canon fit)
- Nikon 10.5 mm fisheye
- Nikon 12–24 mm wide angle
- Sigma 10–20 mm zoom fisheye (Nikon or Canon fit)

For Fx cameras (full frame sensors) they are:

- Sigma 15 mm fisheye
- Nikon 16 mm fisheye
- Nikon 20 mm f1.8
- Canon 15 mm fisheye

The amazing resolution of full frame sensors means that using a small dome could soon be a thing of the past. To achieve the very best performance with these particular lenses, consider using large dome ports such as the Zen 230 mm. For further reading regarding both Nikon and Canon SLR cameras, go to Dive Photo Guide at www.divephotoguide.com and/or www.wetpixel.com.

#### **Viewfinder Discussion**

An angled viewfinder which can rotate 45° is used by many professionals. I appreciate that you rarely choose a housing based on one particular technique but these angled finders will benefit the underwater photographer in so many other ways, including macro techniques and other forms of wide angle, as they allow the user to shoot lying prone on sand or rubble whilst still being able to easily view and compose. A Google internet search on '45° viewfinder underwater' will highlight a number of companies who are producing these angled finders for other housings.

#### My Own Favourite 'Go To' Wide Angle Lens: 2020

I continue to use a Nikon 7200 camera in a Nauticam housing. My first choice lens continues to be the Tokina 10–17 mm fisheye simply for its zoom flexibility. If I know that the subject I'll be shooting will require a very wide angle, I'll opt for my Nikon 10.5 mm fisheye. Though for 95 per cent of all my wide angle work, I go to my Tokina lens.

#### **Be Aware of Distortion**

When using wide angles, the relative size of subjects near and far are distorted. Nearer subjects appear to be larger and closer than they really are and more distant subjects appear to be smaller and much further away. Wide angle lenses do, in effect, increase the appearance and scale of underwater visibility because the background appears to be more distant. This can be used effectively to create a huge fissure in areas where they don't exist – for instance, using a small gap as a surround for a distant diver or a seascape gives the impression of a huge hole, which frames the distant reef. Again, when photographing divers interacting with marine life, by composing the fish closer to the lens than is the diver you can achieve a dramatic impression of a subject greatly oversized in proportion to the diver in the background.

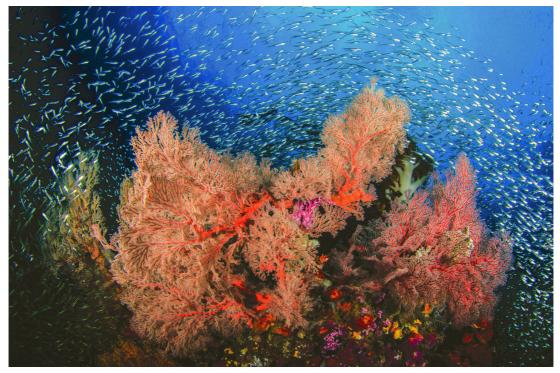
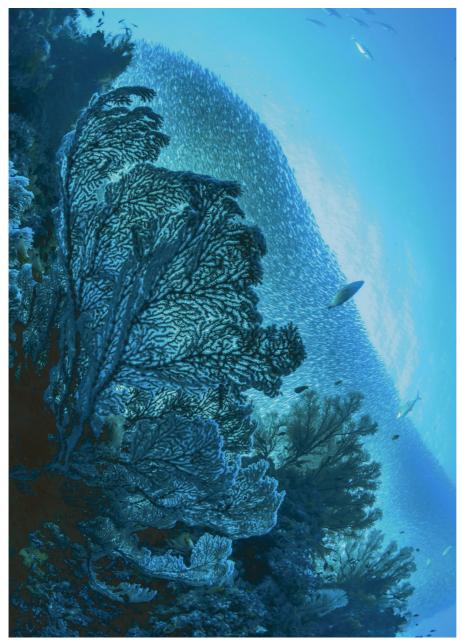


FIG. 9.1 Wide angle underwater photography in all its splender. No one that I know has ever been able to predict when that moment, that climax all comes to fruition before your eyes. A mid-morning photo dive around the back of Misool Eco Resort. The previous day, same time same place was so uneventful.



**FIG. 9.2** Screen grab of the above and how the opportunity played out.



**FIG. 9.3** A very early morning Indonesian dive off the beautiful boat Dewi Nusantara. How I swore when I realised I had forgotten to change strobe batteries, but how lucky I was to be able to shoot natural light instead. The fish action on this particular morning was amazing. Nikon 7200, 10.5 mm lens, ISO 400, *f*8, 1/200<sup>th</sup> sec.



FIG. 9.4 Raja Ampat. It is always best to be in the water as early as possible in the tropics. As the early morning sun appears on the horizon the underwater photographer should be ready to exploit the magnificent light by getting wet as early as possible. I wanted to portray the light in the best possible way so I looked around for a colourful bommie in shallow water around 5 m. A number of my group bombed down past 10 m and wondered why they had missed the underwater sunrise. It was still erie and dull on the top of my ledge but as soon as I delicately illuminated (with strobe) the colour of the reef the reds, pinks and oranges came to life. The sunlight was quite frail when I started to shoot but within a few minutes it became too bright to include within the composition. Nikon 7200, 10.5 mm lens, ISO 200, *f*10, 1/250<sup>th</sup> sec.



**FIG. 9.5** I wish I could predict when encounters such as these are about to happen. I had been to the same place, same time over several days and I am still none the wiser regarding this type of fish behaviour. I have now learnt to watch for a sign, an indication that a feeding frenzy is about to occur. I'm told that they aggregate because they are all feeding on the same nourishment or swimming on the same section of the reef looking for protection. They always seem to be pointing in the same direction and working together. Nikon 10 mm fisheye lens, ISO 200, *f*10, *1*/320<sup>th</sup> sec.

FIG. 9.6 All these images can be taken with numerous cameras but the lenses are all wide angle lenses. My particular wide lenses are my Nikon 10.5 mm and my Tokina 10–17 mm lens. Above, a whale shark in natural light. ISO 400, 10.5 mm, f11, 1/200<sup>th</sup> sec.



## Wide Angle

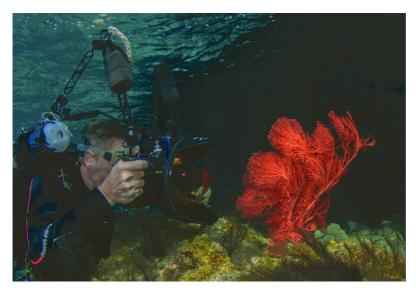


FIG. 9.7 Notice how this red fan coral is so small when placed against a wide angle lens with a large dome port. You may think it too small and move on, however this photographer knows otherwise. He has recognised the potential and has moved in close to fill the image frame. Always remember that wide angle lenses can focus to within just a couple of inches.



FIG. 9.8 My buddy Nick Blake is perfectly set up to shoot the corals. He has adopted a horizontal composition, as opposed to a verticle composition. His two strobes are perfectly situated level with his face mask.

#### **Huge Depth of Field**

Another element of wide angle underwater photography that offers a tremendous advantage is all to do with depth of field. The wider the angle of the lens, the greater the depth of field. This increase is so marked that with a full frame fisheye lens of 10.5 mm, when the lens is focused at 1 m, for example, it will be in focus from 0.5 m to infinity at *f*11. When you shoot up towards the surface, apertures of *f*11 and *f*16 can often be indicated, which practically eliminates the need to focus. The key in choosing at which end of the zoom lens to shoot is to consider what I refer to as the ability to get close to. Wreck photography and seascapes are good examples of subjects which you can get close to. Another may be a school of fish and other larger creatures, but I emphasise once more that you must anticipate being able to get close to. This is the advantage of using a fisheye zoom, in that you have that flexibility to zoom in if you cannot get physically close.

So why use wide angle lenses at all? Why not just back off a metre or two and shoot the same scene through the viewfinder with a longer lens like a 20 mm or similar? That's what our land photo cousins would do. But as you know, it doesn't work this way. Underwater we have to reduce that column of water and shoot as close as we possibly can. Fisheye lenses are able to do this more effectively than any other wide angle lens. As a result, the subject is comprehensively saturated with colour and silhouettes are sharper and more clearly defined simply because we are close to them. Another reason for using ultra wide lenses is for creativity. Because of the inherent bending of straight lines, the capability of 'seeing' an amazing 170° and sometimes more makes this lens uniquely artistic and imaginative. In land photography these distortions are a disadvantage because of the many straight lines in manmade structures. Underwater, however, nature has blessed us with curves and spheres. The only straight lines we encounter are generally human intrusions such as shipwrecks and divers.

#### Looking, Seeing and Training the Eye

Successful UW photographers train their eye with practice and develop the ability to 'see in pictures'. They may stop and examine a formation of coral and view the scene with a completely different perspective than their buddy, who may be photographically blind to the creative opportunities that are all around. This type of photographer may have the technical 'know-how' and all the enthusiasm, but lacks that underwater inner eye so essential in recognising a subject's potential in the first place. I have dived with photographers who swim past glorious opportunities because the corals do not appear to their eye to justify so much as a second glance. I work to help them to develop this aspect of their learning more than any other part. If only they could view the scene through the wide angle viewfinder in their

'inner eye' and take a moment to visualise how things may be recorded, perhaps with strobes, they would discover a wealth of possibilities right under their nose.

#### **My Tips**

- Get close to the subject this is the most important tip for wide angle underwater photography. On your next trip, experiment for one day and, no matter what equipment you are using, try to get so close that the subject is bursting out of the viewfinder. When you view your results, you are likely to find that your distance is just right.
- Ensure that you shoot either at eye level or upwards towards the surface. Whilst there are a few exceptions (wrecks work well from a 'shooting down' perspective), shooting down on a subject will often produce a flat result with little contrast.
- When the sun is low on the horizon, try swimming in that direction. It is an effective way to 'see' in pictures more easily, when the spark of sunlight is in view.
- Always fire off a strobe exposure before you enter the water. If your strobe fails to fire or the camera malfunctions, you have a chance to fix it before you get wet.
- Before you enter the water, set your aperture to f11 or f16 and your focus distance to about 1 m. Turn your strobe on and position it to light a subject about 1 m away from the lens. The reason for this is that within seconds of entering the water you will often see opportunities that would make excellent pictures. So, be prepared for them! Being set at f11 or f16 at 1 m will provide you with the best possible chance of getting a quick snapshot in a hurry.
- Take a snap to check out the colour and condition of subjects before you compose them for real.
- If you feel a little obsessive in your quest for technical perfection, try
  to let go of it. If your results are not to your expectation, it may be
  that your preoccupation with the technical aspects is getting in your
  way. I often find that this will cloud any artistic ability. Learn it on land
  and then trust it underwater. This will make room for increasing the
  amount of thought and creativeness regarding the image itself.
- If you lack confidence in determining exposure then make use of the histogram in your camera to determine correct exposure. If the ambient light is incorrect then alter the camera settings. If the strobe exposure is incorrect, then alter the power settings or the aperture. I find it easier to make a small adjustment to strobe power by pushing the strobe itself either forward or backwards a little.
- Of all the subjects we see underwater, 60 per cent are unphotographable because of their location on the reef. If you cannot get to shoot it without fear of harm to the environment then move on and find something located in an easier position.



**FIG. 9.9** 6pm in Misool Resort is dapple hour and I always like to drop in around 5.45pm to 6pm, when the light is 20 minutes before it's best. My way of shooting is to find a shallow cave in no more than 2–3 m. In this way I'm confident that I can 'work the light'. I've hidden the weak sun ball behind the cave ceiling which emphasisis the sunbeams and transports the eye of the viewer towards the back of the cave. It's lit with two strobes on ¼ power, level with each side of my ears. The very last thing I want to do is to strobe it with too much light. ISO 400, 10.5 mm fisheye, f11, 1/60<sup>th</sup> sec.



FIG. 9.10 Same time, same place, just inside the cave entrance. The light was rapidly fading, however I had one more 'string to my bow'. Instead of pushing up the ISO to 1000, I let the water fade at its own pace so I could bring about the idea of shooting motion blur. I set my ISO to 200, aperture to f8 and most crucial of all, my shutter speed to 1/8<sup>th</sup> sec. Nick More, the master of motion blur techniques will discuss his splendid work later in this chapter.

## **Close Focus Wide Angle**

Close focus wide angle photographs are the images which every aspiring underwater photographer wants to capture. I would go as far to say they are some of the most dramatic, creative and popular taken underwater.

They are easy to achieve if you know how. The secret, as the name suggests, is to select and focus on the foreground subject with perhaps a distant diver hanging out in the blue water with sunbeams piercing the surface behind. Before I move on, allow me to discuss these words 'close' and 'foreground'. Close means really close! I'm talking about as near as your wide angle lens will focus. It's this close perspective of between 20 cm to 50 cm, which is dramatised by the distortion properties of fisheyes and other wide angle lenses.

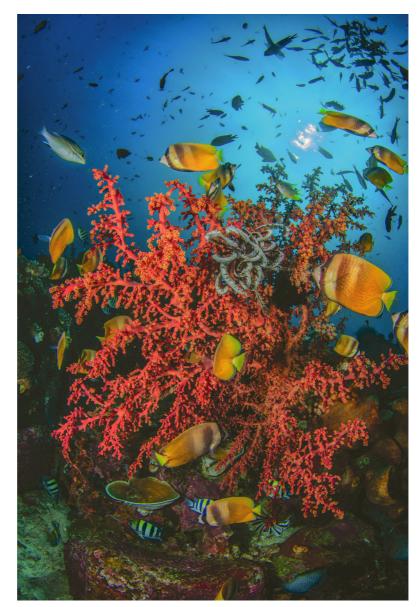
Try and include the entire subject in the frame. Although the subjects appear huge to the eye of the viewer, in reality they can be quite small in size. Don't choose a fan coral which is 2 m across as you may have to back off to get it all into your picture frame. By taking advantage of the extreme depth of field that fisheye and wideangle lenses provide, you are able to capture all the elements in focus at the same time. What is essential is to balance the exposures of the natural light and the light from the strobe on your near subject. Select an aperture of *f*11, *f*16 or *f*22. (*f*8, if using a compact system camera) in order to retain the required depth of field. This is important to achieve pin sharp focus from the near foreground to the far background.

Approach this type of shot by doing the following:

- Selecting a foreground subject, such as a fan or soft coral, which you can photograph at a slight upward angle.
- To achieve the correct exposure with your camera and strobe, set a shutter speed of around 1/125<sup>th</sup> sec. Point upwards to where you will achieve apertures with the best (greatest) depth of field.
- Position your strobes and select an appropriate power setting of about <sup>3</sup>/<sub>4</sub> of full power.

- Compose, press the shutter and review the result in your LCD. You are looking for a correct exposure which suits you and your taste.
- If the background water is overexposed, with clipped highlights then increase your shutter speed, for example from 1/60<sup>th</sup> sec to 1/250<sup>th</sup> sec.
- If the foreground subject is incorrectly exposed in any way, then re-select a manual power setting on your strobe.
- In order to achieve a small aperture you simply shoot upwards toward the lighter regions.
- You don't have to include a sunburst within the frame; it's not mandatory.
- I often use the technique of leaving the sunball out of the image frame in order to capture just the beams of light emanating from the sunball.
- If it's a dull day and you are struggling with exposure then increase your ISO.
- The critical exposure is the one on the foreground subject. Considerable latitude can be allowed for the distant blue water and the surface.
- Compose and shoot when a scene looks promising through the viewfinder. Avoid trusting your eyes it's the reason your pictures look so distant. You have to move in and get close whenever you can.
- With experience, you can learn to 'shoot from the hip' accurately, guessing the angle of coverage of a wide angle lens and shooting without looking through the viewfinder. This technique is invaluable should an opportunity arise where cameras and diver cannot fit into the same space (such as a small cave or gully).
- Shoot upwards towards the surface using small apertures for the greatest depth of field.
- Bracket both shutter speeds and strobe positions to give you some variety.

**FIG. 9.11** A typical close focus wide angle opportunity. In reality the foreground colour is actually quite small, perhaps the size of a football. The sun is setting towards dusk when the beams are at there best.





**FIG. 9.12** This entire frame is the size of an A4 piece of paper. My dome port is almost touching the soft coral. ISO 200, 10.5 mm Nikon lens, *f*11 at 1/250<sup>th</sup> sec.



FIG. 9.13 In relation to the image above. Whilst I composed and shot the image in a verticle format, my two strobes were placed side by side close to my housing just behind my handles.

FIG. 9.14 An exceptionally close focus wide angle opportunity using my 'inward lighting' technique. It was quite a barren reef so I decided to play and practice to see how severe I could isolate the background reef from the colourful yellow sponge. ISO 320, 10 mm lens, *f*9, 1/320<sup>th</sup> sec. It worked but I spent at least 10 to 15 minutes playing with it.

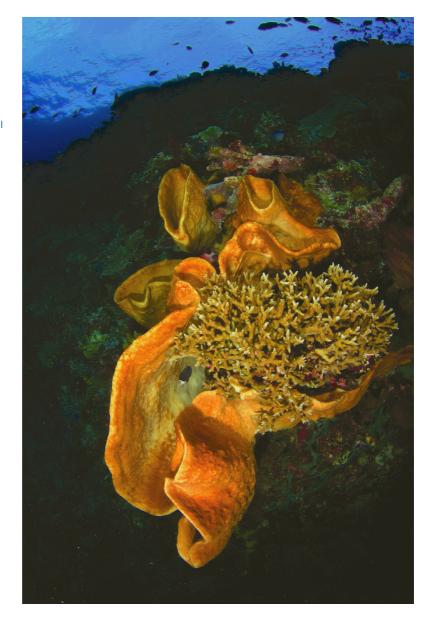




FIG. 9.15 You tend to get a sense that something is occuring with the fish life. Is it feeding time once more? I'm not sure, but I remember this image and the energy which it gave off. The grouper looks like he is having a rest on the coral but in reality he was just swiming through the frame looking for some action. ISO 400, 10 mm lens, f11, 1/250<sup>th</sup> sec. Two Inon strobes pointing downwards from above.

