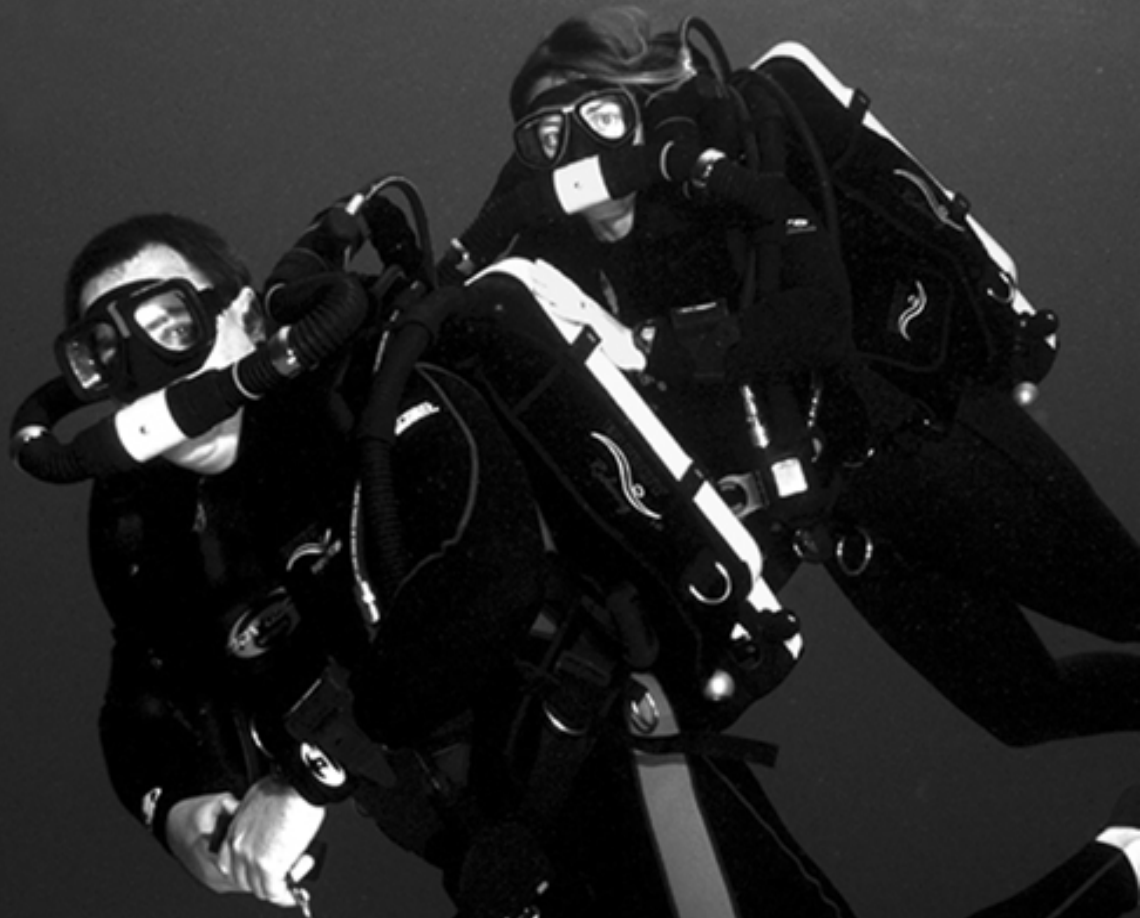


**A comprehensive guide to  
effective underwater exploration.**



# **Technically Speaking**

**By Bill Nadeau**

All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of both the publisher and author.

Copyright © 2005 by Deep Fathoms Productions  
[www.DeepFathoms.com](http://www.DeepFathoms.com)

# Technically Speaking

---

## A Comprehensive Guide to Effective Underwater Exploration

PUBLISHED BY DEEP FATHOMS PRODUCTIONS



All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of both the publisher and author.

