

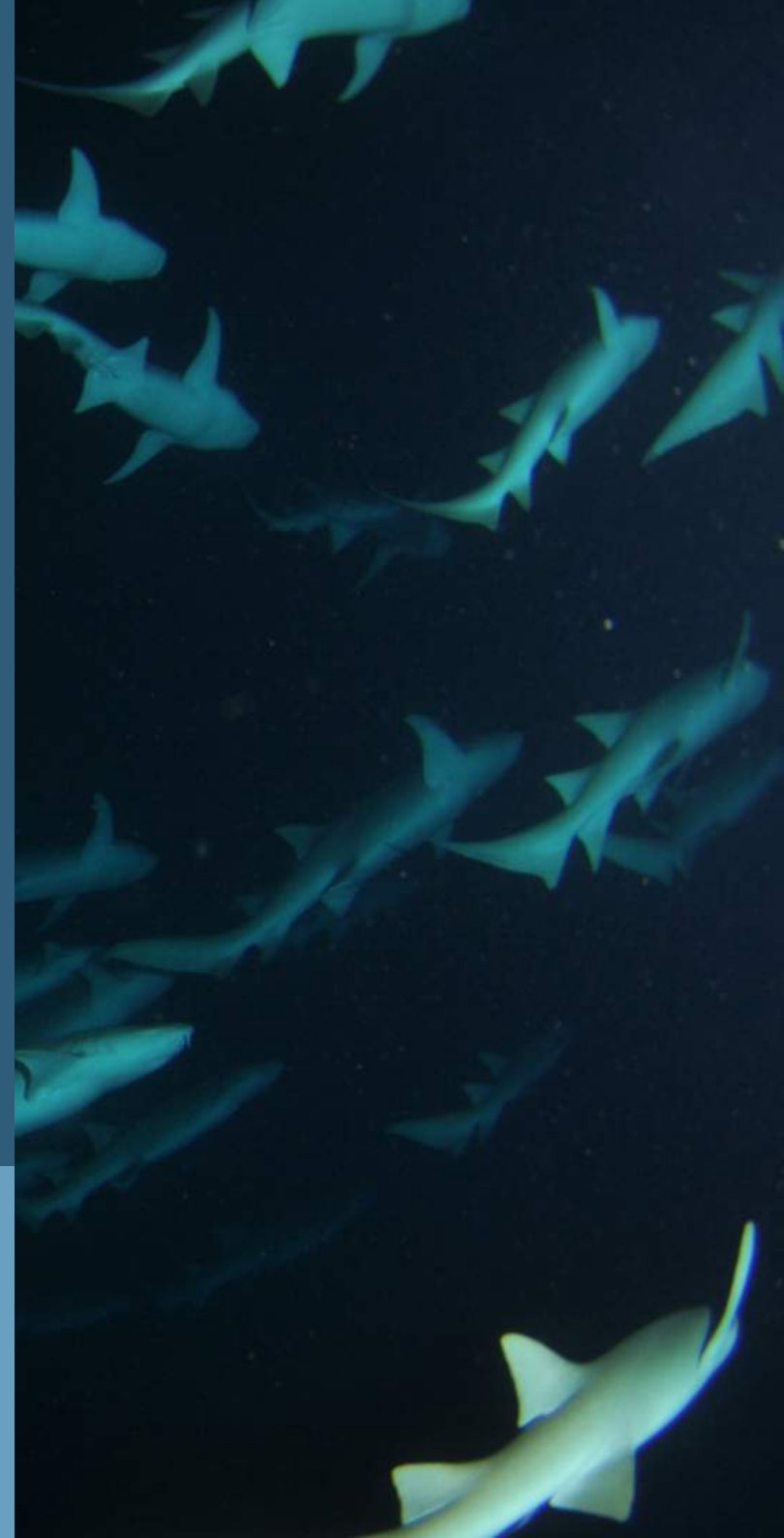


SHARKS OF THE MALDIVES

Introduction to field based research and monitoring techniques

9-16 December 2023

“A scientific diving cruise in the Central Atolls
of the Maldives”






Organized by MaRHE Center of the University of Milano-Bicocca (Maldives), Shark Research Mexico (Mexico) and White-Wave Maldives (Maldives)