## Working with a Model

Few underwater photographers have the chance to dive and photograph professionally trained models, but we all have the opportunity to shoot our dive buddies. During my workshops I encourage buddies to assist each other in the modelling department. The inclusion of a model may be used to add human interest, drama and scale to an existing scene. However, if you include a diver in a seascape, which already stands up for itself, there's a chance it will end up in the bin if they (the model) detract too much from the main subject. Before I embark on modelling, first and foremost it's essential to agree some hand signals for mutual understanding.

#### **Hand Signals**

I have no intention of describing all the various hand movements, you can agree these with your buddy, but there are a number of simple directions you need to communicate to each other. For example:

- Come closer move back
- Go up go down
- Stay where you are that's perfect!
- Move to the side
- Swim in this direction
- Align your body like (to communicate this I lean my left forearm at an angle)
- Look at the subject this direction
- Look over my shoulder
- Most importantly, don't look into the lens *unless* you are lining yourself up with your own reflection, which you can often see in the dome or fisheye port of the shooter.

For the purpose of this chapter I'm going to separate different techniques into:

- In the distance
- Your model gets closer
- Eyes only

#### In the Distance

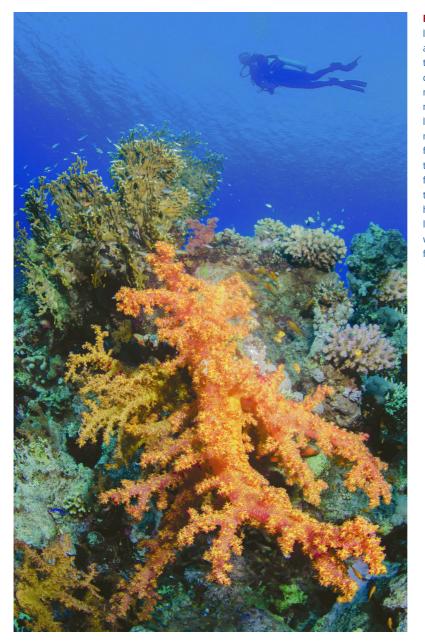
This is an effective way to add a sense of scale to an existing wide angle scene. Try and separate your model from any distracting clutter in the background, surrounding them with water is ideal. Achieve this by obtaining a low viewpoint and shooting up into mid water. Whether you choose a vertical or horizontal format, remember composition and the rule of thirds. In this way you direct the viewer's attention to your secondary point of interest. Think about pressing the shutter when the model is exhaling. Bubbles create further interest and the contrast in tone between their sunlit bubbles and the blue water background adds to the impact. Instead of just hanging-out in the blue, have them fin slowly through the frame. A fining pose is a dynamic pose, which creates a sense of movement and energy. In my own work I try to avoid shooting them motionless in the water. It can lack impact.



FIG. 9.16 One of my first attempts photographing Sylvia (my wife) took place with her in the entrance and myself at the very back of a cave. I was attempting to direct her with hand signals. I didn't realsise that not only could she not see me or my hand signals, she thought I was in the cave next door! The lesson I learnt from the outset was communication – essential when working with a model.



**FIG. 9.17** From the outset the eyes of the model are crucial to making it work. Sylvia knows to look for a 'centre of interest', in this case the grouper. Make sure you brief your model regarding eye contact with anything they may find interesting.



## Wide Angle

FIG. 9.18 Out in the open, when looking for an opportunity of a wide angle shot I would raise my left hand towards Sylvia to stop. Once I have composed a vertical orientation using my free left arm I will bring Sylvia into my idea. Holding my housing with my left hand, I will use my right arm above my head to position her in the image frame by using a simple thumbs up, thumbs down, etc. I then use my right forearm from the 9 o'clock position to the 12 o'clock position. For example, her body position above is 9 o'clock. I'll press the shutter and take the shot when she makes a movement with her fins, like in the image above.



**FIG. 9.19** After thirty years of practice, Sylvia knows to look at the centre of interest and not the photographer. It's very easy to look for guidance, for example to stay in my frame or move out of the frame. In our opinion Sylvia is best to stay in the shot if she is already there, rather than trying to swim out of the shot, which can look poor. If I need her to move out of my frame I use my right thumb to signal 'move away'. My thumb can be used to direct her either up or down, or side to side.

#### Light or No Dive Light?

Equipping your model with a dive light at every opportunity was a very popular thing of the past back in the 1980s. However, in the present day this has become a tad dull and repetitive. I still think divers and lights look good but take care that this is not overused. Make time to check out this type of photo and decide what you want. There is no right or wrong way.

#### Your Model Comes Closer

As you position your model closer to you and your camera things begin to change. At distances of 2 m or less it's important for you to appreciate that the light from your strobe will fall on your model's face. It may be diffused and underexposed but nevertheless it changes the entire dynamics of your story. Why? Well, the eyes will instantly become the centre of attention as eyes always are. The viewer, intuitively, will seek out the eyes, and for the idea to work the eyes must complement your foreground subject. If the eyes are closed, looking away, screwed up, looking bored, looking at you for instructions, even if the mask is a little fogged-up, this is what the viewer will see first and it seldom looks good.

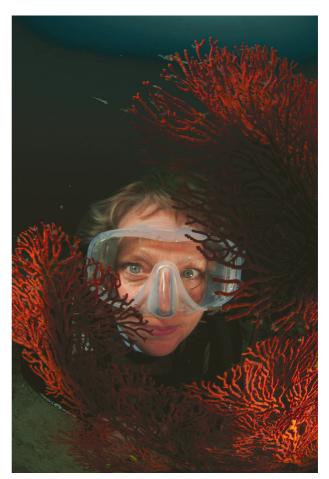


FIG. 9.20 This image I would describe as an underwater portrait.



**FIG. 9.21** If you include a model in your image from this distance then you have to have the face and eyes correct or the viewer will turn off. This image is a simple idea of exploration. The eyes are directed towards the clown fish. Nikon D7200, Tokina lens on the 17 mm end, *f*8 at 1/250<sup>th</sup> sec, ISO 200. Two strobes used on each side of my dome port in order to illuminate the inside of Sylvia's mask as well as the small clown fish. Both inside and outside the mask her skin tones are consistently illuminated. Shooting so close to each other may take a little practice to achieve but stick with it, and in a short time you will soon become proficient.



**FIG. 9.22** An example of 'implied eye contact'. You cannot see the eye of the chasing diver but you know what he is looking at. Also ensure that the turtle and your buddy do not merge into each other.

FIG. 9.23 This particular undercut just below the surface has great potential. It was shallow as you can see and I wanted to include the large fan coral, which is about 2 m in length. I composed in my 'minds eye' and with the use of my hand signals I directed Sylvia to swim into the frame.





FIG. 9.24 Don't try to do this idea all in one go! Ensure the background water colour is to your liking and then, and not before, bring in your model by using your left hand to position her either slightly up or downwards. Then, use your free right hand to press the shutter. You may need a few goes to get everthing as you like it so between the two of you, think up some hand signals which you are both happy with and more importantly, which you both understand.

## Wide Angle



FIG. 9.25 Yes, you recognised it. My Fifth edition front cover! This took Sylvia and myself six photo dives from Bunaken Oasis Dive Resort, Indonesia. I wanted to work with just one strobe to keep it easy, but for some reason I could not find a foreground to my liking. I had to leave a sizeable space both at the top, around the sides and the bottom for the text of the book. I decided to equip Sylvia with just the one strobe to make it easier on the eye for the front cover of the Fifth edition.

## **Eyes Only**

Eye contact is a primary consideration whenever a model is close. A mask that allows a clear, undistorted view of the eyes is preferable. The model should look happy, interested and at one with the subject, whether it be a fish or a reef wall. Eye contact should usually be directed at the subject, and wherever possible the photographer should try to get light into the mask by means of either strobe or natural light. Positioning the subject between the camera and the model can make the picture more dramatic, but take care not to overpower the picture by the model's presence. Remember, the model should add to the scene and not detract from the main subject.

## **Implied Eye Contact**

Thi is when you cannot see the eyes of the model but the direction of view of their facemask points the viewer in the intended direction. Even if your model is 5 m to 10 m away in the water column, direct them to view the subject of your intention and try to press the shutter when they are looking towards the subject and not into your camera lens for instructions. This is where clear communication is a must. The success rate with good model pictures is one reason why you need to take plenty of shots to get a few which work well.

### **My Modelling Tips**

- A model can look and see their own reflection in a wide angle dome port and can use the reflection to position themselves.
- Make a habit of taking a snap and showing your model in the LCD the view that you're composing. In this way they may have a good idea of where to be in the picture and how to pose.
- Swimming slowly through a seascape tends to be more successful and natural than just hovering motionless. When a model hovers, the fins drop and the suggestion of movement diminishes.
- A strong compositional suggestion is for models to align themselves at a similar angle to the reef, or the main focal point of the picture.
- It is the responsibility of the photographer to direct the movements and body angles of the model not the other way round.
- Avoid mergers where a silhouette has a leg or arm, which merges into the shadows of the reef. This can completely ruin a shot when it appears that they have staghorn coral for legs. We all know that this is not the case, but it will continue to pull the viewer's eye towards these anomalies rather than the intended focal point.
- If your model can see the strobe then the strobe can see their eyes. Your model should glance as opposed to turning the head towards your strobe. Features inside their mask will be illuminated.
- Give your models praise, praise, encouragement and more praise. They need to know that their efforts are much appreciated.
- If you want the model to gaze at a subject, it's effective to also place that subject within the frame. This avoids the eyes of the viewer from running out of the frame and leaving the picture.
- Sylvia and I have a signal for any ideas she may have.
- Show the finished picture to your model when you're down there at the time. They will have their own ideas of an alternative composition or style of body position. Work as a team not as individuals.

### In Conclusion

We use models to place a human element within the sea. We also use them as a 'prop' to occupy the blue water void in the background, which could otherwise appear to the viewer as empty space. I would encourage advanced photographers to explore other ideas to fill dead space in wide angles. It is so easy to fill the void with a diver but I have been in search of other ideas to accomplish the same thing. Filling the void – occupying the dead space – the far-off background. I discuss my ideas on this at the conclusion of this section in Wide Angle Surface Suggestion.



FIG. 9.26 An outstanding model, my grandaughter Evie.

# Motion Blur by Nick More

Motion blur is a way of incorporating movement into images to help create powerful pictures that capture power and dynamism. A slow shutter speed is used with either front curtain sync (FCS) or rear curtain sync (RCS) depending on the effect you are looking to achieve. Front curtain sync (FCS) is the default sync mode and is used in combination with an 'accelerated panning' technique. The strobes fire at the beginning of the exposure, freezing the subject. The movement of the camera (panning) in the direction that the subject is facing, combined with the natural, ambient light then blurs away the background, creating motion effects and blur.





FIG. 9.27 Jack School. Panning with front curtain sync (FCS). Nikon D500 and Nikon 10.5 mm fisheye, f20, 1/10<sup>th</sup> sec, ISO 100. Nauticam housing and 2 Inon Z330 strobes on full power.

The accelerated panning technique is to move the camera in time with the subject, trigger the shutter and then continue to move and accelerate the camera ahead of the subject. Panning fast or slow will determine how much blur is rendered in the final image. It is down to the photographer as to how much blur they want to incorporate.

To achieve focus you can either lock the focus (pre-focus) to the back button or use the cameras autofocus. Modern cameras such as the Nikon D500 have lightening fast AF and it has never let me down. I also set the AF points to pick out the subject's eye. When using this technique, the photographer must control the 'pass' of the subject by positioning themselves in the water to encourage the subject to pass to a particular side.

The benefit of using FCS is that the photographer, via the viewfinder and shutter release can accurately compose the shot and position the subject within the frame. This allows a much more predictable image. Panning also helps to remove background distractions, such as other divers and their bubbles, as well as backscatter. Reef and other background objects are rendered with a painterly effect to produce pleasing backgrounds that allow the subject to 'pop'.

Rear curtain sync (RCS) can be used with the camera stationary. The shutter opens at the beginning of the exposure and the strobes fire as it closes. This allows for capturing motion blur on moving foreground subjects but keeps the background relatively sharp. The downside to this technique is that the photographer is not fully in control of the composition, as the subject can be erratic and may not swim through the frame as expected. When executed well though, photos shot with RCS have a more natural 'feel' compared to those shot with FCS.



**FIG. 9.28** Jack School using rear curtain sync, which gives a more 'natural' feel to the frame. Nikon D500 and Nikon 10.5 mm fisheye. Nauticam housing and 2 Inon Z330 strobes on full power. Settings *f*16, 1/8<sup>th</sup> sec, ISO 200.

### Set-Up

To shoot motion blur, it is essential that the camera be set to 'manual'. The flash sync should be set to either front curtain sync or rear curtain sync depending on the 'look' of the shot you are trying to achieve. Shutter speed: this needs to be anywhere between  $1/4^{th}-1/15^{th}$  sec. It is the slow shutter speed that allows the blurring of the image. The slower the shutter speed, the more blur you can achieve. Its important to remember though that slowing the shutter speed will also allow more ambient light onto the sensor and can lead to overexposure.

Aperture: a small aperture should be chosen (f16–f22), this helps minimize ambient light but also to control the strobe light and to guarantee sharp focus of the subject. ISO: the ISO must be set low (ISO 50–200) to minimize the ambient light.



**FIG. 9.29** Oceanic white-tip shark using FCS and accelerated panning technique. Nikon D500 and Nikon 10.5 mm fisheye. Nauticam housing and 2 Inon Z330 strobes on 3/4 power. Settings *f*18, 1/8<sup>th</sup> sec. ISO 50.

### Strobes

Twin strobes should be used on high power, postioned behind the camera housing with the housing handles in the 9 o'clock and 3 o'clock position. It is the strobe light that 'freezes' the subject and the ambient light that allows for the blur, therefore the trick is to get close to the subject to allow the strobe to light the subject. The strobe needs to over-power any ambient/available light. Removing strobe diffusers creates 'hard', directional light to only light and 'freeze' the foreground subject. 'Inward lighting' can also work very well, to prevent illumination of the background. This strobe positioning and power would normally result in horrendous backscatter but with the panning technique the backscatter just gets blurred away and can even add to the overall effect.

I generally start at ISO 100, 1/8<sup>th</sup> sec and f18, with my strobes on almost full power. If it is very bright, I'll stop down to ISO 50, 1/15<sup>th</sup> sec and f22 but if is too dark, ISO 200, ¼ sec and f16. These same settings can be used to produce creative and artistic pictures such as swirls or zoom blurs. Bright sunshine with the sun directly overhead will result in overexposure due to the slow shutter speeds needed for motion blur effects. The best time for motion blur images is during periods of low light, for example, cloudy days or early or late in the day in order to minimize the ambient light. In very bright conditions, neutral density filters can be used to control the excessive ambient light.

FIG. 9.30 Oceanic white-tip shark using front curtain sync (FCS) and accelerated panning technique. Nikon D500 and Nikon 10.5 mm fisheye. Nauticam housing and 2 Inon Z330 strobes on ¾ power. Settings f16, 1/10<sup>th</sup> sec, ISO 100.



### **Subject Selection**

Not all subjects suit motion blur. The technique is suited to dynamic subjects or as a technique to blur away distracting backgrounds, such as the black sand of Lembeh when shooting the benthic residents or 'messy' divers and their bubbles in a wide-angle scene. Sharks are an obvious choice but its fun to experiment with other subjects to see what works.

### Composition

Subjects swimming parallel or coming 'onto' the camera work best. It is also essential to have natural separation between the subject and the background. It is vital to have the eyes of the subject 'pin' sharp with critical eye contact to engage the viewer. Unless the eye is sharp, the whole image is just a blur. Shooting slightly up towards Snell's window or even into the sun, when low in the sky, renders the surface with a painterly effect and introduces surface suggestion and is key to the audience engaging with the image. Objects and other divers in the background also create depth to the images and help to lead the viewer though the frame and identify with the picture.



FIG. 9.31 Blue shark using front curtain sync (FCS) and accelerated panning technique. Note the abstract background rendered with a painterly effect. Nikon D500 and Nikon 10.5 mm fisheye. Nauticam housing and 2 Inon Z240 strobes on ¾ power. Settings f22, 1/8<sup>th</sup> sec, ISO 125. A very nice surface effect can be achieved when there is a slight chop on the surface, less so in calm water. If its perfectly calm, you should be shooting shallow, dapple light images anyway.

## Editing

Importantly, these images need some post-production editing as they will look slightly 'flat' straight out of the camera. Using Adobe Lightroom or Photoshop, adding clarity, contrast and vibrance whilst reducing highlights will allow the images to really pop.



**FIG. 9.32** Pike blur using front curtain sync (FCS) and accelerated panning technique. Nikon D500 and Tokina 10–17 mm fisheye. Nauticam housing and 2 Inon Z240 strobes on ¾ power. Settings f18, 1/10<sup>th</sup> sec, ISO 200.

Successful motion blur images require a lot of practice to refine the skills needed and experience to recognize potential subjects and situations. Repetition as well as trial and error to find out what works is essential. You must be prepared to commit to the technique and plan entire dives or even a whole day in order to achieve pleasing results. These types of images really do stand out and will boost your portfolio as well as appealing to judges in photographic competitions.

# Wide Angle Surface Suggestion

During my workshops and presentations I get more questions about underwater wide angle than anything else. 'How can I improve?', 'what am I doing wrong?', 'there's always something missing but I don't know what it is', 'I seldom get the wide angle wow factor, like i see in photo competitions'.