**Copyright © 2005 by DEEP FATHOMS PRODUCTIONS**  
**Nanoose Bay, British Columbia, Canada.**

[WWW.DEEP FATHOMS.COM](http://WWW.DEEP FATHOMS.COM)

ISBN 0-9738920-0-5

First Edition September 2<sup>nd</sup>, 2005 - Copyright 1032498, Victoria, BC

## Acknowledgements

Without the support and assistance of a great number of people, the publication of this book would not have been possible. To begin, a large amount of credit needs to be extended to every dive Instructor, diver and underwater enthusiast I have ever had a chance to meet and dive with. I would like to thank my mentor Carl Chambers, who set a standard for me and constantly raised the bar, for this I am eternally grateful. I would also like to thank the many diving pioneers who gave me the chance to watch first hand how history is made. These folks include, Reg Creighton, Erika Leigh Haley, Greg Mossfeldt, Tom Mount, John Reekie, David Sawatzky, Al Spilde and my favourite old time diving buddies; Ralph Hoskins, Norm Levellier, Scott Humphrey, Mike Purdue and Adam Harrington.

I also need to thank all those within the industry itself, the Instructors and shop owners who work hard at defining what the dive business is all about. There are a few in particular who have assisted me over the years, thank you to Ron Akeson, Ian Hall, Ed Singer, Blake Fry, Polly Lenon, Bryan McEwen, Dan Ferris, Sharon Morgan, Steve and Trudi LeCasse. I must acknowledge all those who have contributed to this book, their part represents a significant share of what is read or seen in and amongst all of these pages; Bill Coltart, Leon Scamahorn, Chris Brandson, Larry Hill, Ron, Erika, and Reg. My professional support team who have contributed endlessly by editing and correcting my far-from-perfect work and providing guidance when and where I needed it most; Norm Nadeau, Lorne Hildebrand, Theresa Al-Hajj, Brian Collins, and my primary editor-in-chief Ann Collins.

Finally, the patience and support of my wife, Tonia, and to my father. This book is dedicated to them. ~BN

# Contents

---

<b>Preface</b>	<b><i>i</i></b>
<b>Introduction</b>	<b><i>v</i></b>
<b>Chapter 1 - <i>The Basics</i></b>	<b><i>1</i></b>
<b>Chapter 2 - <i>The Trichotomy of Diving</i></b>	<b><i>39</i></b>
<b>Chapter 3 - <i>The Essentials of Extended Range Diving</i></b>	<b><i>67</i></b>
<b>Chapter 4 – <i>Equipment</i></b>	<b><i>123</i></b>
<b>Chapter 5 – <i>Environment</i></b>	<b><i>191</i></b>
<b>Chapter 6 – <i>Activity</i></b>	<b><i>219</i></b>
<b>Chapter 7 - <i>The Dive Industry</i></b>	<b><i>253</i></b>
<b>Glossary</b>	<b><i>282</i></b>

## Preface

# The Purpose of This Manual

***‘No one can walk backward into the future.’ - J. Hergesheimer, 1917***

And so passes another day of the new millennium and with it a generation of diving technology and ideology so dynamic that its changing face sometimes creates controversy and even inhibits progress. The single high pressure hose, the buoyancy control device, the dive computer, the long hose, the technical training agency, nitrox, and rebreathers; all have been met with resistance as traditionalists maintain that the old way of doing things should not be messed with – especially if it works. Those who dare to venture beyond conventional practices are labeled as cowboys taking on unnecessary risk or using things *‘they don’t need’*. Yet time passes and we eventually accept the change (some earlier than others) and evolution continues to keep the world spinning. Ironically the latest in dive technology includes mechanisms (like nitrox and rebreathers) that have been around for over a century and were the birthing parents of the very same activity of sport diving we participate in today. We are seeing the future today and these same dynamics that are shaking the world of underwater exploration will inevitably become tomorrow’s standard – and this includes nitrox and rebreathers.

Some people peer through the looking glass and see a future with unlimited boundaries; a part of the underwater world that can now be safely explored using modern diving technology. This is a world that includes caves, deep walls and shipwrecks, extended bottom times and shorter decompression requirements with far less equipment than is currently used. They understand the human desire to explore, grow and change. They evolve and embrace the new era with open arms.