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INTRODUCTION



Sharks are betrayed as blood-seeking villains in Hollywood movies, but in reality, they're far more fascinating and complex than they're often depicted. Like rays and skates, sharks belong to a subclass of fish called elasmobranchii. Characteristically, species in this subclass have skeletons made from cartilage, not bone, and have five to seven gill-slits on each side of their heads which they use to filter oxygen from the water. Sharks can be found in both shallow waters basins, reefs and the pelagic zones throughout the world's oceans, with some migrating vast distances to breed and feed. Some species are solitary, while others hang out in groups of varying degrees or aggregate for reproductive purposes. Sharks may not be a significant threat to us, but we are to them. Humans are responsible for drastic declines in shark populations. Overfishing is the biggest threat. It is estimated that around 100 million sharks are killed each year, mostly to supply demand for shark-based products such as fins and cartilage but also as a result of bycatch, being a new threat to the species. Rising water temperatures and coastal development are also contributing to shrinking populations by destroying the mangroves and coral reefs that sharks use for breeding, hunting, and protecting young shark pups.

Now it is the time to act and support the conservation of sharks as losing more sharks could have unintended consequences since they are top ocean predators and help to balance the ecosystems.



Furthermore, considering that the survival of many coastal human communities largely depends on fish controlled by the presence of sharks both for the supply of proteins through fishing and from an economic point of view due to the touristic activity, the study and description of shark communities that inhabit reefs and coastal zones can provide useful information for the management of all human activities involving the sea, from fishing to tourism. The skills acquired in the field of shark biology and ecology can therefore be used both in the sectors related to the protection and conservation of ecosystems, in the fields of fisheries management and tourism, as well as obviously the fields of academic application with these majestic top ocean predators.

At the end of this theoretical-practical course the student will acquire notions to:

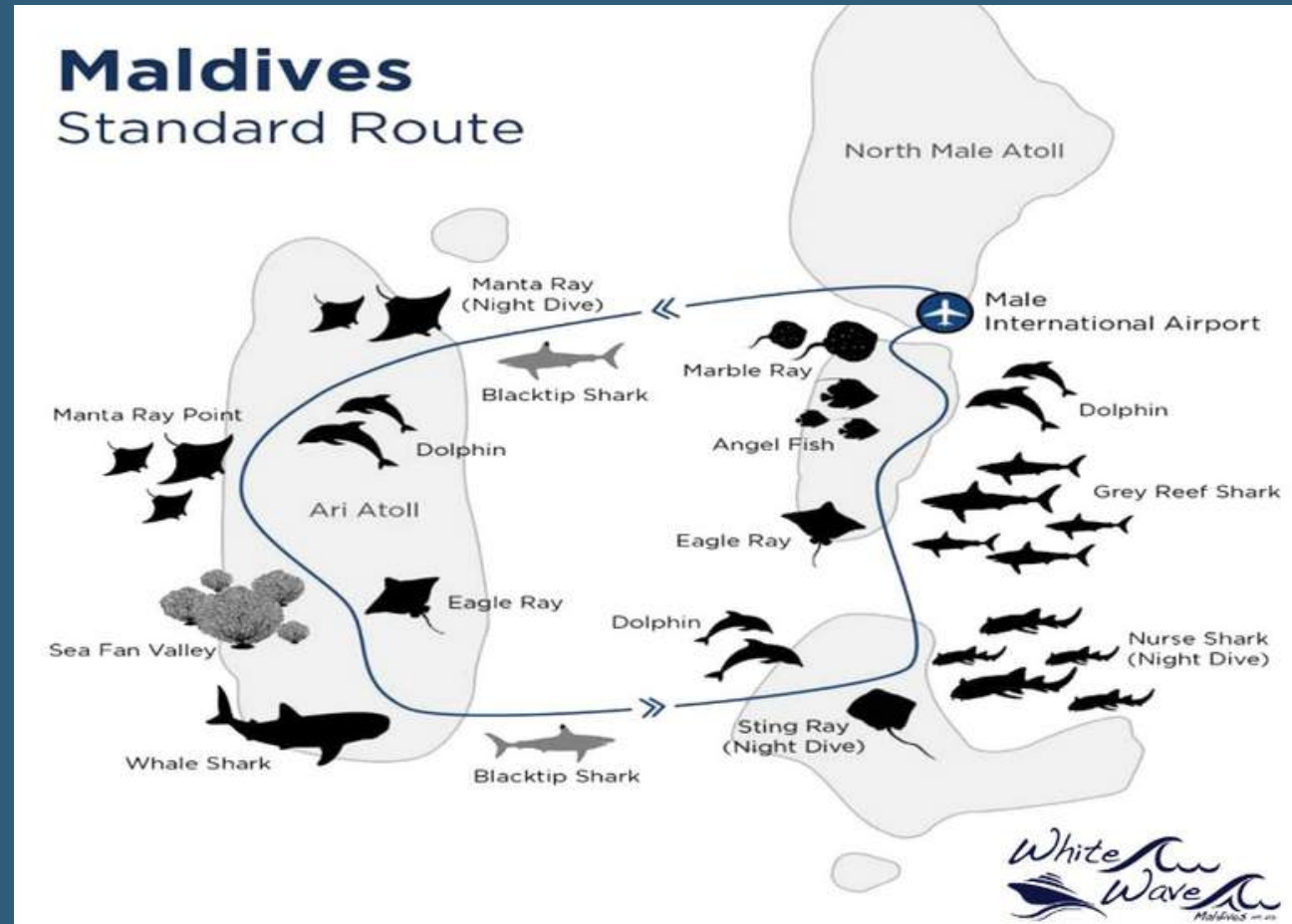
- Identify sharks and their associated fauna
- Use specialized recognition software to catalog and database sharks
- Identify the common behaviours of sharks in their natural habitat
- Use diver survey and photogrammetry techniques to survey sharks
- Understand shark handling and the safe capture and release of sharks
- Design and carry out visual census operations, for the study and monitoring of sharks
- Conduct citizen science data collection techniques
- Terrestrial and aerial census of sharks using a drone or vantage points
- Use baited remote under water video stations (BRUVS) to monitor shark abundance and composition.