My best advice on how to improve is a technique which I call 'surface suggestion'. I have developed this approach in order to achieve strong underwater wide angle images with impact, which I intend to discuss and illustrate in much detail. I stumbled on surface suggestion in the late 1990s. A friend phoned one evening and asked me to look out a specific underwater image in a 'coffee table' book of mine. He knew it was one of David Doubilet's but could not remember which particular book. He described the image as, 'a shot of two divers swimming just beneath the surface with a drop off towards the right hand side and awesome beams of light breaking through the surface'. Convinced that I knew the shot he was referring to, I began to wade through my David Doubilet books. My friend became impatient over the telephone! 'It's a wide angle shot, it's very shallow, a couple of feet, no more, sunbeams at the top'. He continued on and on about the beams, divers and the sunlight but his encouragement (kind word for impatience) was of little help to me as I turned page after page only pausing to look at wide angles. 'I know for sure the shot you're talking about but all these wide angles have the surface showing. All of them!'. And like a bolt out of the blue, that is when it dawned on me. I paged over and over every wide angle image from David Doubilet's book and realised that they all had the surface or a suggestion of the surface visible in so many of Doubilet's wonderful wideangle images. I immediately finished our telephone conversation and I began to search through my other underwater photo books looking specifically at wide angle images. I searched the web

for underwater wide angle competition winners and over a couple of hours I recognised the same characteristics time and time again. That particular evening I stumbled on one of the most significant discoveries of my own UW photographic journey, which is that the vast majority of quality underwater wide angle images have a suggestion of the under-surface present. I would even go as far has to suggest that over 85 per cent of quality underwater wide angle images have one thing in common with each other, which is the visible presence in the image of under surface detail of some kind or another. Over the years I have been able to break down the fundamentals of 'surface suggestion' so my students understand the individual characteristics of each feature and understand how and when to use them in their own wide angle work. To date I have labelled and illustrated six surface suggestion characteristics, which, in no particular order are:

- Texture
- Sun ball
- Sun beams
- Reflections
- Snells window
- Splits

### Texture

Is the most universal and identifiable of all 'surface suggestions' and all you have to do to include it in your wide angle idea is to tilt your wide angle lens upwards towards the surface and there it is. It will never go away. It will always be there. You can be 15 m deep and still capture texture detail towards the top of your image frame. The shallower you are to the surface the more distinct and eye-catching the texture of the undersurface will be. If you shoot downwards all the time you'll have little chance of becoming aware of it because you will be pointing your camera in the wrong direction. In preparation for this book I recently experimented in the wonderful waters off Raja Ampat by finning horizontally in the water column at various depths from 1 m to 30 m. I found that deeper than 10 m I was unable to see the surface unless I deliberately tilted my eyes/mask upwards. A rule of thumb is that below 10 m you have to make a conscious effort to angle your camera and your body upwards. Above 10 m, providing visibility is reasonable and you are using a wide angle lens you will include the surface automatically without a great deal of difficulty

**FIG. 9.33** Notice the blue water texture of the undersurface.



### Visualisation

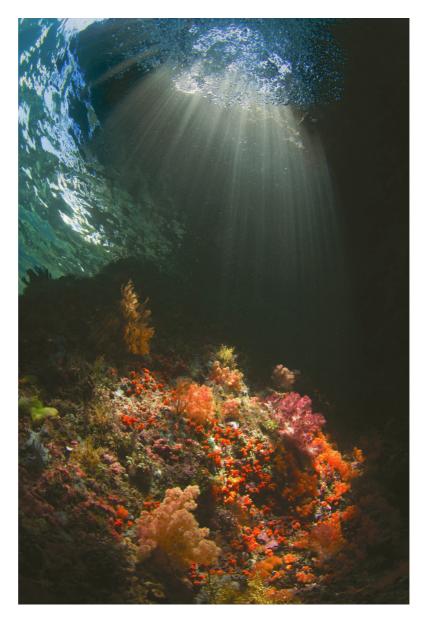
Whilst you're reading this page, imagine in your mind's eye some of your own favourite wide angle shots. I'm sure you will see surface texture in many of them. Go one stage further. Close your eyes and imagine yourself kneeling on the sand in shallow water looking up towards the undersurface. What do you see? Visualize the colour of the sky through the surface. Can you see the sun and palm trees that fringe the beach? Can you see reflections of the shallow sandy bottom, the sunbeams dancing on the sand? Study the wave action and the texture of the under-surface. Once you become familiar with looking and shooting upwards you will begin to discover more and more aspects of the undersurface and your wide angle work will thrive and develop significantly.

One more thing. Humour me, it will only take a minute. When you're next at your computer, go to Google images and in the search bar, type in 'Finding Dory', the 2017 film animation from Pixar. It will return numerous animated depictions of the underwater world. Click on images and scroll down and see just how many include surface suggestion. If it works for Pixar and Hollywood, it will work for you. That first evening I eventually located the David Doubilet shot which my friend had been so eager to locate (page 17 of *Light in the Sea* by David Doubilet ISBN 0-934738-54-8). We laugh about it now!

### The Sun Ball and Sun Beams

Consider the idea of including the sun ball and/or the sun beams in your wide angle images. However, I should point out that there is a difference between these two elements in terms of both camera and capture. Pointing the camera towards the surface and capturing the sun ball was relatively easy during the film era. The nature of film emulsions could easily capture a sharp, well exposed underwater sun ball on both print and colour transparency. When digital muscled in around 2003 early camera sensors did not possess the dynamic range essential to effectively capture a typical underwater sun ball. SLR cameras worked much better than compact cameras back then but both fell painfully short of the dynamic range compared to slide film of former times. In recent years and with the advancement of sensor technology there is little doubt that we now have our 'sun ball' back for good! The latest full frame and mirrorless cameras enable shooting directly into the sun with more control. Other camera systems such as compacts, and Micro 4/3<sup>rds</sup> can now choose higher shutter speeds whilst using a strobe, which makes shooting a sun ball a great deal easier. I need to emphasize that this relates to the sun ball only and not sun beams. There's a difference between the two. Sun beams are much easier to photograph.

FIG. 9.34 Shooting sun beams with a Tokina 10–17 mm lens on the 10 mm end. I was beneath a shallow reef in no more than 4 m with strong sunbeams piercing through. The time was around midday. ISO 200, *f*16, 1/320<sup>th</sup> sec. I turned one strobe off and lit the reef at ½ power on my other Inon 220. I wanted the reef to look as though the sunbeams had created just a 'kiss of strobe'.



To get the very best result from shooting the sun ball we need to control aperture, shutter speed and ISO.

- We set ISO at just 100.
- We need to set the fastest shutter speed possible within the limits of strobe synchronisation. With a Nikon SLR that speed is 1/320<sup>th</sup>. With a Canon SLR the speed is 1/250<sup>th</sup> sec, a slight difference of EV 0.5. Many other cameras such as Micro 4/3<sup>rds</sup> and mirrorless to name a few now have the dynamic range to shoot directly into the sun ball itself by making use of high shutter speeds.
- In relation to the aperture I have had the most success using f22. I use the camera's native ISO base of 100. The concept to capture the intensity of a sun ball is to keep all camera settings as minimal as possible. An aperture of f22 an ISO setting of 100. I position my strobes behind the shade protector of my wide angle Nauticam zen dome port. I select a colorful soft coral, which is small enough to include in the frame from a distance of no more than 15–20 cm from the front of my dome port. If the subject is too big I have to back off and if I back off I need to open my aperture from f22 to f16 to strobe light my foreground subject, which I've found can be just a little too bright to control the sun ball. It might sound surprising but these techniques are very much depth dependent. The intensity of the sun ball at 5 m deep can be just too much to control. If you descend to 10 m the addition of 5 m can make a difference as the intensity of the sun ball is diminished within the water column.

### **Shooting Sun Beams**

Shooting sun beams is much easier. The technique is to compose the beams within the shot and leave the sun ball just out of the frame. I took a number of shots with the sun ball at the top of the frame and then re-composed lower and lower in order to remove the ball, which left the beams remaining. Settings were f16 at 1/320<sup>th</sup> sec, ISO 200 with strobe fill. I took eight shots and varied the aperture from f16 to f22. Same lens as above, my depth was 4 m.



FIG. 9.35 Early morning in Raja Ampat the sun ball bursts through Boo window in all it's glory. Several years ago part of the window came away but it is still an amazing sight to see.



# Wide Angle

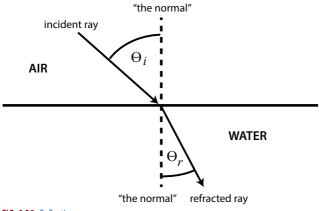
**FIG. 9.36** Shooting into the sun towards noon. This is about as good as I could do with the dynamic range of my Nikon D7200 ISO 100, *f*16, at 1/320<sup>th</sup> sec.

## **Splitting the Beam**

This is another technique to include direct sunlight. With your buddy or another obliging photographer (or a close coral outcrop) the idea is to silhouette a subject against the sun ball. This has the effect of 'splitting the beams' around their silhouette leaving them in outline. The concept is to swim close above your housing using their own reflection in your dome port to position them. They need to be close to your wide lens for their upper body to block out the sun. This works well in practice.



FIG. 9.37 When the sun is out in a clear blue sky l often practice possibilities for the future. You cannot see the beams but they are there. Also notice the blue water texture of the undersurface.





### Reflections

When I consider the list of surface suggestions, reflections are totally depth dependent. You need to be shallow and up close to the surface and I mean really close, 2 m could be too deep at times. Whether you dive or snorkel, you will have seen surface reflections at some time or another, often subconsciously. I want to encourage you to go look for surface reflections intentionally and add them to your photographic repertoire. The science of underwater reflections states that to see a reflection your viewing angle to the surface must be less than 42°. An example of this is to suggest that if you are directly beneath a subject, looking upwards, you won't see a reflection. But as you move your eyes away from your subject towards the undersurface, you will see it. Don't wait until you're in the sea to analysis this, a swimming pool with mask or goggles will suffice to practice this visual orientation. Reflections can be shot with a variety of lenses from fisheye to a medium length zoom such as 17-35 mm. I've had some success with a 60 mm lens but in the main, opportunities with a macro lens are few and far between unless using creative double exposure techniques.

I'm stating the obvious when I suggest that reflections work best when the surface is calm and the subject is as near to the surface as possible. In these conditions both the subject itself and the reflection of the subject can be included in the composition. This close proximity is of great advantage to both focus and depth of field and in the vast majority of examples, sharp focus throughout the frame is relatively easy to achieve. In my experience, the most challenging aspect of shooting surface reflections is the

opportunity to find subjects just below the surface. I teach these techniques in the sea by diving shallow and using a typical coral reef situated close to the surface. It's an opportunity to practice various skills such as:

- eye balling the reflection in the under-surface;
- composing the reflection line within the viewfinder;
- focusing on either the subject or the reflection itself;
- lighting the reflection either naturally using available light or with a strobe.



FIG. 9.39 Sand and reflection. It's always there.

### **Equipment and Lighting**

Capturing reflections can be done with all manner of cameras. The most basic compact camera will do the job, but ensure it's on the wide end of the zoom option. Surface suggestion is a wide angle technique. Reflections can be captured in natural light, with the aid of a strobe or a combination of the two. One frequent question in my talks and presentations concerns which? Subject or reflection? Which one do you point your strobe towards? My answer every time is the subject. Illuminate the subject but be aware that the reflection will never be quite as bright as the subject itself. The reason for this is that the reflected light usually has a longer light path than the camera to subject distance.

## **Adaptation and Practice**

Shooting undersurface reflections may take time to achieve. They involve observation, creative seeing and practice. Remember, smooth, calm water is ideal, whilst choppy waters disfigure and eliminate reflections.

- Identify subjects close to the surface.
- Wide angle lenses work best.
- Snorkelling is ideal to find subjects at the surface with reflection potential.
- Be careful to control your breathing. Bubbles can disturb the surface.



FIG. 9.40 I often find that we take reflections without giving them much thought, be it above water or below. They are taken for granted because they are always present in some way or another. We see reflections but how often do we acknowledge them in our underwater photography? On this occasion I ensured that the sun was behind my back and the surface line easily visible.



FIG. 9.41 From a compositional point of view, I find that the reflection line works well across the top third.

### Snell's Window: The Science

Snell's window got its name from the Dutch mathematician Willebrord Snell who first discovered and documented the law of refraction in the seventeenth century. Here is my short version of the science: in simple terms, our view of the surface from underwater is refracted into a cone of light, which has a width of about 95°. It's perfectly circular and can create an effect of a dark vignette. Looking through Snell's window you'll see clouds and sky whilst everything else looks dark. This 'darkness' is reflections of the undersurface and other subjects, which are also underwater. The visual appearance of Snell's window in the background will always enhance the impact and overall appeal of your wide angle images – whatever your foreground subject may be.

### Awareness

I talk to many divers and budding underwater photographers who have never noticed Snell's window. In my opinion the reason for this is because the effect of Snell's is so commonplace to the human eye, particularly when ascending and in sight of the surface at the end of a dive. It's always there. We see it all the time but fail to notice it. Cast your mind back to a boat dive. Just as you return to the surface, perhaps less than a metre deep, you look up and see the boatman or your dive pals on the boat looking back at you. You're looking through Snell's window. As discussed, this window is circular, but depending on your depth you may only notice an arc or at the most, a half circle. If the visibility is good and the surface is flat and calm you will clearly see the sky through the water but you will really have to stretch those neck muscles to see the entire ark of Snell's window through the surface.

To shoot this kind of shot with any camera a wide angle lens is a necessity. If using a digital compact, you'll need a supplementary wide angle add-on lens. The wider the lens the more of the circle can be captured and when using an ultra wide lens underwater like the popular Tokina 10–17 mm at the 10 mm end almost all of the circle of Snell can be encapsulated. I'll emphasize – almost all, but not quite! The best conditions for shooting Snell's window are when the surface of the sea is glass calm and the sky is blue with white fluffy clouds. The effect of Snell can be shot at any depth simply by pointing your camera upwards towards the surface. In shallow water close to the surface take advantage of details such as your pick-up boat waiting to collect you or topside vegetation such as trees and foliage close by. In deeper water look directly upwards for patterns of clouds in a blue sk.y

To photograph the full circle of Snell's window we need a fisheye lens equivalent to a 12 mm lens on a full frame Fx sensor. Since the majority of SLR shooters continue to use Dx 'cropped sensors' to my knowledge only the Sigma 4.5 mm circular fisheye will capture the entire circular window of Snell. I use this lens occasionally and whilst in my opinion 'one trick pony' comes to mind, the Sigma 4.5 mm circular fisheye is fun to use and Snell's window can be captured in its entirety all be it, with a circular field of view.

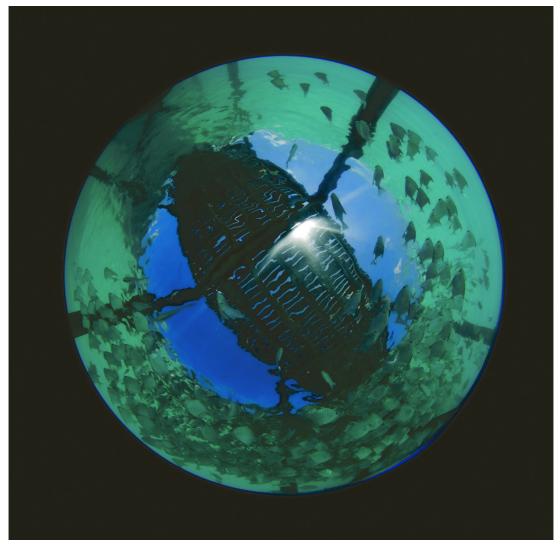


FIG. 9.42 Snell's window can be captured in its entirety with various lenses. I used my Sigma 4.5 mm circular fisheye lens. I purposely composed the struts of the pier against the sun in order to avoid overexposure whilst still capturing the sunbeams. The position of Snell appears as a circle within a circle. The image is circular due to the lens characteristics. Snell itself is the circle of bright and dark blue behind the diver. ISO 200, *f*11 at 1/125<sup>th</sup> sec. Natural light in the Red Sea.



**FIG. 9.43** In my opinion this image sums up everything about surface suggestion. In no more than 1 m of water we have the golden setting sun breaking through the shallow white water surge at dusk. I have illuminated (top down) the yellow hard corals with just a trace of one strobe on half power. This complements the two warm colours both below and above the surface.



**FIG. 9.44** At the very same time I had alternative options to bring in the surge as opposed to the sunlight. So many possibilities when you work shallow.



FIG. 9.45 Surface suggestion and the wide angle wow factor! Hard corals and a breaking wave in 2 m of water. The peak of the action is the breaking wave. The surge was controllable. I had found a position on the reef where I could hover just below the breaking wave, which pushed me out into the blue water column without any danger at all. The colourful corals were in perfect condition in the southern Red Sea.

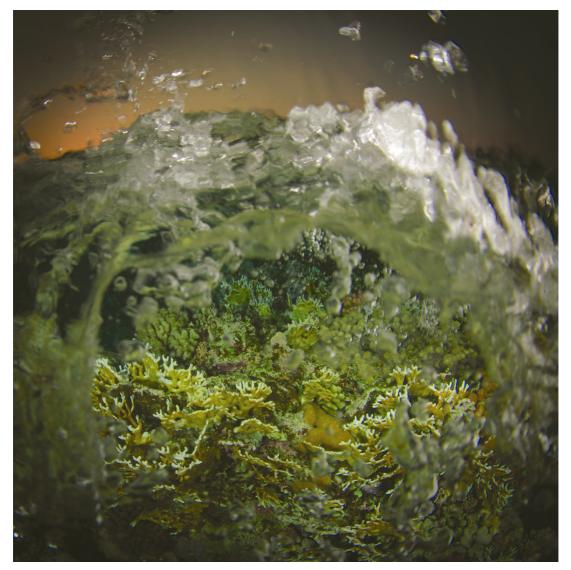


FIG. 9.46 For more than 25 years now, instead of looking for a fish or a critter swimming on the sand or perhaps just a piece of coral, when I enter the water I'm looking for an opportunity. I am neither critter or big fish or super macro orientated. I'm just looking for an opportunity to make a strong picture and I will work hard underwater to achieve that aim. The image above is typically me. Taken in the Red Sea just after sunset, I was bobbing along beside a reef, which also came to the surface. I decided to plunge my housing into the water from head height and press the shutter (with strobe of course, it was getting darker by the minute). I got back to the liveaboard, looked at my last shot (the one above) and had a deluge of questions on how I had shot it? How I had lit it? How I had made a opening into the reef to view it? To this day I have no idea at all. I just have fun, experiment with the light and the waves and amuse myself. Perhaps more than anything I'm curious and often wonder what will happen if I do this or that with my photography. Just in case you are wondering, I have never been able to replicate the image above and that was nearly 10 years ago.