Others stare through the looking glass and see only their reflection. It is a comforting familiar image and therefore they are content with what they have. The world around them is quickly changing and for them nitrox, rebreathers, DPV (diver propulsion vehicles), communications and multi-functional computers are nothing more than novelties, fads and not where diving should be headed.

When people ask me what I see for the future, I describe the diver of tomorrow as follows:

An average individual with a small, light compact unit that delivers an optimal gas mixture containing oxygen, helium and maybe nitrogen for the depth he is diving at. Despite the small and weightless features of the unit the gas supply will be at least 10 times that of a standard 80cutft-aluminum tank. This diver will have the capability of diving deeper and longer than the presently prescribed recreational limits of 100-130fsw (30-40msw) and technical limits of 300fsw (90msw). I envisage a small computer that not only tracks his or her depth, time and decompression requirements but also calculates the fraction and partial pressure of the oxygen that he or she is inhaling as well as continually monitoring all dive statistics – all displayed on a heads-up panel inside of the mask. The exposure suit will automatically adjust for any environmental condition. He will hold a small compact dive light with over 100 watts of intensity and over 4 hours burn-time. Allowable bottom time will increase exponentially and the equipment will provide him with enough redundancy to provide total self-sufficiency, dramatically decreasing the level of risk for both diver and buddy. The diver will move through the water with the assistance of a powerful scooter with side-scan and directional finding capability and constantly in communication with another diver and/or the surface – if desired. The level of dive training will be much superior to the traditional approaches we currently use, and diver qualification will include personal accountability and advanced risk-benefit analysis.

Yes and how many thousands of dollars will this cost? Consumers have a tolerance to what they will pay. Value, need and want all contribute to a complex relationship that is recognized by manufacturers and retailers. The above products are already available. As the demand increases, the production numbers will match and soon exceed that of open circuit systems forcing prices to drop. They have already. I do not foresee much of anything new in diving technology – just a takeover of the market. People are explorers by nature – which is why they took up diving in the first place. When they discover what new worlds can be safely reached with advances such as nitrox, rebreathers, and DPV's, they will invest in this new technology. Technical diving will no longer be seen as a remote and shadowy arm of the sport.

What is quickly going to happen is a technological revolution in the diving industry. Stand today's diver side by side with the diver of tomorrow I described earlier. They are both outfitted in comparably priced set-ups. Once today's diver compares the functionality and comfort of the unit of today with that of my diver of tomorrow, how long do you think it will be before today's diver will change his traditional approach to diving? I don't see too many old double-hose regulators around anymore!

I wrote this manual because I have been witness to this change: in fact I would like to think that I am part of it. And with change comes acceptance and a responsibility to keep an open mind. There is no single way to dive, no single system that must be

followed and no one piece of gear that is right for everyone just as there is no one place to dive. Millions of people are looking for a new way to explore this world and a means to use this new technology safely and effectively. I wanted to provide divers with a tool to help develop their skills, to dive safely, using new technology and up-to-date diving practices.

I want to create a system of personal development that is practical – one that is based on the needs of the diver whose primary objective was to effectively explore the varied parts of the hydrosphere in the safest way possible.

I also feel that this application should apply from the beginning – when and where we first learn how to dive. Today, many of the key components or **elements** taught in specialty diving courses (deep, cave, wreck) or specialty equipment (rebreather, trimix) are introduced at the advanced diving level or ‘technical diving’ level. I believe this is too late, as progressive diver development requires that basic fundamentals be embedded from day one. These include breathing techniques, survival skills, stress management and risk evaluation. To accomplish this, I have divided diver training into three distinct facets: Environment, Equipment and Activities. I refer to this as the “Diving Trichotomy” – a concept I develop thoroughly in this book. It can be applied to any level of diving and used by any caliber of diver.

As well, I wanted to address the issue of labeling different types of diver activity – specifically segregating the ‘technical diver’ from the ‘recreational diver’. To me, they are one and the same, technically speaking that is. Any diver that dives for fun is diving recreationally whether it is a deep mix gas dive or a short shallow reef dive. Basically, any person underwater who is not diving for the purpose of earning a living (and even then the translation is loose) is a recreational diver. Each one of these divers is applying a form of technical application to ensure a dive is conducted safely and effectively. At what point does this approach require that one’s attention to technical considerations be withdrawn or complacent? I also address the whole concept of defining technical diving in this book.