ORGANIZATION OF THE WORKSHOP

The 8 days-workshop will take place from 9 to 16 December 2023 with a diving cruise in the central atolls of the Maldives (standard route). The logistical support base will be the safari boat **Island Safari 2** operated by **White Wave Maldives** team (www.whitewavemaldives.com). The program and the activities are organized by the staff of the **MaRHE Center, the Marine Research and High Education Center** of the University of Milano-Bicocca (Italy) located in Magoodhoo Island, Faafu, Maldives (www.marhe.unimib.it), and the **Shark Research Mexico** (www.sharkresearchmexico.com).

The program includes daily theoretical lectures, practical sessions on shark data collection and analysis, on-hands activities, and field activities

through scuba diving in different reefs of the Maldivian archipelago. In particular, 2 dives per day are scheduled (a third dive could be scheduled some days). Participants will be assisted underwater by the staff of White Wave and MaRHE Center. The workshop will be conducted in English language.



The activities and lessons will be mainly held by **Dr. Darren Andrew Whitehead**. Dr. Whitehead is a competent shark researcher with over 15 years' experience working with sharks around the world and is an expert in shark behaviour, shark nutrition as well being at the forefront of our knowledge on the human impact on sharks through tourism and fisheries. He is the founder of **Shark Research Mexico (SRM)**, a non for profit organization dedicated to the research and conservation of sharks and rays in the Gulf of California. Darren holds both a Masters and a PhD in marine biology focused on sharks and has published many peer-reviewed papers from habitat suitability of sharks, to species toxicology, reproduction, and behaviours of these animals. Since 2014, he has been working solely in Mexican waters focusing his research on seasonal aggregations of whale sharks, mako sharks, blue sharks, silky sharks as well as bulls, black tips and tigers from the Mexican Caribbean to Nayarit, Bahía de Los Angeles, Bahía de La Paz and as far as the Mexican pacific. Through his work with sharks, he has continued to push scientific knowledge on these top predators through active field work and has assisted in developing management proposals for tourist activities in Mexican waters by calculating the carrying capacity of the tourism industry and he has been a linkage between fishing communities and the scientific community.