### Splits: Over-Unders

This popular wide angle technique has gone quite trendy over the last 5 years, particularly with underwater photographic competition entries. It's a rewarding skill to master and whilst the concept is straightforward it can take some practice and patience to achieve a shot to satisfy you.

## Equipment

The best way to capture this type of image is to use the following:

- Wide angle lens, preferably a fisheye or fisheye zoom lens.
- Ideally, the largest dome port available for your housing. A large dome port will always handle surface ripples and swell better than a smaller port. So the bigger dome the better.
- In an ideal world an underwater housing fitted with an angled 45° viewfinder which allows you to view the composition with your head and most importantly, your eyes out of the water (see further discussion at the end of this chapter).

For my split shots I use either a Nikon 10.5 mm fisheye or the Tokina 10–17 mm zoom, usually on the 10 mm end. Both lenses have a considerable depth of field, which cope with most focusing issues. If the underwater and land portions are too far away from each other, ensure you prioritize sharp focus on the foreground.

## Focusing

Another tip in order to create as much depth of field as possible is to consider the use and technique of hyper focal distance. Try focusing just behind your foreground portion of the scene. In this way the depth of field in front of the sharpest point of focus of the lens will take in the foreground portion and maximize the entire depth of field range.

One advantage of both the 10.5 mm and the fisheye zoom is that they're both compatible with and designed to perform at their optical best behind large fisheye domes, notwithstanding the make of housing.

## **Problems with Water Droplets**

There are a number of ideas to prevent water droplets clinging to your dome port when holding it above the water line. I've tried most of them and still have a problem with water dispersal. I have used motorcar products effective on windscreens. Another alternative is to lick your dome! A coating of saliva on the outside of your dome achieves the same effect. Neither is totally reliable, and this is where frustration with these techniques can set in. Choosing a day when the surface of the water is flat calm is more likely to result in success. Enter the water with every intention of keeping the top half of the dome dry. I know it's an enormous challenge but when the sea is glass calm it's much easier to control and compose the water line across the surface of the wide-angle dome port.



FIG. 9.47 My buddy Stuart is shooting a split but can you see that 95 per cent of the dome port is underwater.



**FIG. 9.48** This time the water line is across his dome. He is also shooting in a horizontal position in order to get plenty of width in the topside interest.



**FIG. 9.49** The result has excellent corals with a slight gap between the water line and the top of the reef. Notice the thin line of blue water, which adds another layer of interest and also the perfect placement of the small white clouds towards the right-hand corner.



FIG. 9.50 An excellent location for splits at Misool Eco Resort.



FIG. 9.51 Make every effort to practice splits whenever you have the chance. Whilst the corals in this image are average, the depth of water is perfect. The light is behind my back hence the sunny blue sky in the background. Take as many shots as possible to manage the water line and also look for sandy outcrops. Do not walk over the corals! I reiterate, practice your split shots whenever you can.

#### **My Tips**

When shooting the surface line in conditions less than perfect, I've developed a routine to keep droplets off the finished picture as much as possible.

- Select a shutter speed of 1/250<sup>th</sup> sec or higher if possible as we are going to freeze motion.
- Hold your camera housing at the desired angle across the surface line.
- Pre-focus as required (see above). I use back button focus to ensure the lens does not hunt.
- Depth of field with fisheye lenses is more than adequate and has never been a problem for me using Nikon Dx SLR cameras.
- Practice tilting and submerging the dome port downwards just enough to cover it completely with water.
- Then, in one motion, bring the dome up to the level of the water line and press the shutter.
- What you'll find within a few minutes of practice is that it takes between 1 and 2 seconds after submersion for droplets to begin to run down the dome into the picture area. The idea is to press the shutter in the 1 or 2 second window of a clear dome.
- A shutter speed of at least 1/250<sup>th</sup> sec is required to freeze action of the submersion to avoid camera shake with the movement it entails.
- To achieve one clean split image it could take as many as 50 frames.
- The bigger your wide angle dome the more success you will achieve.

### Exposure

What may be correct for the topside view is normally one to one and a half *f*-stops too dark for the underwater view. I encourage shooting when the sun is directly overhead (there is rarely more than a one to two stop difference) or when the sun is behind your back. This keeps the exposure differential at a minimum and by bracketing the combinations of aperture and shutter speed, acceptable exposure can usually be achieved. I like the sun coming from behind my back because of the quality of light, which falls on the topside portion of the composition. Shooting a split into the sun can be challenging but don't let that stop you having a go!

### **Composition and the Layers Approach**

When I shoot and teach splits I look to achieve as many layers of interest as possible. What do we mean by layers? For example, let's take the sky portion. If the topside portion is a vivid blue sky – then that is one layer of interest. If the sky is also punctuated with fluffy white clouds then that is two layers of interest.

In a perfect world I would have:

- an interesting underwater portion in the bottom half;
- an interesting topside view;
- a flat calm surface but with a curved shaped waterline to provide a sense of energy;
- the sun behind, illuminating both the over and under aspects equally.

Who says underwater photographers don't ask for much? This is where the challenge begins to bite us. You have to practice these techniques and the best place to start is the dive-photo resort swimming pool. Think laterally – avoid the open sea by all means. Where do you find glass calm water and shallow under-surface subjects? Answer: in shallow water, so consider swimming pools, rock pools, shallow calm sandy beaches, mangroves, inlets and harbours, I'm sure you can add to the list.

The difficulty is finding half a scene that will complement the other half. I am forever finding a colourful, photogenic shallow seascape with nothing on land to complement it, or a white sandy beach and palm trees topside with no interest underwater. If you want to shoot splits, I cannot stress enough to take advantage of the conditions when they all come together. If you don't take advantage – if you put it off till the next day then either the sun will be behind cloud or the visibility will be murky or the glass calm surface will be choppy. Something will blight your efforts so don't wait until tomorrow – it never comes.

FIG. 9.52 A sunset split in the early evening. The depth of water was no more than waist-height. The corals were lacking but the sunset more than made up for that. The dive boat adds another layer of interest with the silhouette placed in a perfect position.

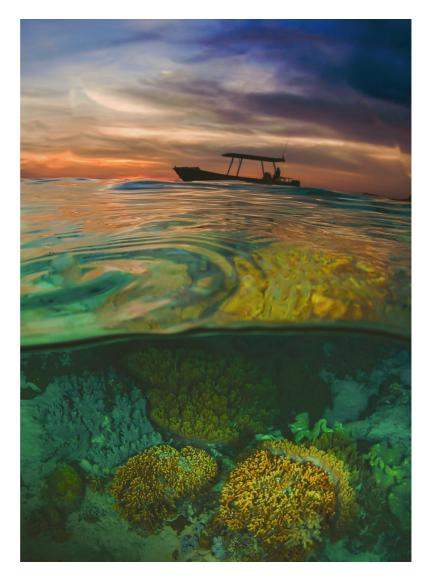






FIG. 9.54 Lankayan Island in Malaysia. Practice, practice, practice wherever and whenever you can. Don't wait until the last day of your photo trip. With a glass calm surface and the sun behind you, in shallow waters that you can stand up in, take advantage of the conditions there and then. I took at least forty frames to get what I wanted, which was the curve of the water line whilst no one else was in view. I had no reason to use a strobe in anyway whatsoever.



# Wide Angle



FIG. 9.55 Split levels are a given at Grand Cayman. Shooting the stingrays in 1 m of water will often create both a top and a bottom half split without even thinking about it. In this case I was trying to get some shape with the rays. As I entered the lagoon on day one I never gave a thought to creating splits of this nature. I do now though. ISO 200, at 13 mm on my Tokina 10–17 mm lens, f18 at 1/250<sup>th</sup> sec.

FIG. 9.56 For all the images in the wide angle wow factor, my strobes would have been very similar to what you see above. Both strobes pulled back, level with my eyes behind my housing. When I'm at a distance, for instance at about 2 m, I would have pulled them out much more. As I get closer to my subject I bring them in like you can see in the image above. I keep them back behind my housing. Notice my long strobe arms. In recent years I tend to leave them on much of the time. The reason for this is that I can respond to any lighting circumstances whatsoever whilst I'm underwater, be it macro or wide angle. I'm not suggesting you go down this path at all, it's just the teacher in me always looking for new and inventive opportunities.



### **Viewfinder Discussion**

Angled viewfinders which can rotate 45° are used by many professionals. I appreciate that you rarely choose a housing based on one particular technique but these angled finders will benefit the underwater photographer in so many other ways, including macro techniques and other forms of wide angle, as they allow the user to shoot lying prone on sand or rubble whilst still being able to easily view and compose. Having said that, I continue to use a 90° finder for all my split images. Many professionals now invest in an oversized dome port just to be able to control the water line meniscus. It works very well. The bigger the dome port, the easier it is to control, and as a direct result the fashion of shooting splits has gained a huge popularity all over the planet. At this current time (2020) splits are extremely popular in underwater photo competitions the world over. A Google internet search on '45° viewfinder underwater' will highlight a number of companies who are producing these angled finders for other housings.

## Wreck Photography by Nick Blake

From my very first dives back in the 1980s through to today, I have been fascinated by underwater wrecks of all descriptions. Ships, planes, cars, trucks, the list of man made objects that can be found underwater is endless. Wrecks offer so many photographic opportunities and combine aspects of my own photography, which I particularly enjoy shooting. There is of course the history of a particular wreck: tragic and heroic stories of loss and survival, in some cases a record or relic of an iconic moment in history. What I find captivating is the new life which these wrecks take on in their underwater environment, often festooned in corals and home to a host of marine life. The beauty of wreck photography is that we have a static subject, offering a plethora of photographic possibilities both outside and inside the wreck.



## Equipment

Whether you use a compact, SLR or mirrorless camera, a wideangle lens is essential. It will ensure you get close to your subject, whilst at the same time being able to frame the size and scale of a wreck. In the absence of a wide angle lens, backing off significantly to fit it all in will result in a loss of clarity and contrast and won't work. As digital cameras have evolved, wideangle solutions have become available for most types of camera used underwater. Whether that is a wide angle or a fisheye accessory lens for a compact camera, or a dedicated wide angle lens for an SLR or mirrorless, there are many options.

The majority of wreck photographers use either a fixed focal length fisheye lens or a fisheye zoom. The Sigma 15 mm fisheye is typically my lens of choice when I shoot full frame and a Tokina 10–17 mm fisheye zoom when shooting with a cropped sensor such as a Nikon 500. Whilst rectilinear lenses preserve straight lines and right angles underwater, there are also limitations for these lenses, particularly in terms of corner sharpness where full frame SLR cameras are concerned. To address this necessitates the largest dome ports and often the addition of extension rings, potentially adding significant weight and bulk to your underwater system. My preference is towards fisheye lenses, allowing for a more streamlined underwater system, whilst at the same time providing a field of view as wide as 180° in some cases. There are many discussions related to this on www.wetpixel.com, which may help to inform any purchase decisions. You may also like to skip back to Alex Mustard's piece on corner sharpness in Chapter 3.



**FIG. 9.57a** The USS Kittiwake Wreck, Grand Cayman is a popular dive and relatively shallow with a maximum depth of around 20 m. The depth allows plenty of time to explore the entirety of the wreck, including the interior. Over several dives we explored every aspect, the shallow depth allowing for extended periods to work on compositions. Nikon D810, 13 mm, *f*16, 1/100<sup>th</sup> sec, ISO 640.

## **Dive Safety and Pre-planning**

Any wreck dive is potentially a hazardous environment, particularly where penetration inside the wreck is planned, and must of course only be attempted within the limits of your dive training and qualification. In choosing to photograph wrecks it is essential to also consider the depth at which the wreck rests and the opportunities available to undertake repeat dives. For example, a wreck in 40 m of water presents a problem if you are unfamiliar with it and only have one or two opportunities to dive and photograph. Your priorities should be centred on dive time and depth.



FIG. 9.57b The USS Kittiwake. Time of day and the position of the sun can play a huge part in wreck photograph opportunities. In this instance, the sunlight across the wreck creates shadows and when converted to black and white, makes for a moody image. Nikon D810, 13 mm, *f*16, 1/100<sup>th</sup> sec, ISO 640.

This is where dedicated underwater photography workshops really make a difference. Typically, an entire day or more are set aside for a particular wreck, allowing for multiple dives and therefore, understanding the wreck's history, the layout of the wreck, prime photogenic areas, specific points of interest, as well as an understanding of the sun's positioning in the sky in relation to the wreck.



**FIG. 9.58** The Thistlegorm wreck in Egypt is one of the most popular wrecks in the world and its cargo of trucks and motorbikes from the second world war offers a multitude of photographic opportunity. I had wanted to photograph the trucks in this wreck for some time, and visited this particular truck two or three times during the time spent at the wreck. Using a fisheye lens, I positioned my two Inon strobes vertically upwards above the housing as high as they would go on the strobe arms and close to each other. Pointing the strobes straight out and using a high strobe power helped project a pool of light onto the truck, lighting the scene. The light levels inside the hold were extremely low and I knew that focusing the camera inside would be a challenge. Therefore before entering the inside of the wreck I set my autofocus to AF-ON only, which allowed me to pre-focus the camera outside of the wreck choosing part of the hull I thought would be about the same distance as the trucks inside. Once pre-focused, it remains locked until you press the AF-ON button again. Therefore, once inside, I could concentrate on composition and lighting, with the focusing taken care of. In the low light, I used a slow shutter speed of 1/10<sup>th</sup> sec, which still allows for a sharp shot. Nikon D810, 15 mm fisheye, 1/10<sup>th</sup> sec, f13, ISO 640.



FIG. 9.59 Upturned Zero Fighter, Truk Lagoon. Wreck photography is one of the few occasions underwater where downward angles tend to prove more effective than shooting upwards. Shooting downwards helps to create a more interesting and dynamic image, making the most of shape, perspective and shadows, whilst highlighting interesting features. Including a diver in the scene, perhaps your buddy, can help to give the viewer a sense of scale, which everyone can relate to. Encourage your buddy to use a dive light in order to draw the viewer's attention to a specific subject or point of interest in your composition.



FIG. 9.60 On a recent trip to Truk Lagoon, I had taken a powerful dive light, which I intended to use for modelling. My buddy and I alternated in modelling for each other, using the dive light in most shots and at the time, I thought to great effect. However, on my return home, a fellow underwater photographer reviewing my images, noticed that virtually all my shots had a diver modelling alongside different wrecks. In every case they were using the dive light, and typically I had positioned them more or less in the same place in my frame, relative to each wreck. I realised that I had become quite blinkered in my approach to the use of models and modelling lights, oblivious to the fact that they all looked the same. My learning was to ensure that in future I introduce more variety in my wreck work, particularly when other divers are modelling for me.

#### FACING PAGE

FIG. 9.61 Natural light, flash/strobe and creative lighting. The sheer scale and size of a wreck makes it impossible to light with a strobe. A stern or bow view are usually shot with natural light, so be prepared to increase your ISO, depending on depth and visibility. I tend to shoot with my camera set to auto white balance, and I may adjust this balance during post processing. I like to shoot a scene first with my strobes turned off, then introduce one strobe and if necessary, a second strobe, reviewing each shot as I work. In shooting a subject within the interior of the wreck, natural light may well be poor, or absent altogether, in which case the use of strobes becomes paramount, so the position and power setting are key to illuminating the subject successfully.





FIG. 9.62 As members of our dive group headed into the interior of the wreck, I remained outside with one of the dive guides and observed some of the features of the wreck. I was fascinated by one of the davits, which was festooned in colourful soft coral growth. The dive guide saw me composing the shot and moved into the frame to model for this image. Nikon D800E, 15 mm fisheye, f9, 1/100<sup>th</sup> sec, ISO 500, twin Inon strobes.

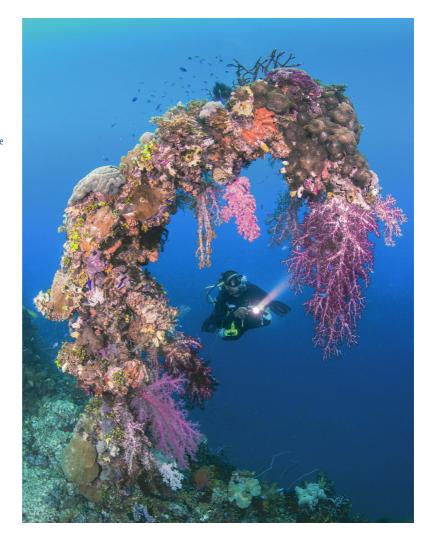




FIG. 9.63 Magic Filters and wrecks. Given the size and scale of a shipwreck and the emphasis towards natural light, I have found Magic Filters to be an ideal accessory in helping me capture a pleasing wreck shot. They were developed by underwater photographers Alex Mustard and Peter Rowlands, and are particularly effective with large subjects, allowing colour to penetrate deep into the shot – something which cannot be achieved with strobes. In principle, they work in a similar way to a red filter, removing blue, cyan and green casts and restoring available light to natural colour. They are a relatively inexpensive accessory for underwater photography and are available for both blue water and green water use and also for a range of cameras and lenses. I ensure I always carry one with me to fit my Sigma fisheye lens, and if the wreck I am diving is in the 1 m to 15 m depth range, where the Magic Filter can produce vibrant images, I will look to make use of it.