This publication is by no means an alternative to proper training and other training manuals. It offers the diver a practical reference and a source for diving methods and systems. This book should be used as nothing more than a teaching tool to help complement the valuable training one can receive from an experienced and qualified dive instructor. Nothing can replace that.

With all of the educational resources  
available to divers the final qualifying  
process lies within you – the diver.

The material found in this book is comprised of ideas and concepts with the intention that it will improve your diving capability and make you a safer diver. Not all of the

information contained within is practical for everyone and in some cases may even be discouraged. We are individuals with distinct needs and diversified backgrounds. As with anything there is inherent risk and diving – especially to the extreme – is not without its share of risk no matter how well prepared you are.

It does not matter how many certification cards you have, what kind of gear you dive with, how long you have been diving or what training and practice you have done. You must make the final decision about whether your next dive is within your limits. Neither this book nor any others can give you enough information to qualify you for that. Unfortunately hundreds of divers have died because they did not know this, or knew it but failed to accept it. As dive educators our responsibility is to provide as much information as we reasonably can to help you plan your own dive. Beyond that you need to adequately develop the foundation that will help you execute a safe and enjoyable dive. Failing to do so may result in injury or death. The decision is yours.

As you work your way through each chapter you will also notice a couple of things for which I will now apologize. The first is the conversion of various units from metric to imperial. My hopes were to include values that were of use to those who use either. Unfortunately it was impossible to select examples where the numbers came out clean and exact and I did not want to have decimals and fractions lying around everywhere. So in many cases I simply rounded up or down. Next I apologize for my consistent reference to you and/or the diver as *he* or *him*. In no way, shape or form is it my intention to insinuate that divers are or should be male or to exclude the other fine half of our species. The use of *he* or *him* is only a way of simplifying my grammatical obligations. When I originally began writing this book I made every attempt to include references to both sexes with phrases like ‘*When he or she dons his or her tank...*’ and ‘*...at the end of a dive he or she needs to wash his/her gear.*’ From a writer’s logistical point of view, this was literal chaos. I also attempted to alternate between male and female with the hopes that both the guy and gal reader would not feel excluded. That did not work either as I just appeared even more confused. Finally I decided to make a decision and that I would refer to only one gender, hoping that this disclaimer would satisfy everyone. I chose male so that I would not raise any suspicions with my wife.

I hope you find the material in this resource to be helpful and useful. I ask you to embrace it with an open mind. Above all else remember why you chose to become a diver - to explore, plain and simple. If you can remember that, you will continue to embrace the fundamental principles that keep divers alive and healthy – you will forever enjoy the sport of diving and enjoy it safely.

*Bill Nadeau*

# Introduction

So you want to expand your abilities and learn how to dive or improve on your existing diving capabilities. What a rewarding and adventurous path you have chosen – to explore a part of this world so few even know about. Like all learning resources where there are inherent risks, there is always some form of a disclaimer. Alas, this book is no different, less one small feature. This book explores beyond the very elements of SCUBA diving that require us to have disclaimers in the first place. Disclaimers essentially say ‘we’ve done our best to avoid trouble but you still might have problems and if you do we are not responsible.’

Imagine if you read a disclaimer that said ‘there is no way we can guarantee you will not have problems but here are some of the reasons why, so let’s figure it out together and then you can make a decision on your own.’ Confused? Let’s take a look beyond any disclaimer you might be required to read and sign before diving.

We’ll begin by first reminding ourselves why we would even want to consider taking such risks. The answer is simple; we seek to experience the adventure of underwater exploration, a world occasionally referred to as Inner Space and often compared to Outer Space. Let’s look at why.