SHARK RESEARCH MEXICO



The workshop will be coordinated by researchers from the **University of Milano-Bicocca and MaRHE Center**, who have a long experience of study and research in tropical marine environments and are expert of the coral reef ecosystem of the Maldives from different points of view. In particular, **Dr. Simone Montano** and **Dr. Davide Seveso**, marine biologists, work as Assistant Professors at the University of Milan-Bicocca, Dept. of Earth and Environmental Science (DISAT), and both are vice-directors of the MaRHE Center in Magoodhoo (Faafu, Maldives), where they organized and carried out several workshops related to coral reef ecosystem. Their research topics are mainly focused on the ecology of the coral reefs and their related organisms, by studying their health condition, their pathologies and their responses to different environmental and anthropogenic stressors. They are authors of more than 70 publications in international scientific journals plus some book chapters. They are lectures of the course Biodiversity and Marine Ecology in the international master's degree course of Marine Sciences in University of Milano-Bicocca, joined with the Maldives National University. They are PADI diving instructors, with an Advanced European Scientific Diver license, with more than 500 scientific dives in the tropical marine environments of the Indo-Pacific, the Red Sea and the Caribbean.



Andrea Parmegiani, marine biologist, works as a dive guide with **White Wave Maldives** since 2019. He is currently PhD student at the University of Milan-Bicocca, Dept. of Earth and Environmental Science (DISAT), and at the MarHE Center. His primary research focus is on shark aggregations in the Maldives and, given his great diving experience in all the Maldivian atolls, he is an expert on shark ecology and behaviour.



PARTICIPATION REQUIREMENTS

The workshop is mainly aimed at **University students enrolled in bachelor or master's degree courses or in a PhD course.** However, even graduates (preferably in the scientific field such as, Biology, Environmental Sciences, Natural Sciences) and anyone interested in learning more about shark ecology and biology can join the workshop.

The **maximum number of participants is set at 18.** If the maximum limit of participants is exceeded, a selection will be performed based on applicants' experience and interests. For this reason, in the enrollment process we ask you to also submit your Curriculum Vitae and, optionally, a short motivation letter, for a possible evaluation and selection.



DIVING REQUIREMENTS

Each participant must be an **Advanced certified divers** (diving license of any association e.g., PADI, SSI, CMAS are accepted), with a minimum number of **30 logged dives**. However, the selection of Open Water certified divers with proven experience is not excluded.

All divers must have a **valid diving insurance** (DAN or similar) in order to perform diving activities.

Each diver must fill in upon his/her arrival at the Liveboard a medical declaration for suitability for diving (see **Appendix 1** as example). In case of positive answer to any questions, an additional medical certificate will be required to attest the suitability to diving activities. This must be obtained before travelling to the Maldives.

To carry out some practical activities it is very advisable (not mandatory) to be in possession of an **underwater camera or GoPro and a diving flashlight or torch**.

Participants must bring their **own diving computer**, which can NOT be rented on-site, as well as the **SMB (Surface Marker Buoy)**.



UNIVERSITY CREDITS

Recognition of training credits are foreseen for **students of the International Master's Degree in Marine Sciences (University of Milano-Bicocca)**. In particular, for these students the set of all the activities carried out during the workshop, both theoretical (lectures plus elaboration and presentation of results), as well as practical (field activities and data collection) will reach a number of hours corresponding to **4 ECTS (practical training)**.

For students of the bachelor degree in **Biological Sciences (University of Milano-Bicocca)** the recognition of **6 ECTS** is foreseen as an internship (not combinable with any other internships carried out in the Maldives).

Students enrolled in other degree courses and/or PhD course and/or at other Universities or Institutions are requested to inquire at the respective administrative secretariats for the possible recognition of credits ECTS.



PROGRAM*

* The program may be subject to changes, due to weather conditions or other problems

DAY 1 - (Saturday 9th December)

- Meeting at Male' International Airport at 15:00 and welcome on the boat
- Briefing of the boat and introduction to staff
- Registration for diving activities
- Introduction of the Maldives and its dive sites
- Brief Introduction of the course

DAY 1 - (Sunday 10th December)

- Briefing on dive logistics and safety
- Dive 1 – Check Dive
- Lesson 1– Shark biology and species identification
- Dive 2 – Shark ID and visual surveys
- Snorkeling – Calibration of instruments
- Practical session – Shark measurement
- Briefing on the next day's activities

DAY 1 - (Monday 11th December)

- Dive 3 – Visual census measurements – Baited remote underwater videos stations (BRUVS)
- Lesson 2 – BRUVS explanation, structure purpose, benefits, global research
- Practical session – BRUVS deployment
- Dive 4 – Visual census measurements – Shark ID and behavior
- Lesson 3 – Sharks of the Maldives: identification and history
- Data analysis and Identification software
- Lesson 4 – Shark behaviors
- Briefing on the next day's activities