## Getting the Best from a Magic Filter

There are a number of key considerations which, when followed, make a major difference in capturing a pleasing result. Whilst these are also covered in the information supplied with the filter, it is easy to overlook some of the key points and it is well worth recapping:

- You must have the sun directly behind you. Anything else will most certainly result in an unpleasant red/pink colour cast.
- A downward shooting angle works best. This suits wreck photography as most wreck shots tend to work better when a downward shooting angle is used.
- The optimal depth range is between 1 m and 15 m. Beyond this depth, the Magic Filter may still improve the result versus natural light, though tones will be more muted.
- You will need to be comfortable in manually setting your white balance. It will need to be reset if your depth changes by more than 1 to 2 m and also if you adjust your direction of shooting. I tend to use the palm of my hand to set the white balance or even my buddy's dive tank if it is white or a neutral grey.
- Once you have fitted a Magic Filter, you will need to shoot in that mode for the duration of your dive. If you have strobes fitted to your housing, you won't be able to make use of them due to the harsh colour casts they will now generate.
- There are many aspects of using a Magic Filter which are well suited to wreck photography. A very worthwhile and cost effective accessory which could make a big difference to your wreck images when the opportunity presents itself.



FIG. 9.64 Black and white imagery and its simplicity, combined with natural light is for me one of the most enjoyable aspects of my underwater photography. Large subjects such as wrecks typically have little colour and so lend themselves well to black and white. A black and white image can also help to enhance structure, shapes, textures and tones. In the case of a wreck, it could help portray a moody or melancholic tone, which may complement the particular history of the subject. The position of the sun in relation to the wreck can help create a very different effect for a black and white shot versus colour. For example, shooting with the sun falling across the wreck, rather than from behind or in front of it can create strong and dramatic shadows, adding drama to the image. With a black and white image in mind, I often change my camera settings so that the rear LCD display shows black and white on playback, instead of colour. I find this useful in terms of evaluating whether a particular composition is working in black and white or not, and therefore whether it is worth persevering with. The RAW image is unaffected and when downloaded will appear in colour, requiring conversion to black and white in post processing.



FIG. 9.65 In recent years the use of remotely triggered strobes has grown in popularity and offers a very creative use of artificial lighting or can help convey a very different look or point of interest to your image. Typically, they make use of a slave sensor unit attached to a strobe with a standard sync cord cable, which allows the triggering from a substantial distance, or positioning the strobe within the composition, resulting in an image with implied light. The slave sensor, connected to a strobe via the sync cord will automatically respond to the strobe connected to the underwater camera. My system consists of a Triggerfish sensor attached to a spare Inon Z240 strobe with a standard Nikonos sync cord. To complete the set up, I attach my remote flash to a gorilla pod or similar small tripod, which helps in placing it where I want. In a wreck environment, remote strobes can be a very creative lighting option. They can be used in combination attached to your underwater housing, or alternatively in isolation.



FIG. 9.66 Making the most of the limited time on location at a wreck site is essential. I endeavour to spend time using local dive sites to practice and perfect my techniques. Across the UK, and in other countries, inland dive sites typically hold purposefully sunk attractions such as boats, aircraft, cars and trucks. I find these 'any weather' locations perfect for practicing wreck photography techniques, such as remotely triggering, Magic Filters, natural light and monochrome. I have spent many dives, particularly across winter periods, using these inland sites to practice different image compositions, which has paid dividends when on photo workshops overseas, and also resulted in many pleasing images along the way.

### In Summary

Wrecks and the marine life which colonise them offer a multitude of photographic opportunities, from wide angles, through to supermacro. The shapes, structures and dramatic lines offer endless compositions, the history associated with many of them adding fascinating context and points of interest. Without doubt, for me, wrecks bring together those aspects of underwater photography which I enjoy so much, particularly natural light, and black and white imagery. Make the most of opportunities close to home to practice your techniques, and when you dive on a photogenic wreck which suits your needs, you are ready to unlock your photographic potential.

## **Mangrove Adventures**

Over the last 10 years I have become well aware that I have had some of my best underwater photography in and around mangroves and other shallow water environments. As a direct result of being immersed in the completion of this Fifth edition I have gradually begun to recognize the photographic wealth of opportunities, which are so very much in plain sight, so much so that I may have been casual in failing to notice what I have enjoyed directly in front of our house reef at various photo/dive resorts all over Indonesia and beyond. In more recent years I have made sure that the house reef is visited at the commencement of a workshop as opposed to the last few days of a trip.

Mangroves are a group of trees and shrubs that live in the coastal intertidal zone. There are about 80 different species of mangrove trees, all of which grow in areas with low-oxygen soil, where slow-moving waters allow fine sediments to accumulate. Mangroves are coastal forests that grow in the tidewater of tropical and semitropical regions. For a mangrove swamp forest to flourish, it requires a tropical climate, saltwater, tidal movement and a substrate of fine grained silt. Under the silt roots of mangrove trees, a diverse array of plants and animals can thrive. Mangroves are bright below the surface due to the sun and shallow sand, which reflects the light. Very good visibility is also an advantage due to the stillness of the water and also the lack of visitors. A depth of 1 or 2 m is usually the norm but will fluctuate with the incoming and outgoing tidal range where animals live. The distinctive structure of the mangrove tree roots also provides a safe haven for birds and fish to construct nests and breeding areas protected from predators.

For my own work in particular mangroves have everything. Split shots are guaranteed with the bonus of great light and lots of it. So many outside influences are in play such as the trees and foliage, which grow from below and rise up through the undersurface to populate even more outside influences. It's safe, it's shallow and delivers great imagery both below and above the water line. Do make sure you try it out soon.



**FIG. 9.67** Waiting around for the tide to rise a little!

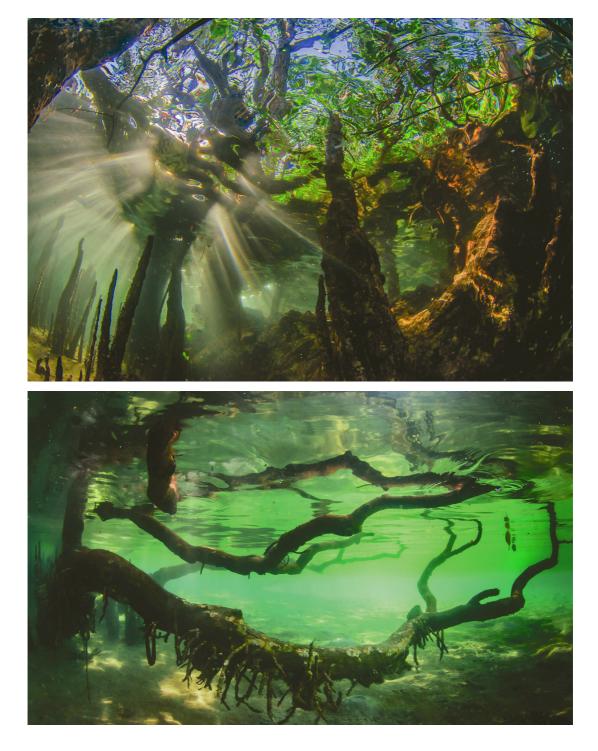


**FIG. 9.68** Whilst it may be a fun shot, we are actually waiting for the tidal mangrove waters to rise to about 2 m in this particular vicinity of Bunaken Oasis Resort. When the light is at its best it is truly spectacular.

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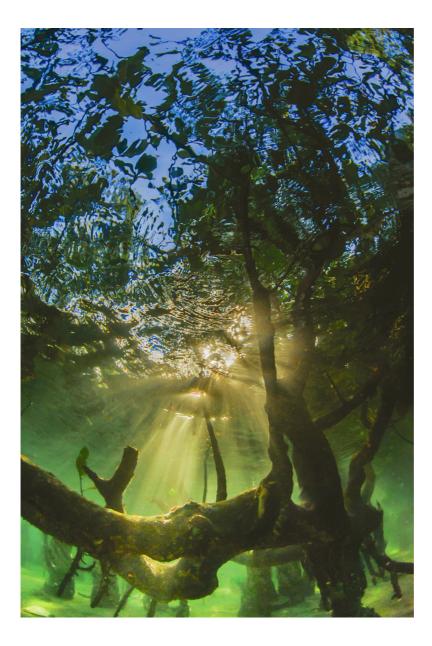
**FIG. 9.69** I'm snorkeling in about 1.5 m of water without fins. Sometimes it is too deep but on this particular afternoon (around 3pm) it was ideal. I'm using my Tokina 10–17 mm lens and I'm shooting my favourite subject, the light! I'm using the trees to silhouette the sunbeams and I am making a huge point of positioning myself in the middle of the light so when I look up, it's almost blinding me.

FIG. 9.70 Whilst the light is like this I will shoot without a strobe, alternating between an horizontal and a vertical format. The sand is visible so I try to keep straight lines with my housing. I don't stay in the shade all of the time but I do like to place myself on the very edge of the shade where it meets the light.



FIGS. 9.71 and 9.72 This particular afternoon was gin clear so I knew I needed to take as much advantage of the light and conditions as possible. Small compositional ideas let me play with the light, particularly with the composition of the trees.





FIGS. 9.73 and 9.74 There is no difference between these two images other than a vertical format as opposed to a horizontal composition. See below.

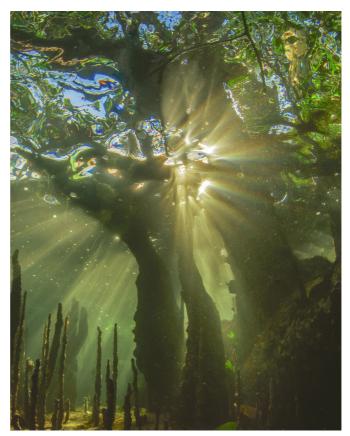






FIG. 9.75 I like to give a hint of the outside world through this tiny slice of Snell's window at top middle.



FIG. 9.76 I'm in 1 m of water carefully lying on the sand and on a day such as this I'm shooting anything and everything into the light.



FIG. 9.77 On an alternative afternoon in the same location – off Bunaken Oasis Resort. We had a small window of blue water mangrove photography. I curse myself for my wobbly surface line! I never noticed that it was not straight.



FIG. 9.78 Another blue water mangrove opportunity, which was waylaid due to a crocodile sighting.



FIG. 9.79 Using a monochrome interpretation with just a hint of colour in the fallen leaf.

## Popular Opportunities Piers and Jetties

Seasoned underwater photographers will be well aware of the excellent opportunities to be found on, in and around piers and jetties. I began my own journey many years ago with regular visits to Swanage Pier in Dorset, UK. Back then Swanage was convenient to me and, for reasons which I never appreciated until much later, I was able to concentrate on my photography much more beneath the Pier than I could when diving out in the bay from a dive boat. Under the Pier in 3 to 5 m of water I felt a sense of calm and safety and I was more than happy to dive solo. This had a knock-on effect of more bottom time, zero deco and an all round general feeling of safety and wellbeing. I took some of my most successful images under Swanage Pier, which provided the motivation to seek out other shallow water opportunities. In 1983 when I began to write and teach, the full potential of photo diving piers and jetties became evident. It was all so much easier to photo dive just off the beach, beneath a pier rather than out in open water.

I want to discuss how to use the backdrop of a pier and other shallow water environments to enhance elements of exceptional negative space in order to frame the main subject, whatever that subject may be. Macro enthusiasts can also benefit from shallow environments with much more bottom time and once again, a heightened sense of safety.

## **The Pier Structure**

Using a wide angle lens it is essential to photographically link the structure of the pier with other elements such as the surface itself. An example of this would be to shoot upwards towards the surface through Snell's window and to include in the picture frame outside influences such as the pier structure itself, clouds in the sky and with a bit of luck, photogenic sunbeams. In order to achieve this I believe that it is best practice to shoot in a vertical composition in order to capture as many layers of interest both above and below the surface as we possibly can. If we stick to a horizontal format then, whilst comfortable and easy, it may be we will miss opportunities to connect the underwater portion of our idea with the topside interest and it's the topside interest, which most often provides the magic. A vertical format will stretch the height of a composition to include surface suggestion and beyond. Having said that, if you choose to shoot a horizontal also then go ahead by all means, shoot both.

## **Tilts, Slants and Angles**

Underwater photographers have the opportunity to tilt a composition around numerous angles for the simple reason that the viewer has no idea where the horizon line is to know what is straight or tilted. We shoot tilts underwater and get away with angles, which we could never shoot on land. However, piers and jetties are usually quite shallow so we must pay attention to achieve straight horizon lines when including the surface, which also means if at all possible to avoid tilting the legs of pier structures. Now, this is one of my own regular mistakes. I'm so fastidious in making the topside lines straight that I end up tilting the structure of the pier itself. Yes, I can get away with it by cropping later but I'd rather not, so I have learnt to pay attention to the surface suggestion in the background. There's no technique to this. It's just a case of remembering.

## Body Angles. Get Low, Get Close

If a pier is quite shallow, i.e. 3–5 m, I try to find a simple subject and get as low as possible to be able to shoot upwards towards the surface and beyond, and this is where our own individual body angle becomes important in order to get a good dynamic angle of view. When shooting upwards we also have the sunburst to contend with. If you are shallow and pointing upwards towards the sun be aware of overexposure. My preference is to hope for a flat calm surface with great light either in the early morning or late evening, however, it's not always possible to visit the location at the time of your choosing.



FIG. 9.80 Popular Opportunities. These are several images I took some years ago beneath a shallow pier called Air Manus in Indonesia. It was particularly gloomy, extremely loud and for some reason which I have difficulty explaining, I found it quite foreboding. I swam around looking for opportunities but I couldn't settle at all. Of all the many thousands of images I have taken, when I view this shot it takes me back and I recall my apprehension. However the image continues to grow on me for some reason. Settings ISO 400, *f5.6* at 1/60<sup>th</sup> sec.

#### My Wide Angle Strobe Tip

When I'm shooting wide angle, both foreground and background, I frequently turn my strobes off in order to concentrate on the natural light appearance of an idea. Only when I have the background natural light exposure to my liking do I begin to use light from my strobes. The reason for this is that I can become distracted by too much colour in the foreground that I take little notice of the background. Via my viewfinder the colour tends to 'get in my way'. My routine is to develop the background effectively both compositionally and exposure-wise before I start to introduce colour from my strobes.

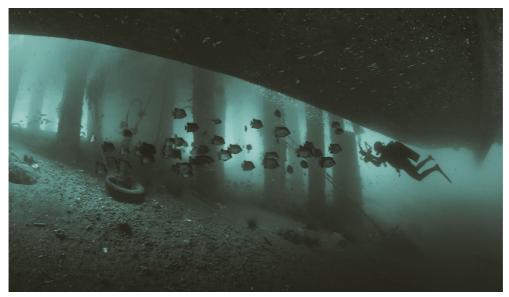


FIG. 9.81 Taken in Ambon, Air Manus is also called the Twilight Zone. I'm watching my photo buddy checking the back of his housing and repositioning his strobes. He is totally engrossed in the moment. From my point of view and without him knowing, he is making a perfect sillouhette.



**FIG. 9.82** He is now in position and framing at an upward angle along the pillars. As a result of his posture and implied eye contact, we the viewers intuitively follow his angle of view. This is a compositional technique which I refer to as 'implied eye contact'. We cannot actually see his eye, we can just about make out his face mask, but the line of his body position takes our eye from right to left, upwards through the frame, whilst in the previous frame, Figure 9.81, our eye is drawn downwards towards the gloom of the pillars.

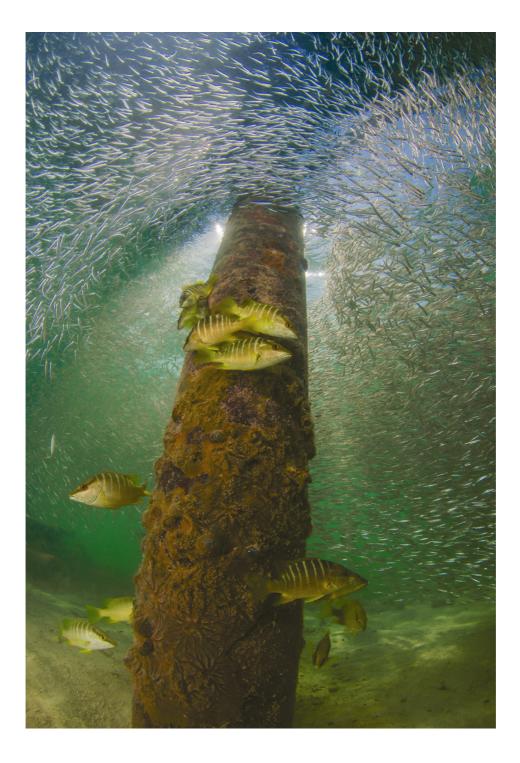


FIG. 9.83 I was checking out the dive resort pier for potential wide angle opportunities at Ocean Frontiers Resort, Compass Point on Grand Cayman. One moment it was quiet and the next it seemed to explode with frenzied fish action. Using my Tokina lens at the 10 mm end, I framed a composition in no more than 3 m. This was my first exposure and my first mistake! To frame this opportunity in an horizontal format was to loose the majority of the action. As you can see above, a horizontal was far too tight, whilst the structure of the pier stanchion was crying out for a vertical format.

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FIG. 9.84 For my second opportunity I adjusted my housing and strobes into a vertical orientation in which to included the afternoon sunbeams, carefully placed behind one of the pier legs. Notice how the shadows of the pier at top right tend to darken the water, which in turn creates contrast and additional layers in the top right hand corner. I'm sure that numerous areas of the pier were bathed in the most exceptional light but my vision was to capture not only the best light possible but also the interaction with the fish school. Once again I was choosing my canvas for the light effects and hoping, that the accumulation of fish would swim into my composition, which fortunately they did. I took no more than 20 frames before it all went quiet once more. Nikon D7000, Tokina 10–17 mm at the 10 mm end, f14 at 1/200<sup>th</sup> sec. ISO 200, twin Inon strobes on three quarter power.