## Explorers in Inner Space

**‘The most beautiful thing we can experience is the mysterious. It is the source of all art and science.’ -Einstein**

In a world where technology abounds before and around us, it appears that we, as explorers, look further into breaking the laws of nature. We strive to go beyond what was not so long ago, journeys considered unheard of – in fact unimaginable. We have been to the moon and walked upon it in much the same manner as an alien would land in the Nevada desert, walk out of its space ship and wander aimlessly. We have sent unmanned spacecrafts to Mars and beyond. We have descended to the deepest point in the oceans, climbed the tallest of mountains and we have even journeyed far under the crust of the earth’s surface. We are by far a very curious creature. And what drives us to such insane extremes is our need to explore.

It is a characteristic that separates us from any other species on this planet. It is what helps us defer our own extinction – it is what evolves us from ‘many eras of dark ages’. In fact, it is probably the biggest reason we do not totally annihilate each other and completely destroy this planet. In a world where the business of war is at an all time high and the need for personal comfort makes us apathetic towards the environment, human curiosity alone may force us to stop killing every living thing we can for a moment. For brief moments in time we are invited to stop and metaphorically smell the roses. We forget about the small things in life and say ‘hey, what’s this part of the world all about’? One diver bumper sticker says it all:

**‘Take only memories, shoot only pictures and leave only bubbles.’**

As creatures of habit we are in a constant drive to develop new technologies that help us explore. And as hopeless romantics we stake our accomplishments in a competitive race to not only be the first but the best as well. We search to unveil the mysteriousness that not only exists in our physical world but in our personal one as well. How far are we willing to go to explore around that next corner? What sacrifices are we prepared to make?

Since diving plays such a large part in the exploration of Innerspace, it is important to remember that the technology within the diving industry is evolving very quickly. It is a technology that has given us great powers to explore parts of our oceans and lakes that have never been explored before. Within these abilities exists a need for competency and awareness. By competency we mean a foundation of skills and know-how to safely and effectively use the technology available to us. By awareness we mean a clear

understanding of all the risks involved in our actions and an ability to determine whether they justify the benefits.

It is not a surprise that every major training agency offers technical or advanced level dive training. This is a significant milestone in the history and evolution of sport diving. We knew it would happen – we just did not know when or how. Perhaps the answer lies in the reason why. Advanced levels of diving have become so much easier to participate in, that it is now very appealing to the average diver and even to the new diver. This is primarily due to the advancements in the diver training and dive equipment industries – the result of incredible ingenuity and vision of key pioneers. When we compare the advanced level diving we did fifteen years ago to the way we dive today, a bewildering contrast is evident. We are diving longer, deeper and with greater ease. It is no wonder diving has grown in popularity. Yet you have to ask yourself is ‘easier’ a good thing? A year or so ago the seasoned diver may have said no, but when you look at the technology that makes both basic and advanced levels of diving easier today, one tends to feel compelled to give an unequivocal ‘yes’ vote.

Let’s begin with extended range dive planning and preparation. Many gases and blending systems a decade ago were somewhat scarce and what did exist was expensive and moderately hazardous to use. Today a dive shop can get into a continuous flow nitrox and trimix blending system for a fraction of the cost of five years ago and be pumping cheap gases within minutes of initial set-up. These systems are extremely safe, reliable and easy to use.

And if you thought mixed gas diving couldn’t get any cheaper, you were wrong. Closed Circuit Rebreathers (CCR) have been around since the beginning, but until very recently, inexpensive reliable units were not available to the sport diver. Today a person can get into a CE approved CCR for about the same cost as setting up a set of deep diving twin tanks – and the cost is still dropping. These units weigh a little more than a single tank set-up, are compact and streamlined like a single tank and provide enough bottom gas and decompression gas for up to 8 hours of diving at any depth. Fed with oxygen and trimix from two small tanks, the unit automatically mixes the breathing gas, providing a diver with an optimal mix for any depth.

There is no question that diving has become easier – from beginning to end. These are just some of the toys that have made our sport so incredible. We could also talk about scooters with 30 kilometer ranges, heads-up displays, underwater MP3 players and powerful dive lights the size of a small baton. What has not changed is the training required to use all of this technology.