### **More Popular Opportunities**

Sorong is the largest city of the Indonesian province of West Papua. One hundred miles out to sea is the Eco Resort of Misool in South Raja Ampat. From a personal point of view, Misool is the best underwater photography I have ever encountered. There are numerous spectacular photo/diving opportunities, which begin directly in front of the resort's lagoon, however, it's the jetty itself which I can only describe as 'in a class of its own'. Over the last decade the jetty as been allowed to flourish and as a direct result the corals, sea fans, and fish life including white tip reef sharks and huge schools of jacks have had it all to themselves.

Such are the mass of soft corals beneath the jetty itself it is not that easy to negotiate. Perfect buoyancy is a must and strobe arms need to be shortened and handled with great care. Subject selection is more about how to access a particular area of the pier rather than to shoot anything and everything. I conducted many teaching sessions during my workshop with Alex Mustard, there was so much potential below the pier which included tips and tricks on how to shoot seascapes with short strobe arms and towards the end of day one I came to realize that I had shot the soft corals flat-on, so much so that I had left no room in the image frame to develop any sense of depth towards the background and beyond. The vast majority of my efforts where well lit, sharp, colorful, in focus but more importantly they were also rather dull and I knew I could do better. On day two I set out to create perspective. Depth perspective!

My aim was to take in the view in three dimensions. I had in my minds-eye some familiar soft corals in the foreground with space in my frame behind. I also had a view of the water texture and a hint of the surface beyond. As it turned out it was the wrong time of day for the position of the sun in the sky, which was also much too bright for the sensitivity of my Nikon camera.

Mid to late afternoon was without doubt the optimum time to create this shot so the following day I spent some time working with the space towards the surface. I chose some colourful soft corals in the foreground which I lit with my two Inon strobes on less than half power. I left 30 per cent of the top half spare to create the sense of depth I'd been looking for. The small fish filled a void, which left plenty of space and depth to create what I was looking for.



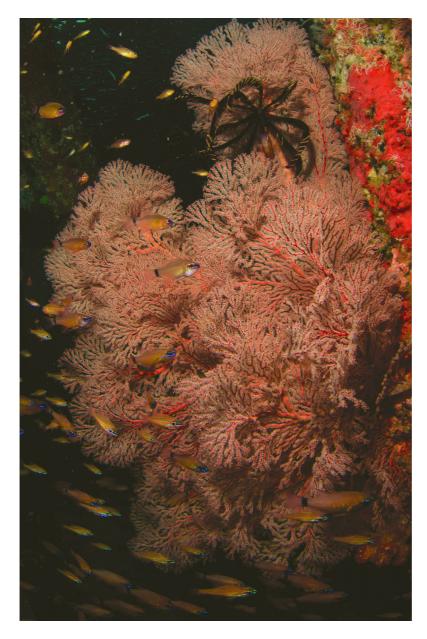
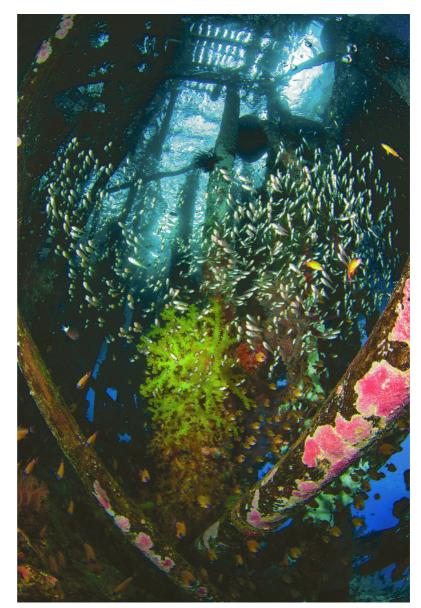


FIG. 9.85 Colourful corals with loads of fish life, but there is no depth to this image at all. It's just fish, fans and a black background. It's flat. I was looking for more depth perspective but the dark water does not allow this and whilst it is easy to take more than 20 frames it is still a flat picture. Shutter speed 1/320<sup>th</sup> sec.

# The Underwater Photographer

**FIG. 9.86** All I have done is to open my shutter speed to 1/30<sup>th</sup> sec in order to lighten the water column so that your eye can see the depth and understand the perspective.





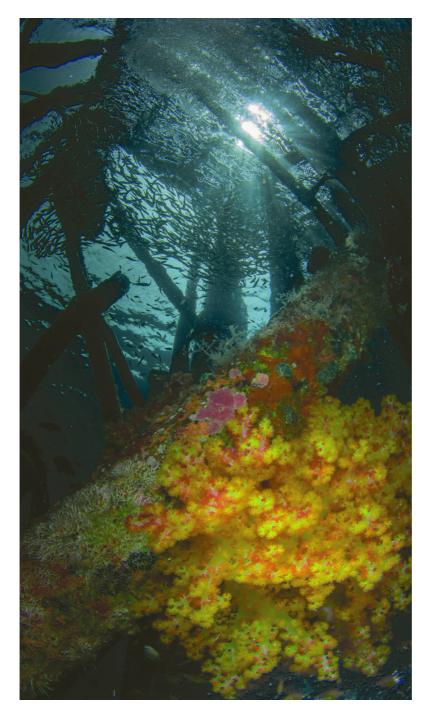
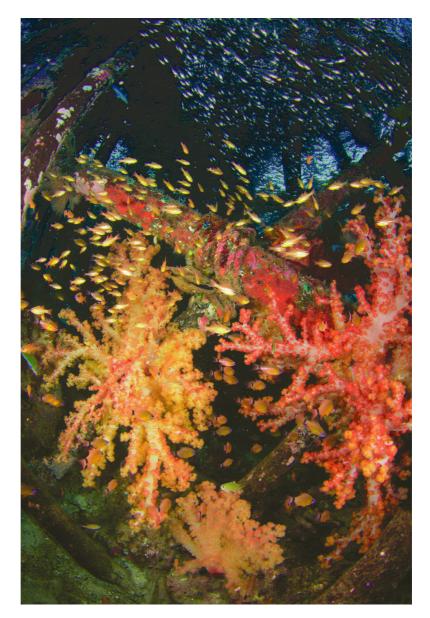


FIG. 9.87 Late afternoon, once again leaving space towards the background to make room for the setting sun to warm up things up a little. Shutter speed 1/25<sup>th</sup> sec. FIG. 9.88 I have made the soft corals the centre of attention, they are bursting with colour but the eye of the viewer still has room to plot a course towards the top right-hand corner, where the space is, which in turn creates the depth perspective.

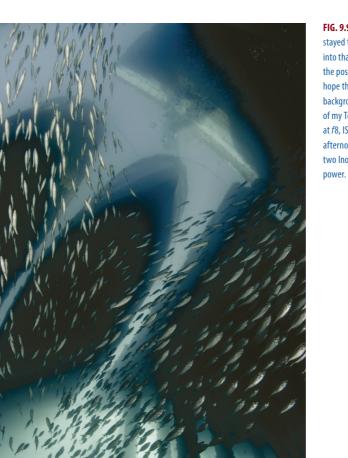




**FIG. 9.89** Beneath the same pier I found myself much deeper, around 10 to 12. I was looking to shoot the soft corals, which had been 'hand grown' in cages since around 2009. Notice how I have left a space in the composition to make room for the schooling jacks in the distance and the shadow of the pier behind them. I left the space so the eye can travel through the image and settle on these hints way off in the distance.

FIG. 9.90 This is another image I made beneath the Air Manis pier, Maluka Divers, Ambon. My group dove this pier many times during our workshop. The wealth of critters and the safe shallow environment made this the most 'do again' photo-dive of the entire ten days. Towards dusk the horse eye jacks and silversides would school in generous numbers. With this in mind I swam around beneath pillars looking for a striking composition to frame and develop the background of my ideas. I was very much inspired by the silhouetted upward angle of the pier columns alongside two fishing boats moored against it. I had found my ideal background! All I had to do was to retain my compositional idea through my viewfinder and have the patience to wait for the fish school to swim into the frame. I was slow on occasions and missed several passes. I remember thinking to myself 'how long shall I stay in this particular position with a very balanced composition of the pier pillars'. They must have read my mind, for in less than two minutes the jacks and silversides took flight above my head, close enough for my twin Inon strobes to illuminate them.





# Wide Angle

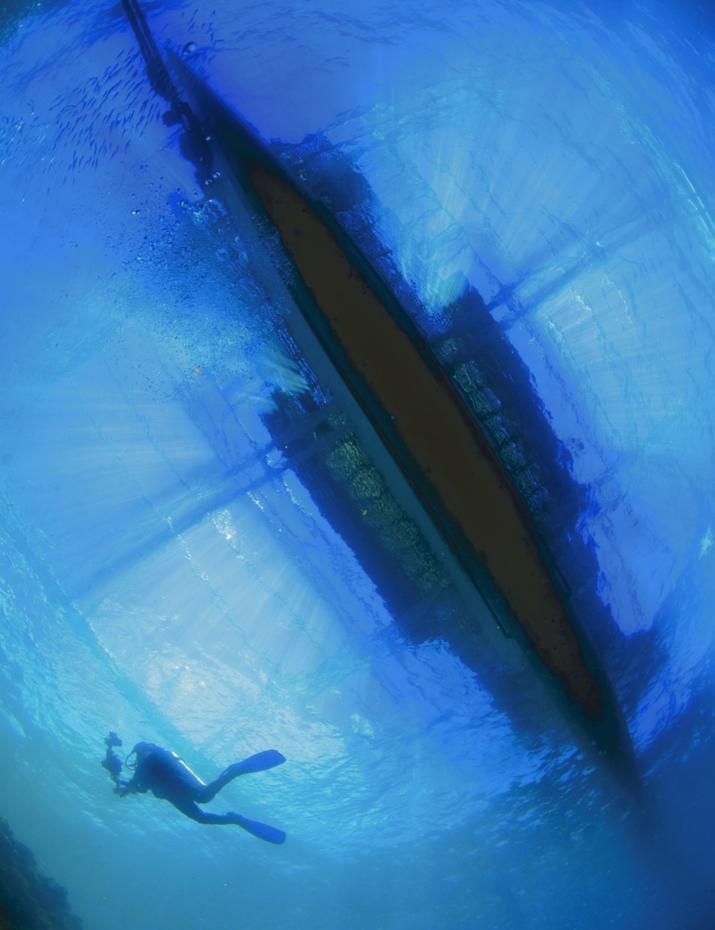
FIG. 9.91 Notice how my backdrop stayed the same and the school moved into that space. I didn't go chasing the position of the school. I waited in hope they would swim into my chosen background. Taken on the 10 mm end of my Tokina 10–17 mm. 1/320<sup>th</sup> sec at *f*8, ISO 400. Nikon 7000, late in the afternoon, Nauticam housing, using two Inon 220 strobes on manual half power.

# **Exploiting the Light**

Since I first began my love affair with underwater photography I have been infatuated with wide angle light and if, like me, you enjoy shooting this particular type of light, it would help you enormously in choosing diving destinations where you have an opportunity to dive both early morning and late evening. 'Why would this be?', you might ask. This is when the light in the sea is at its very best for passionate photographers like you and I. At these times of day the light is subtle, delicate, magical and influential. Numerous dive/photo resorts exist which enable the photographer to take advantage of the light and a good place to start is a photographically orientated liveaboard or a shore-based operation, which is sympathetic to the needs and wants of UW photographers. I and others who teach photography organize workshops in all corners of the globe, and it's fair to say that we are able to influence both the time of day we dive and the location of particular dive sites. Nothing frustrates wide angle photographers more than visiting a dive/photo resort which opens for business much later, when the morning-light magic hour has disappeared (in the tropics around about 7am), and closes for business before evening light dapple dive has begun (in the tropics around 5pm). These particular times of day, sunrise and sunset, are so influential for the underwater photographer, which is one specific reason why liveaboard itineraries are busy with enthusiastic photographers. My advice for all you passionate wide angle photographers, whenever and wherever you visit, is to research business opening and closing times of your dive resort. They should be able to provide dive/photo options which coincide with the times of both morning and evening magic hour.

# Wide Angle

**FIG. 9.92** The very last sunbeams of the evening. Bunaken Oasis Resort, Indonesia.



# Three Deadly Sins by Kevin and Maggie Reed

#### The three deadly sins:

- 1. Allowing salt deposits to form.
- 2. Over greasing 'O'-rings.
- 3. Dripping on internal components.



# Deadly Sin 1: Allowing Salt Deposits to Form

**S**ea salt is harvested by allowing salt water to evaporate leaving only the salt crystals, this has been carried out for thousands of years. Since early Roman times the evaporation process has been turned into a more efficient system by heating the water and therefore causing it to evaporate faster.

Leaving kit not rinsed or badly rinsed and exposed will have exactly the same result: lots of salt, great for food – not so great for camera gear. It will attack

the anodising, exposed or untreated metals, plastics, optics and even the 'O'ring designed to keep the water out. The salt will also do a lot more damage if left to crystallise into solid and abrasive grains that will tear soft seals and scratch optics, metals and coatings, thereby dramatically shortening the life span of your camera protection system!

**FIG. 10.1** Corrosion forming around and behind button heads due to poor rinsing technique.



How do we avoid this problem? Well, every time you dive, the salt water will get into every crevice of your photographic gear. There is nothing you can do to stop this, but the salt crystals can be stopped from forming in the first place, and the most critical time for this is when you exit or pass your kit to somebody on the boat. Put it in the rinse tank I hear you say – that depends on how salty the rinse tank is (saltier than the sea? Use the sea!) and what other kit is also going in the tank, on top of the camera kit!

Rinse tanks in an ideal world are great and will dilute the salty water, but without working the camera system, the salt water will not be displaced by the cleaner water and the problems will still become apparent over time. A constant supply of fresh water and time to work the system through thoroughly is needed after every dive!

Taking your kit into the shower or a sink in a container is a great way to do this efficiently. Time consuming? Yes. Worth it? We think so.

However, we all know that just isn't going to happen, what about the second dive of the day? We are only stopping for a short while and will be back in the water before very long. Just a quick lunch!

It's unlikely that many breaks will be short enough to negate the forming of salt crystals, they will be deposited as soon as the wind, sun or air starts the evaporation process. We suggest the best course of action is to keep the equipment wet until you can get to a sustainable clean water rinse. If there is no rinse tank, hand wrap the equipment in a wet towel and seal the lot in a plastic bag while removing as much air as possible – no evaporation can occur and the equipment can be safely transported or left until you have the time and resources to rinse the kit properly.

After rinsing, be sure to remove the water from behind the buttons and other areas where liquid can get trapped: use a blower brush or even the air from your demand valve, dry as much of your kit as possible with a soft cloth and use an old toothbrush to remove any stubborn deposits.

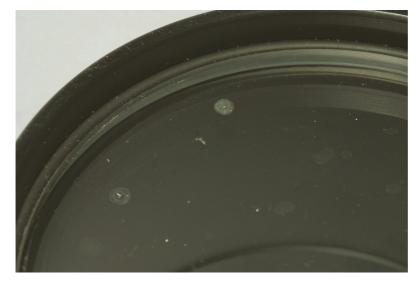


FIG. 10.2 Round spots clearly seen are surface coating damage through dirty water.

Clean the optics with a soft lint free cloth before opening up the housing and removing your equipment, this will ensure you don't get drying marks forming (these can be caused by Salty water, hard water, dirty water, or just greasy water). Finally a very light coating of grease will keep the housing surface well protected and looking good, ready for the next dive trip.

# Deadly Sin 2: Over Greasing 'O'-Rings

This is probably the most popular pastime with underwater photographers, for years we have been told to make sure things are 'well oiled' or 'slap on the grease' 'a good thick coating!' None of these sayings were referring to modern 'O'-ring care.

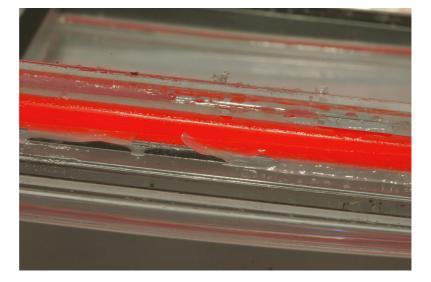


FIG. 10.3 A typical over greased seal!

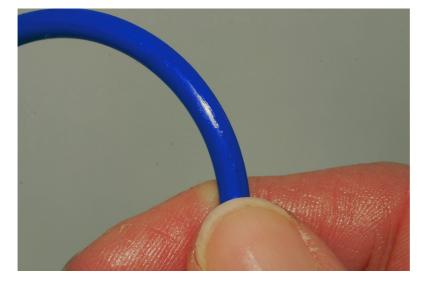
Sealing systems tend to be one of those 'black arts' that few manufacturers talk about. We on the other hand are not manufacturers and are happy to talk seals all day, we know it's not cool and it's more than a little geeky!

A simple understanding of what grease is, how and why it works, will help to explain what the best grease is for our purpose. Grease is made by mixing a base oil with a thickener. The thickener holds the oil where it is needed, to lubricate when it is required. So we need to choose a grease that allows easy movement of the 'O'-ring seal while exposed to pressure, cold, water (mixed with various chemicals) and that helps to keep at bay aggressive materials such as grit or sand. No small task for something that must be easy to apply and last between services, typically 12–24 months. Too much grease will collect all types of debris, not enough grease and it will not do the job effectively, allowing friction and wear over time on the seal and bearings.

Generally as underwater photographers we will only remove and re-grease a few of the many seals within the system, and the current wisdom is to clean and lubricate lightly each time any 'user seal' assembly is opened.

The best current advice is to ensure the seal, seal groove and seal seat are all cleaned thoroughly before the 'O'-ring is then lubricated so it just 'looks wet' before the assembly is put back together. We suggest a small bead of grease is placed in the crook of your *clean* index finger, the seal is then rotated around the finger, wiping the grease onto the seal. Turn the 'O'-ring over and run it round again until the whole surface of the seal has an even covering, with no hairs, blobs or smears of grease on the surface – it should now just look shiny and wet. The seal should then be placed into the 'O'-ring groove as soon as possible and closed up ready for use. If you are storing the seal out of the equipment, clean and grease as just described, then place the seal into a plastic bag (preferably black) and store away from heat or cold and especially sunlight. If the seal is too large to fit into the bag without 'folding' it is best practice to twist into a minimum of three loops, this ensures the seal will have the best chance of sitting correctly when it is reused.

As underwater photographers, we need to consider whether the conditions we are shooting in are detrimental to the grease applied by the manufacturer of our equipment.



A few housing brands use almost exclusively silicone grease. This has been used as a lubricant in diving equipment for many years, it's relatively cheap, easy to get hold of, stable in low and medium high temperatures, all a good reason to use such grease. A large number of housing manufacturers are now using silicone seals, these seals absorb silicone from silicone greases and physically swell, increasing resistance and eventually failing. This is a well-known problem – what is not so well known is that many grease manufacturers use various thickeners or additives to change the properties FIG. 10.4 A well-greased main seal.

of the grease, for example to alter the resistance for higher or lower temperatures, or for use in specific chemical compounds etc. These additives are rarely stipulated on the packaging and could be harmful to the seals in your housing. So using a generic grease with your 'O'-rings may be a cheap alternative, but it could be doing a lot more damage than you know. Sticking to the manufacturer's grease should be the best option, alternatively use a grease that is totally inert. A number of manufacturers understand this and spend a little extra by using 'O2' grease, this is not flushed as readily or affected by the petrochemicals we often find in areas where we swim. It also happens to be slightly more stable in higher and lower temperatures than silicone grease. The only drawback is the initial cost of the product, however we feel this extra cost far outweighs the increased breakdown and wear costs associated with using a silicone grease.

Don't panic if you have been applying grease not supplied by the manufacturer of your equipment. Simply keep a close look out for signs of 'flushing' – typically a dry feel to the controls when not underwater, sticking buttons, sprung levers not returning to the original position, and of course drops of water in your housing. If any of these signs are apparent, get the equipment serviced and ask for O2 grease to be used.

So what about the other seals that we don't clean or even look at? What should we be doing with those? Most of the seals are fitted by the manufacturer or service agent with enough grease to survive between services, the majority of manufacturers advise a service each year or after a set number of dives. The 'service' seals should be lubricated enough to coat all the contact surfaces and then packed at the back (non liquid side) to allow constant pick-up and replenishment of the sealing system. But occasionally seals go dry, buttons stick and levers do not return. Time for servicing! It is rare that this happens at a convenient time to send the equipment away. A short term fix is to add more grease to the back of the 'O'-ring seal. To do this simply apply a little grease to the sticking button shaft, push the button in as far as possible and then apply the grease to the highest part of the exposed shaft (nearest the housing). Releasing the button will draw up the grease to lubricate the seal. If the control feels dry, apply the grease where the control shaft enters the inside of the housing, either rotate or push and pull as far as the control will go in order to draw the grease between the shaft and housing. This is generally only possible if there is lateral movement along the shaft, if not it will probably require dismantling. Unless of course you have some of the base oil that is used during the grease manufacture (this oil should be an exact match with the grease base oil!): using this oil is the easiest option, as it will flow between the shaft and housing more freely. It will of course not stay in place as long, so will need more regular applications.

# Deadly Sin 3: Dripping on Internal Components

Sometimes it is really difficult to contain the excitement of downloading those images for a bigger and better look! Or maybe you just need to put another card in, or change the battery, or some other poorly thought out reason to open the housing between dives or right after the last dive. If you cannot guarantee you are fully dry (including your hair), DON'T open the housing!!! And don't test the leak alarm with a soaked cotton bud! Yes a true story, I'm glad I don't dive with the person who suggested that! Let's just say that dryness is next to cleanliness when working with the inside of our camera housing, yes I know it's designed for use in water, but the water is meant to be on the outside!



OK, so let's suppose the drip from your hair that you didn't notice just happened to fall straight onto the leak alarm circuit. Even though it was a once only opening of the housing, it was OK because it didn't go beep and the little red light didn't flash, so it must still be good. It did however land on a leg of the IC where it slowly created a bridge of salty conductive water, between two legs of the component. The small current running between these legs not only started to etch one of the legs but the alarm sounded and the light flashed, just as you got to 20 meters on the following dive, thus causing an aborted dive, another break of the housing and no sign of liquid. So just pull the battery out and jump back in! You'll sort it out later. I don't need to tell the rest of the story, you have probably heard it many times, **FIG. 10.5** Believe it or not this damage was caused by drips from fingers.

on many trips, or even been unfortunate enough to experience the result. That drip from you or maybe a diver passing, may land on a control wheel, causing it to slip or pass some of the drip into the camera! It might land on the strobe connector, causing erratic strobe operation, or no strobe at all. It may just land inside the port and leave a distortion on all of your photos, or maybe it was mucky enough to leave a permanent blemish on your lens coating. Many of the internal mechanisms in underwater camera equipment are not designed to get wet, a miscalculation by the manufactures maybe, but sometimes the job that is required, often means the metals used cannot be that resistant to liquid damage, parts like 'E'-clips or 'C'-clips, wiring or electronics circuits, the majority of springs, levers and even some of the screws used.



So, if you have dropped water into your housing and not noticed, then only time will tell if you experience a problem. If it results in an 'E'-clip failure you could lose the camera, lens and the day's shoot. If you do notice, then hopefully it's possible to clean the affected area and dry it thoroughly before taking the system diving again.

We have found the very best way to deal with the risk is to try and avoid the situation arising in the first place. Easier said than done? Not if you get into a ritual for setting up your kit before a dive trip or diving day. Planning your photography for the day will ensure your batteries are fully charged and of course your card is empty to start with, or at the very least has room for the day's shoot, plus some. You must make the time and space (no distractions) to sit down in a clean dry environment with a comprehensive check list, to

**FIG. 10.6** Drip damage and fleece hairs are easy to miss if you are not looking.

check, clean and grease the main seals, the flash connector seals and any blanking cap seals on your system. You can then carry out a simple function test of all the housing controls, strobe or lamp controls and a test shot with everything plugged in, switched on and ready to go. Any faults or errors during assembly should be noted on the check list, so they are not repeated next time or can be easily and quickly corrected, without going into panic mode.

Are you thinking you can get away without this? Look at the photographers that never seem to get a problem or those who shoot professionally, and you will find in 90 per cent of all cases they have a fixed ritual that is practised before and after each dive and at the end of each day. Time consuming bother perhaps, but with practice it becomes simpler and quicker, ask those who know, but be aware nobody does it the same way!

# Internet Resources and Suppliers

# You've Read the Book, Now Take the Course! Underwater Photography Tuition with Martin Edge

Martin offers one on one tuition with programmes tailored to meet an individual or couple's needs and budget. Martin adopts a modular approach enabling photographers to select areas of specific interest and for those who want to combine teaching with practice. It must be pointed out that in 2020 photo swimming pool sessions in Bournemouth can sometimes be difficult to facilitate.

The modules are outlined below. It is not necessary to select the teach-in modules ahead of time. Many find it helpful to determine the areas of focus after the introductory photo clinic. A typical full day programme consists of the introductory photo clinic/critique, agreed topics/teach-ins, and a swimming pool session with review and basic Lightroom skills if required.

# **Photo Clinic**

Is a 1–1½ hour session during which Martin reviews and critiques your own photographs to determine style, trends and specific areas for improvement. This session always provides direction for which teach-in sessions to select.

# **Teach-ins**

Each teach-in runs for 45–60 minutes. During a one day programme a variety of these topics can be accommodated. They are numerous but often include:

- The Basics apertures and shutter speeds, etc.
- Getting the best from you compact digital underwater camera
- Moving on to SLR cameras. Which one is right for me?
- Nikon SLR cameras and housings 'Try before you buy'
- 'Mindset' planning an underwater photo-dive

- Digital issues RAW v JPEG, white balance, etc.
- Close-up and macro
- Wide angle and natural light
- The wow factor
- All about lighting including strobe lighting and blending them both together.
- Composition
- Digital editing with Lightroom
- The future other equipment options to suit the individual
- Getting your work published

If there is something that is not on the list and you would like to cover then this can always be included.

## **Practical Pool Sessions**

This provides the opportunity to put all the teaching and tips into practice in an accompanied photographic session with Martin. The results are reviewed and critiqued. For those who have yet to take the 'plunge', digital camera hire is available free of charge.

For further information about tuition contact Martin on martin.edge@btinternet.com.

# **Internet Resources and Other Suppliers**

### **Underwater Photography**

Underwater Photography is a free, web-based magazine that can be downloaded at www.uwpmag.com. It is published bi-monthly by wellknown underwater photographer Peter Rowlands, and each issue contains new product details, equipment reviews, underwater photo techniques and excellent underwater photos.

## Alex Mustard

Dr Alex Mustard MBE, from the UK, is a former marine biologist, now professional underwater photographer. His images have won many awards, including regularly in the *Wildlife Photographer of the Year*. He is the founder of the *Underwater Photographer of the Year* competition, associate editor for Wetpixel and a committee member of BSoUP. In 2018 was made an MBE by the Queen for services to underwater photography. To view images of the highest quality, go to his website at www.amustard.com.

# **Underwater Visions – Alex Tattersall**

Dr Alex Tattersall is the UK based owner of Underwater Visions, distributor of Nauticam products in France, the UK and Ireland, and lives and breathes underwater photography. He runs regular underwater photographic workshops around the world with a specialist focus on creativity and the macro/supermacro world. Go to www.uwvisions.com.

# **Nick Blake**

Nick has been diving for over 40 years, primarily in the UK, but it was the early 2000s before Nick became involved in underwater photography, starting with an Olympus compact camera and progressing to DSLRs. Combining UK diving with more tropical climes, and a growing preference towards natural light, wide angle photography, Nick's images have gained honours in a number of national and international competitions and include the accolade of *British Underwater Photographer of the Year*.

# **Mario Vitalini**

Mario has been involved in photography from a young age, growing up in his father's studio. His first underwater cameras were back in the film days. He currently runs photo workshops with Scuba Travel and regularly contributes to *Scuba Diver UK* and *Asia Pacific* magazine. He has won awards at the *Underwater Photographer of the Year* and the annual *Diver* competition.

## **Nick More**

Has been diving since the mid-1990s but it is only in the past 6 years that he has been taking underwater photography seriously. Nick concentrates on marine life portraiture and is best known for his images that incorporate motion blur. Nick is a successful competition entrant, having multiple winners in the Underwater Photographer of the Year, the British Wildlife Photography Awards and winning the BSoUP/Diver Print Competition back-toback in 2016 and 2017.

## Sascha Janson

Sascha is an underwater photographer and videographer from Germany who got hooked on scuba diving and underwater photography when he went to Thailand in 2005. Since then he has spent thousands of hours capturing special moments of the underwater wonderland. Sascha has been working as a full-time photography pro since 2012 and loves documenting the beauty and behavior of aquatic life from tiny hairy shrimps to huge tiger sharks.

### **Stuart Gibson**

Stuart has been a keen underwater photographer for over 20 years. He currently uses a Nikon DSLR camera in a Subal housing with Inon strobes. Stuart is based in the UK and travels to many popular dive destinations both in the UK and abroad. Examples of his work can be seen at www. stuartgibson.net.

## Shannon Conway

Shannon is an Australian professional underwater photographer creating images for the advertising, editorial and fine art market. To discuss any fine art, stock images or training courses, go to www.underwaterphotography. com.au.

## Kevin and Maggie Reed of Aquaphot

Having been in the photographic trade for 41 years Kevin has seen dramatic changes in both land and underwater camera equipment. He has developed a huge experience in the workings and maintenance of underwater housings and equipment, and as a result Aquaphot was born. In the UK and overseas Kevin is the 'go to' for all underwater camera equipment repairs. Contact by email at service@aquaphot.com or phone +44(0) 1621 868805.

## Wetpixel

www.wetpixel.com is a website dedicated to providing the latest information on digital underwater photography and imaging. The website contains news, reviews, tutorials and features, but probably the main attraction is the forums, where many thousands of underwater photography enthusiasts chat about all aspects of their passion. Wetpixel.com has won the Website Award at the Antibes Festival, and the Editor's Choice Award from *Scuba Diving Magazine*.

## **Dive Photo Guide**

www.divephotoguide.com is a popular resource and community for underwater photographers and videographers of all levels. Articles and news on techniques, equipment, destinations, and marine conservation are published daily. Membership is free and you can create your own photo galleries in addition to browsing galleries from the top pros in the world.

# www.babysplashers.co.uk

Babysplashers is a small, privately owned, swim school specialising in baby swimming and underwater photography. Louise Sanger, proprietor and head instructor, teaches babies using the Swimming Teachers Associations' Water Safety Programme for Babies. All babies are born with a natural affinity to the water and babies start classes from as young as 6 weeks old where they learn to swim underwater, completely unaided.

# British Society of Underwater Photographers (BSoUP)

www.bsoup.org is the largest underwater photographic society in the UK, catering for both film and digital photographers. BSoUP holds meetings at the Holland Club, Imperial College, South Kensington, London, on the third Wednesday of each month. BSoUP publishes the magazine *In Focus*, and provides advice and information on all aspects of underwater photography, both digital and film. If you are a new to underwater photography then BSoUP is your very first port of call.

# ScubaTravel.com

www.scubatravel.com, based in the UK, specialize in worldwide diving holidays and cater for underwater photographic enthusiasts. Edge Underwater Photography uses Scuba Travel for photo workshops the world over!

# **Reef Photo and Video**

Stock everything you need to jump into the exciting world of underwater photography and videography. They are all divers and underwater photographers, so they know and use the products they offer. They concentrate all of their energies on cameras, lenses, housings and lighting every day, so they know what works with what, and may even have a new take on what you are considering purchasing.

# **Backscatter Underwater Photo and Video**

Backscatter (www.backscatter.com) is the world's largest underwater camera and underwater photography equipment supplier. They feature a full service and repair center, professional service, camera reviews and knowledge sales with support for everyone from accomplished underwater filmmakers to complete beginners.

## www.Scubashooters

www.scubashooters.net is an underwater photography community where you can find information, awesome photos and all about your passion...let's dive!

# Dive Resorts for the Underwater Photographer

My heartfelt thanks to all of you and your teams who made the Fifth edition of this book possible.

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- Judith Young for her support over these last 10 years.

Last, but no means least, I am indebted to all of my students over the years since I started to teach underwater photography way back in the early 1990s. You all know who you are!

# Glossary

**Absorption** The blue, filtering effect of sunlight. Water absorbs the colours of the spectrum selectively until, at depths of around 20—25 m, only tones of blue and green remain.

**AE lock (AE-L, Auto Exposure Lock)** This enables you to take a light-meter reading from part of an image and then hold that setting while you compose the picture.

**AF lock (AF-L, Auto Focus Lock)** This enables you to lock an auto focus lens in its present focus setting and then hold that setting while you recompose the picture.

**Ambient light** (also referred to as natural light) The light from the sun which is available underwater.

**Angle of view** The extent of the view taken in by the lens, which varies with focal length for any particular format size. The angle made at the lens across the image diagonal.

**Aperture** Behind the lens of your digital camera is a circular iris that opens and closes to determine the amount of light falling on the CCD. Altering the aperture also changes the depth of field.

**Aperture preview** A small button close to the lens on some SLR cameras that allows you to visually check the depth of field in the viewfinder.

**Aperture priority** A semi-manual exposure mode which allows the user to set the aperture according to the depth of field required, while the internal metering system selects the appropriate shutter speed to obtain the correct exposure. **Apparent distance** The distance at which objects appear to be away from the eye/camera. Objects underwater appear to be one-quarter closer than they really are.

**Artefacts** Compressing an image sometimes causes noise to appear as angular blocks or artefacts.

**Auto Focus (AF)** System by which the lens automatically focuses the image of a selected part of your subject.

**Automatic** An exposure mode found on digital cameras in which all the camera settings, including ISO, white balance, shutter speed and aperture, are chosen by the camera. This is useful for beginners to digital underwater photography.

**Av (Aperture value)** AE camera metering mode by which you choose the aperture and the metering system sets the shutter speed (also called aperture priority).

**Backscatter** Light reflected into the camera lens and showing up as snow on the finished photograph, resulting from suspended particles in the water.

**Barrel distortion** If you take a wide angle seascape with a wide angle or fisheye lens and notice that the horizon seems to curve, you are seeing barrel distortion. This is caused by the camera lens distorting an image so it appears spherised.

**Beam angle** The angle of a strobe beam expressed in degrees.

**Bokeh** The blur or the aesthetic quality of the blur, in out-of-focus areas of a photographic image.

**Bracketing (exposure)** Taking several pictures of your subject at different aperture settings, flash distances or flash-power settings, with the objective of obtaining one perfect exposure.

**Brightness range** The range of brightness between shadow and highlight areas of an image. This is also referred to as 'dynamic range'.

**'B' setting** Brief or bulb. On this setting, the camera shutter stays open for as long as the release button remains depressed.

**Buffer** A buffer is RAM (Random Access Memory) inside a digital camera which can store images before they are written to the memory card. This means you can shoot a number of photographs without having to wait for each to be saved. Shoot too many and you will cause a delay before you can begin to re-shoot.

**Calibration** Calibration is altering the settings of a device so it conforms to a standard. You can calibrate the LCD of your camera's viewfinder, a screen monitor, scanner and printer so that what you see is accurate.