In the end there are many similarities between our approach in exploring Outer Space and Inner Space, specifically the equipment we use, the environmental characteristics that exist, and the various activities aqua/astronauts participate in. These three elements (equipment, environment and activity) we later define in this book as the ‘primary’ ranges of diving. What are the advantages of exploring our own world first? If we go back to our innate curiosity, our diving exploration leads naturally to the wonder

and subsequent respect for our environment without which we will continue to destroy the single source of life support we know of.

Now that we have presented the benefits of SCUBA diving we need to introduce the risks. As you will soon discover, everything in diving (much like life) is based on a Risk-Benefit Analysis.

## Beyond the Disclaimer

One day while teaching an Instructor development program (a course that prepares and qualifies divers to become SCUBA Instructors) I raised the issue of Disclaimers. This was an assembly of seven intelligent people, all very eager to become new Instructors, all with a variety of backgrounds. Some of them had more than 15 years diving experience with advanced level training including Cave and Mixed Gas. Others were relatively new with only a few years of diving under their belts with not more than 300 or 400 hundred logged dives. They were all very confident about their abilities and eager to begin teaching new divers. I asked them, 'Why do we have our students sign a disclaimer or a release of liability when they sign up for a course?'

There was a bit of a puzzled look on the faces of these soon to be diving professionals. They were not sure why I was asking such a question. They all provided similar answers, something to the effect of removing liability or the right to sue them if one of their students were to be injured or die during a course. One Instructor candidate added this bit of insight, 'They sign a statement that acknowledges the risks involved in diver training, even when learning the most basic of skills.'

Wonderful I thought, how some Instructors understand that when it comes right down to it, we really can't ask anyone to give up their rights to sue us (not in this country anyway) but instead get their students to acknowledge the risks of what they are about to do. I was curious to know whether the Instructors themselves were aware of all the risks involved in what they were teaching and more importantly, if they were able to inform their students of the same. I asked my class, 'Give me an example of a basic skill you will be teaching a new diver?'

One of the more experienced students spoke up right away, 'Well, how about removing your diving mask. That's a skill that is fairly straight forward.' Another Instructor candidate who had a lot of experience in assisting in open water classes added his feelings about the skill. 'I like to get the mask clearing and R&R (to remove and replace a diver's mask underwater) out of the way early on in the course.'

I agreed with them, commenting that being able to clear a flooded mask and replace it is a very important skill. I asked them at what point in a diver's training program it should be taught. The answer from the group was unanimous – '...before the end of the open water course, that's when it should be taught.'

I asked if it should be taught in any other course but the class felt strongly that if it was taught properly in a basic open water class than there was no need to teach it in any other programs, not unless the standards required it. A discussion began about how often one really has to take their mask off under water anyway. Another student stated that if she were teaching an advanced class, the students arriving in that class should already have 'mastered' that skill and it would not be necessary for her to teach it again.

Technically she was correct in her statement keeping in mind that all Instructors are still responsible for insuring that their students are qualified to progress to the next level of training. In fact her comment is the essence of what has now become a streamlined and universally standardized curriculum. Training organizations over the years have done a wonderful job at designing programs that clearly and in detail, outline what skills a person must ‘master’ in order to graduate from a certification program. They have created structured procedures that qualified and insured individuals can follow when teaching people to dive. They are so specific that these protocols even state how every Instructor is to teach each single component of a particular skill, such as clearing a flooded mask. The techniques are printed in something called Agency Standards, the law for Diving Instructors. These are based on Industry Standards, minimum requirements that ‘private’ training and certification companies are recommended to adopt. Failure to follow these ‘laws’ can result in an Instructor having his license suspended, revoked or in the extreme, the Instructor him/herself being sued.

It is a system that has facilitated safe and effective instruction for millions of divers. It has provided opportunities for thousands of people to make a living as professional Diving Instructors. It has enabled an industry to support a diversity of commercial enterprises from manufacturing and travel to retail and training agencies.

The larger training agencies have done to SCUBA diving what MacDonalds® did to the restaurant industry; they have devised a systematic, easy-to-follow methodology that diving professionals can follow. This ensures every Instructor teaches the exact same thing, the exact same way no matter where you are in the world. Diving has become a low risk, inexpensive, dynamic recreational activity as a result.