**CCD (Charge-Coupled Device)** The light sensor in a camera that records an image. It consists of millions of tiny light sensors, one for each pixel. The size of a CCD is measured in megapixels.

**Centre-weighted metering** An auto-exposure system that uses the centre portion of the frame to adjust the overall exposure value.

**Close-up attachments** Dioptres, teleconverters, wet lenses and other accessories which enable the camera to focus on subjects that are closer than the nearest distance that the lens would normally allow.

**Colour temperature** The measurement of colour expressed in Kelvin (K). The lower the Kelvin rating, the 'warmer' or more yellow the light. The higher the rating, the 'cooler' or more blue the light.

**Compact flash** A popular form of storage media for digital cameras.

**Complementary colours** A compositional tool for colour balance which indicates the colours that complement each other on the compositional colour wheel.

**Composition** The activity of positioning subjects within a frame or viewfinder. Photographers often aim to create a visual balance of all the elements within their photographs. They do this via careful composition.

**Compression** Refers to a process where digital files are made smaller to save on storage space or transmission time. Compression is available in two types: lossy, where parts of the original image are lost at the compression stage, and lossless, where the integrity of the file is maintained during the compression process. JPEG and GIF use lossy compression, whereas TIFF is a lossless format.

**Contrast (composition)** Photographers who position subjects with different characteristics in the frame together are said to be creating contrast in the composition. Placing a highly textured object against a smooth and even background creates a visual contrast between the two subjects and emphasises the main characteristics of each.

**Contrast (exposure and tone)** The difference (ratio) between the darkest and brightest parts. In a scene, this depends on lighting and the reflecting properties of objects. In a photograph, there is also the effect of exposure level, degree of development, printing paper, etc.

**Crop factor** The ratio of the focal length of a digital camera lens compared to a 35 mm film camera lens.

**Crop sensor (Dx)** Any sensor smaller than a full frame sensor. Common types of crop sensor include APS-C and Micro  $4/3^{rds}$  systems. A typical crop factor is around  $\times 1.5$ .

**Cropping** Cutting out unwanted (edge) parts of a picture in an imaging program such as Adobe Photoshop, or cropping at the printing or mounting stage.

**Depth of field (D of F)** The area that is in focus behind and in front of a subject. Depth of field is controlled by three factors: the focal length of the lens, the size of the aperture and the camera to subject distance.

**Diffuse lighting** Scattered illumination, the visual result of which is gentle modelling of the subject with mild or non-existent shadows.

**Diffuser** A circular or rectangular disc placed over a strobe to widen the beam of light. Diffusers also decreases light intensity from between one and three *f*-stops.

**Digital image** A visible image on a computer monitor formed by a stream of electronic data.

**Digital zoom** Many digital compacts can zoom in on an image by expanding it in-camera. The zoomed area looks bigger but contains the same number of pixels, so will look 'pixelated'. Digital zoom should not be confused with the superior, optical zoom.

**Digitise** This is the process by which analogue images or signals are sampled and changed into digital form.

**Dioptre** Magnification factor of a supplementary lens. The focal length of such a lens can be calculated by dividing a thousand by the power of the dioptre.

**DNG (Digital Negative File)** The digital camera file format from Adobe that was designed to provide a standard for RAW files HDR (High Dynamic Range).

**Dome port** A semi-spherical piece of glass or plastic used to eliminate the magnifying distortion caused by reflection.

**dpi** Dots per inch, a term used to indicate the resolution of a scanner or printer.

**Dynamic range** The measure of the range of brightness levels that can be recorded by a digital sensor.

**Effective** *f***-stop** The actual *f*-stop value when you use a macro lens and focus for extreme close-ups.

**Enhancement** A term that refers to changes in brightness, colour and contrast that are designed to improve the overall look of a digital image.

**EV (Exposure Value)** This refers to the amount of shutter speed or aperture adjustment needed to double or halve the amount of light.

**EXIF** Stands for exchangeable image file. EXIF format enables image data, such as the date and time the shot was taken and exposure, to be stored onto the camera's memory card.

**Exposure** When you take a picture, the camera's light meter determines how long the shutter should be open for and how wide the aperture should be to gain the correct exposure. If a picture is too dark it's underexposed, and if it's too light then it's overexposed.

**Exposure compensation** Adjusting the camera or metering system to give a greater or lesser exposure than that which the light meter considers to be correct. Most cameras now have an exposure compensation dial built in.

**Exposure latitude (film latitude)** The measure of a film's propensity to compensate for over- or underexposure. Slide film has small latitude. Plus or minus a half *f*-stop is common, therefore exposures have to be very accurate. Print film has much wider latitude.

**Exposure mode** Camera settings such as M (manual), A (aperture priority), etc. that determine which controls you have to adjust manually for an exposure and which ones the camera does automatically.

Fast lens — Slow lens — Lens speed Refers to the maximum aperture diameter, or minimum f number of a photographic lens. A lens with a larger maximum aperture (that is, a smaller minimum f number) is a fast lens because it delivers more light intensity to the sensor allowing a faster shutter speed to be used. A smaller maximum aperture (larger minimum f number) is 'slow' because it delivers less light intensity and requires a slower shutter speed.

**Fill-in flash** This is additional light from a strobe(s) to enhance colours and lighten shadows when natural light is the primary light source.

**Firewire** Faster than USB, this is a type of connection between computers and a range of different equipment, including digital cameras and card readers.

**Fisheye lens** A lens with a 180-degree field of view across the diagonal. Fisheye lenses offer maximum depth of field.

**Fixed focus** Non-adjustable camera lens set for a fixed subject distance.

**Flare** Scattered light that dilutes the image, lowering contrast and seeming to reduce sharpness. Mostly occurs when the subject is backlit or when using wide angle lenses with flash and extraneous light from the flash strikes the dome port.

**Flash contacts** Electrical contacts, normally within the mechanism of the camera shutter, which come together at the appropriate moment to trigger the flash unit.

**Flash synchronisation** The firing of a photographic flash coinciding with the shutter admitting light to image sensor. It is often shortened to flash sync.

**Focal length** This describes the magnifying power of a lens. The longer it is, the greater the magnification; conversely, the smaller it is, the wider the angle of the lens.

**Focusing** Changing the lens-to-subject distance to achieve a sharp image.

**Focus priority (single servo)** Auto focus mode by which you cannot release the shutter until the lens has sharply focused your subject.

**Format** Height and width dimensions of the picture area.

**Fractional f-stop** Any aperture setting which is between the full *f* numbers marked on the camera's aperture control ring. *F*19 is an example, being between *f*16 and *f*22.

**Frame** One single image on a roll of film or digital sensor.

**f-stops** The various settings that control the camera lens aperture. The *f*-stop or *f* number indicates the relationship between the size of the aperture opening and the focal length of the lens, so a setting of *f*8 means that the diameter of the aperture is one-eighth of the lens focal length.

**Full frame sensor (FX)** An image sensor format that is the same size as 35 mm film format (36 mm  $\times$  24 mm).

**GIF** An image file format designed for display of line art on the Web.

**Greyscale** A monochrome digital image containing tones ranging from white through a range of greys to black.

Highlights The brightest parts of a photo.

**Histogram** A graphic representation of the range of tones from dark to light in a photo. Some digital cameras include a histogram feature that enables a precise check on the exposure of the photo.

**Hot shoe** Mounting on top of the camera to which the flash is attached.

**Image browser** An application that enables you to view digital photos. Many browsers also allow you to rename files, convert photos from one file format to another, add text descriptions, and more.

**Image stabilisation** This helps you in taking handheld shots that would otherwise require a tripod by compensating for small and fast movements (shaking). It is especially useful on long lenses in less than ideal lighting.

**Infinity** A distance so great that light from a given point reaches the camera as virtually parallel rays — in practice, distances of about 1000 times the focal length or more. It is written on lens focusing mounts as 'inf' or the symbol 8.

**Interchangeable lens** A lens that can be removed from a camera to be replaced by another lens.

**Interpolation** A mathematical method of creating missing data. An image can be increased from 100 pixels to 200 pixels through interpolation. There are many methods of interpolation, but one simple method is to generate a new pixel by using the average of the value of the two pixels on either side of the one to be created.

**Inverse square law** The physical law that causes light from a flash to fall off in such a way that as flash-to-subject distance doubles, the light falls off by a factor of four. It forms the basis of flash guide numbers and close-up exposure increases.

ISO (International Standards Organisation) In the ISO film speed system, halving or doubling of speed is denoted by halving or doubling the

ISO number. It also incorporates the DIN figure, e.g. ISO 400/27 film is twice as sensitive as ISO 200/24.

**JPEG** A file format, designed by the Joint Photographic Experts Group, which has inbuilt lossy compression that enables a massive reduction in file sizes for digital images.

**Kelvin** Measurement unit of lighting and colour temperature.

Kilobyte 1024 bytes.

**Landscape** An image taken with the camera in its normal horizontal orientation.

Latitude See Exposure latitude.

**LED light** A type of fixed light that can be used instead of strobes to light a subject.

**LCD monitor** A small LCD liquid crystal display screen on the back of the camera, used to compose or look at photographs.

**Lens filter** A piece of transparent glass, plastic or gelatine placed over the camera lens to adjust colour in natural light photography or to balance the light when flash is used.

**Lens speed** The widest aperture to which a lens can be opened. The wider the maximum aperture of a lens, the faster it is said to be.

**L-ion** Lithium-ion is a popular type of rechargeable battery. It holds more power and does not suffer from the 'memory effect', where a battery when recharged only registers the additional charge and not its full capacity.

**Line (composition)** 'Line' is one of the strongest visual elements that photographers can use to help compose their pictures. Often, line is used to direct the attention of the viewer towards a certain part of the frame or a specific focal point.

**Macro lens** Intended for close-up photography, able to focus on subjects at close distances. The majority of macro lenses now provide life-size magnification (1:1).

**Matrix metering** An exposure system that breaks the scene up into a grid and evaluates each section to deter- mine the exposure.

**Megapixel** One million pixels. Used to describe the resolution of digital camera sensors.

**Modelling light (aiming light)** A small light, often a torch, which is attached to a strobe and shows the direction in which the flash is pointing and also the effect that the angle of the flash will have on the subject.

**Monochrome** Single coloured. Usually implies a black and white image, but also applies to one which is toned (e.g. sepia).

**Mood** The mood of a photograph refers to the emotional content of the picture.

**M setting** Indicates the cameras is in Manual exposure mode.

**Negative space** Everything in the photograph that is not the subject.

**Neutral density filter** A filter that reduces the amount of light entering the camera lens.

**Ni MH** Nickel metal hydride battery. Rechargeable, ecologically safe and very efficient.

**Noise** Misinterpreted pixels found in a digital image, usually occurring in longer exposures, which can be seen as misplaced or random bright pixels in the picture.

**Normal lens** Lens that has an angle of view similar to that of the human eye. Underwater, that length is considered to be 35 mm (on film).

**Open up** To increase the size of the lens aperture. The opposite of stop down.

**Optical zoom** Digital compacts have optical zoom lenses. This means that they can be adjusted to magnify the scene before you zoom in or, alternatively, zoom out to capture a wide angle scene.

**Orientation sensor** A sensor that knows when you turn the digital camera to take a vertical shot and rotates the picture so it won't be displayed on its side when you view it.

**Overexposure** An image that appear too pale because of too much light reaching the sensor.

**Panning** Rotating or swinging the camera about a vertical axis to follow the movement of a subject. Carried out correctly with the shutter open, this should produce a sharp subject against a blurred background. Plenty of practice is required to master this technique.

**Parallax error** Viewpoint difference between the picture seen in the viewfinder and as seen by the camera lens.

**Pattern (composition)** Repeating subjects that have similar characteristics such as colour, shape and texture create a strong visual element that is often referred to as pattern. Pattern can be used in a similar way to line and colour as a way to balance compositions and direct the viewer's eye throughout the frame.

**Pixel** Short for 'picture element', and refers to the smallest image part of a digital photograph.

**Pixelisation** An effect seen when you enlarge a digital image too much and the pixels become obvious.

**Polariser** Grey-looking polarising filter, able to darken blue sky when at right angles to the sunlight, and suppress reflections from (non-metallic) surfaces.

**Port** Glass (or Perspex) window that is attached to the camera housing, through which the lens 'looks' under- water. A flat port is associated with macro lenses, and a dome port with wide angle lenses.

**P** (**Program**) **mode** Indicates that the camera is in the Program exposure mode, in which the camera selects both aperture and shutter speed automatically. **Prosumer** A broad term that refers to a digital compact camera with a range of manual controls, many of which can be found on an SLR. They are capable of taking pictures to the very highest standard, and usually have a minimum resolution of 5 megapixels.

**Rear curtain synchronisation** Here, the flash fires an instant before the second (rear) curtain of the focal plane shutter begins to move. When slow shutter speeds are used, this feature can create a blur effect from the ambient light — e.g. flowing light patterns following a moving subject with subject movement frozen at the end of the light flow.

**Reciprocity law failure** The effect of dim light, or small lens aperture, can be counteracted by giving a long exposure time, but this reciprocal relationship (half the brightness, double the exposure time) increasingly breaks down with exposure times beyond 1 s. The film then behaves as if having a lower speed rating. Colour films may also show incorrect balance.

**Recycle time** The time it takes for a strobe to recharge between flashes.

**'Red eye'** The iris of each eye in portraits shows red instead of black; this is caused by using flash directed from close to the lens.

**Refraction** Change of the direction of a ray of light passing obliquely from one transparent medium into another of different density, e.g. from air into water. Underwater, this causes objects to appear closer and larger than they actually are.

**Relative f-stops** *f*-stops marked on the camera's aperture ring, as opposed to effective *f*-stops.

**Reproduction ratio** The size of the image on film or sensor compared with its actual 'real-life' size.

**Resolution** An indication of the sharpness of images on a printout or the display screen. It is based on the number and density of the pixels used — the more pixels used in an image, the more detail can be seen and the higher the image's resolution.

**RGB** The colour system used in most digital cameras, where red, green and blue light are captured separately and then combined to create a full colour image.

**Ring-flash** A ring-flash does just what its name implies, encircling the camera lens with a flash tube so that the light is projected forward from the camera.

**Scanner** An input device that uses light to read printed information, including text, graphics and bar codes, and transfers it into the computer in a digital format.

**Short focal-length lens (wide angle)** A lens that provides a wide angle of view of a scene, including more of the subject area than does a lens of normal focal length.

**Shutter** The device in the camera that opens and closes to let light from the scene strike the image sensor and expose the image.

**Shutter lag** The time between pressing the shutter release button and the camera actually taking the shot. This delay varies quite a bit between camera models, and used to be the biggest drawback of digital photography. The latest digital cameras, especially the prosumer and professional SLRs, have virtually no lag time.

**S** (Shutter priority) mode An automatic exposure system in which you set the shutter speed and the camera selects the aperture (*f*-stop) for the correct exposure.

**Shutter speed** The length of time for which the shutter is open and light strikes the image sensor.

**Single lens reflex (SLR)** A type of camera with a lens that is used both for viewing and for taking the picture.

**Slave flash** A flash that is activated by the light from another strobe. The 'slave' can be turned on or off at the touch of a switch.

**Smart media** A popular form of flash memory card.

**Snell's window** The circular arc visible on the under- surface of the water, caused by the effect of refraction.

**Snoot** A device that limits the light from a flash into a smaller concentrated beam in order to control the area of the image that is lit.

**Spot metering** A metering method based on a small circle in the centre of the viewfinder to calculate the best possible exposure.

**Stepless shutter speeds** Infinite number of shutter speeds available on modern cameras.

**Stop** An aperture setting that indicates the size of the lens opening.

**Stop down** To decrease the size of the lens aperture. The opposite of open up

**Supermacro** A level of magnification beyond 1:1 or life size.

**Teleconverter** A device used to increase the effective focal length of a lens that consists of optical glass. It is mounted between the camera and the lens, and usually comes in two different sizes: 1.4x and 2.0x. A 1.4x tele- converter increases the focal length by 1.4 times, while a 2.0x increases focal length by 2.0 times.

**Telephoto lens** A lens that provides a narrow angle of view of a scene, including less of a scene than would a lens of normal focal length, and therefore magnifying objects in the image. **Through-the-lens (TTL) metering** Measuring exposure by a meter built into the camera body, which measures the intensity of light passing through the picture-taking lens.

**Thumbnail** A low-resolution preview version of larger digital image files used to check before opening the full version.

**TIFF** A popular lossless image format used in digital photography.

**Time exposure** General term for a long-duration exposure.

**Tone (subject matter)** Tone can also refer to the mood of a picture. When the tone of a photograph is said to be 'dark', then the subject matter and/or the way that the content is depicted can be emotional, complex, sometimes sad, confrontational and generally thought-provoking.

**Translucent** Transmitting but at the same time also diffusing light (as with tracing paper).

**Underexposure** Exposing the film or sensor to less light than is needed to render the scene as the eye sees it. This results in too dark a photograph.

**Up rating** Shooting film at more than the manufacturer's suggested speed rating (e.g. exposing 400 ISO film as if 800 ISO).

**Viewpoint** The position from which camera and photographer view the subject.

**Vignetting** Progressively diminished illumination on the film from the centre to the corners. There are two kinds of vignetting: natural vignetting caused by the lens, and vignetting that is caused by improper use of accessories such as a lens hood or filter.

**VR (Vibration Reduction)** The name which Nikon have given to their image stabilisation mechanism.

White balance An automatic or manual control that adjusts the brightest art of the scene so it looks white. Cameras have pre-set options, such as sunny, cloudy, flash, etc.

Wide angle lens See Short focal-length lens.

**Zoom lens** A lens that offers several lenses in one by allowing the focal length to be altered at will. The minimum and maximum focal lengths available are made clear by the way in which zoom lenses are described and labelled (e.g. 17 mm—35 mm).



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