**“Over 10  
Million Scuba  
Divers Served  
Here!”**

I asked my class about varying the way we are supposed to teach students to remove and replace their mask underwater. What if they have thick gloves or a bulky drysuit hood on? What if they wear contacts? What if their mask comes off when they are hovering on a wall that drops to a 150 feet below? Can we train a diver in an Open Water course to deal with mask problems that are caused or affected by other factors such as equipment or current? I provided this real life example for them.

Let us suppose a diver who because of limited visibility is following his buddy fairly closely. They are swimming along a shallow reef, fifty feet under the surface when the following diver turns quickly to his buddy only to have his mask swiped off his face by the other diver’s fin. Not only did the mask get dislodged but the diver’s regulator from which he breathes (air delivery system) was also knocked out of his mouth. This now distraught diver, who was originally trained on a holiday in the tropics, is wearing a drysuit hood and gloves and is having difficulty finding his mask and regulator due to the loss of dexterity in his hands. Has this diver been competently prepared to handle this situation?

Note that I did not ask if this person had been competently certified. In all likelihood they have been taught properly following all of the protocols and meeting of all of the standards. In short they have been certified to use a particular piece of equipment in a very specific environment.

You see, over the years in order to instill a sense of confidence and accomplishment in divers, and to provide a system of recognizable qualification, training agencies have broadly categorized a hierarchy of certification levels (i.e. Open Water Diver, Advanced Open Water Diver, Rescue Diver, etc) all defining a somewhat generalized criterion of restrictions. For example an Open Water Diver level is qualified to dive down to a depth of eighteen meters of salt water (18MSW/60FSW) just as a person with an Ice Diver Specialty certification has been qualified to dive under ice.

I am not suggesting that the system is responsible for allowing the diver in the above example to get into trouble. In fact this is probably one of the greatest challenges the diving industry is facing today – identifying what an Instructor is responsible for teaching and what a student is responsible for learning. This needs to be clearly understood by every person who dons a SCUBA tank.

So what went wrong? Well to begin with, the vast majority of certified divers are qualified in warm clear waters where learning a skill like clearing a diver's mask is easier. That is not the only contributing factor to our distressed diver's predicament. During the part of the course where a student is taught to remove and replace his mask, the Instructor guides the skill development gradually. First the student learns about it in class, perhaps gets a chance to see a video of another diver demonstrating it and then he gets an opportunity to have an Instructor demonstrate the skill right in front of him. The diver will then practice it on the surface before trying it in the shallow end of a pool and then again in the deeper pool waters. Finally the diver will demonstrate to his Instructor that he has mastered the skill by performing the task in an open water session. This is usually done in clear water so the Instructor can monitor everything that is occurring safely. The Instructor lines his students up in a row, kneeling comfortably on the bottom. Then the Instructor grabs hold of the students one by one (in case they have problems and panic) and coaches them through each step of a mask removal and replacement by getting them to slowly flood the mask, slowly remove it, and slowly put it back on.

Successful demonstration of this skill (and others) by the student will qualify him as an Open Water Diver. The diver should feel proud of this accomplishment; it is the result of hard work and practice. But does it really mean that he is ready to deal with any kind of mask problems? In reality, does a mask always come off when you are kneeling on the

***There is a difference between what Instructors are responsible for teaching and what students are responsible for learning.***

bottom of a shallow protected dive site while an Instructor is holding on to you and you are psychologically prepared to perform such a task? Nope, and in the earlier example our diver also had to contend with the cold water he was not used to or trained in.

It happens when you least expect it and there are other matters complicating the situation, like current, like a wetsuit hood that you have never worn before that did not allow the mask to seal on your face properly in the first place, and like a regulator that was torn from your mouth.

Don't be alarmed by this story. My intention is not to scare people away from learning how to dive. My point is this (as it was to my class of soon-to-be Instructors): when we train someone to dive, we do not qualify them to do anything but rent and purchase SCUBA gear and participate in SCUBA activities offered by businesses that require divers to have certification cards from recognized training agencies. There are very few places on this planet where the government laws say you have to be certified to dive, to buy or rent gear or to get onto a dive boat. The industry alone has set these rules and the rules are self-regulated by industry members. It transfers liability back to the diver by making a very simple but incredibly important statement:

In recognizing you as a certified diver, we, the dive industry, have been affirmed that you have taken a specific level of training by which you have come to understand and accept the inherent risks to SCUBA diving, that you are responsible for being familiar with those risks and because only you can control the amount of training and practice you do, and only you know what your personal limits are. We are not responsible for your level of competency while diving.

The diver in our example completed the minimum standards and demonstrated an acceptable performance in all of the required skills to earn an Open Water Certification. This does not mean the diver was competently prepared to handle the situation he was in.

**FACT**

An Open Water Diver certification does not competently prepare divers to dive in all types of environments identified by the limitations of that certification (i.e. certified to dive to 60fsw). It merely prepares him to safely begin to gain experience at a gradual pace and to help him better identify what his personal limits are.

When attempting to achieve that level of competency, there is far more involved than just taking a course. No Instructor in the world, regardless of the type of course being taught, is responsible for ensuring his students are trained to obtain such a level. No Instructor with the ability to teach such a course exists and no course could ever be designed to include the myriad facets that make a diver competent in all environments, using any kind of equipment in every manner that divers could possibly use them.

And even if we could find such an Instructor to teach such a course, we still could not account for the most uncontrollable, unpredictable and indefinable element of all, human nature. Putting an Instructor in a position to assume that kind of responsibility would not be fair to him. Finally, allowing an Instructor, his training agency, and the industry as a whole to accept that kind of responsibility ultimately promotes a lack of accountability on the diver's part to ensure each and every dive he makes is within his own personal limits.

***All practical aspects of diving begin with a basic approach but must continue to develop as we extend the ranges of our diving practices.***

So, apart from following the standards set forth by the SCUBA Industry, what is an Instructor's primary responsibility when issuing a certification card to a student?

That Instructor is responsible for providing his students with the all of the tools reasonably necessary to determine how they are going to safely make every single dive. That does not mean he is required to show his students how to replace a mask that might be knocked off in any kind of situation, nor does it mean he is responsible for teaching his students about every academic or practical aspect of SCUBA diving. But the instructor is responsible for showing his students how to recognize, and evaluate the risks involved in any dive they might make.

How is this then done?

How do we as divers and dive Instructors determine when and how every dive should be made in order that it is made safely, when there are so many complex and dynamic facets to the sport?

Let's go back to the original question about the basic skills a diver must learn such as our example with the diving mask. We now realize that this skill, although taught in a basic Open Water Course, is a skill that must be

practiced and mastered in a variety of environments such as cold water or in current. We also know that each time our equipment changes (such as wearing a new wetsuit hood) we must practice those skills repetitively to see how it affects our ability to respond to the various problems we might have with our mask. And we must also practice it while participating in the different kinds of diving activity we do such as diving on a wall or while holding onto a very expensive camera. We realize now that we cannot assume that our open water training prepared us for any of these situations. We also know that it is not a skill taught or practiced only in an Open Water Course.

Therefore the Instructor begins the process by showing students that there is an endless number of interrelated elements that can affect a dive. As such, he presents a system that then enables his students to identify those same elements.

At that point it becomes the student's responsibility to apply this system in determining all that is involved in making that dive. A newly trained diver must make an effort to develop an intimate relationship with these elements by gradually gaining experience.

What is a basic skill then?

All practical aspects of diving begin with a basic approach but must continue to develop as we extend the Range of our diving practices. The secret is defining what those Ranges are so that we can apply them to a query process that determines what is required of us to complete a dive safely or help us determine if the dive can even be made with an acceptable amount of risk.

Let's begin by stepping back and taking a look how this recreational activity began. From there we will get a bigger picture of the sport and better understand why the basics are so important and the necessity of understanding 'inherent risk'. To do this we will break down the science of Scuba Diving into basic elements and then group them into 'Ranges'. We will then develop this foundation into a simple but complete infrastructure that guides a diver through each stage, enabling him to reach the ultimate objective – that of conducting a dive competently and safely.