DAY 4 - (Tuesday 12th December)

- Dive 5 – Visual census measurements – BRUVS and behavior
- Dive 6 – Visual census measurements – BRUVS and behavior
- Lesson 5 – Whale shark research and field-based monitoring techniques of the species
- Data analysis
- Briefing on the next day's activities

DAY 5 - (Wednesday 13th December)

- Dive/Snorkeling 7 – Whale shark research: shark ID, human impact, aerial surveys and behaviour
- Dive/Snorkeling 8 – Whale shark research: shark ID, human impact, aerial surveys and behavior
- Lesson 6 – Whale shark and Manta photo ID software and analysis
- Data analysis
- Practical session – Shark measurement
- Briefing on the next day's activities

DAY 6 - (Thursday 14th December)

- Dive 9 – Nurse shark visual survey: shark measurements and human impact on provisioning site
- Dive 10 – Shark survey
- Lesson 7 – Terrestrial and aerial drone surveys for sharks
- Practical session – Shark measurement
- Data analysis
- Briefing on the next day's activities

DAY 7 - (Friday 15th December)

- Dive 11– Hulhumale urban sharks
- Data analysis
- Conclusion of the course and free time
- Visit of the capital Male



DAY 8 - (Saturday 16th December)

- Preparation and departure from Male International Airport

IMPORTANT NOTES

- **The program can be subject to modifications** due to logistical needs or weather and sea conditions. In case of extreme marine conditions, diving could be replaced by snorkeling .
- During the cruise we will try as much as possible to spot and analyze as many different shark species as possible (such as black tip reef sharks, white tip reef sharks, grey reef sharks, whale sharks, nurse sharks, and manta rays). However, encounters with these species are not guaranteed.
- Some of the dives could be performed in channels or in areas particularly subjected to sea currents, sometimes even strong ones. Please take this factor into account. Even the simplest dives could become challenging. It is therefore compulsory for each participant to bring a personal Surface Marker Buoy.
- Each dive is preceded by a briefing during which the dive profile and organization as well as the scientific activities are presented and summarized to the students.
- It is advisable to bring a personal laptop for work and analysis. Specific instructions on software to be installed to ease data analysis and exploration will be provided in detail in due time.

PRACTICAL INFO

ACCOMMODATION

The accommodation is provided by the Liveaboard Island Safari 2, in multiple rooms (up to 4 beds). Each room has a private bathroom and air conditioning. The rooms are cleaned and tidied up every day. Sheets and towels are provided. **There is no accommodation in single rooms.**

Meals are included (breakfast, lunch and dinner) and are served as a buffet. **Special dietary requirements and allergies are to be mentioned in the application form.** More info is reported in the technical specifications below.

The White Wave Maldives team, composed of expert Italian instructors and integrated with the local Maldivian crew, will welcome you, making each day of your stay on board an unforgettable experience and dives.



TECHNICAL SPECIFICATIONS M/Y ISLAND SAFARI 2

Year of construction: 2007.

Boat type and hull: Three-deck wooden motor yacht of Maldivian construction.

Length: 32 meters.

Width: 10 meters.

Decks: 3.

Electrical power: 220/240 volts - 2 silenced generators, 30KV each.

Engine: 480 HP Yanmar.

Cruising speed: 11 knots.

Desalinators: 6000 liters of fresh water per day.

Cabins: The 9 passenger cabins are equipped with a private bathroom with hot and cold shower, and autonomous air conditioning control and are divided as follows:

- 2 junior suite cabins with double beds
- 4 double/twin cabins
- 3 triple cabins

Passenger capacity: 18 pax / 21 max.

Crew: 12 persons and 5 instructors and Divemasters.

Diving crew: 4/5 people.

Restaurant: International cuisine.

Buffet-style: Breakfast, Lunch, Dinner

Served bar: Wide selection of cocktails, wine, liquor, fruit juices, and soft drinks.

Bar lounge: (1st deck) with TV, DVD player, Hi-Fi system, library.

Telecommunications: Paid Wi-Fi internet. CB radio, GPS, cell phone, and safety devices required by local regulations.

Tender: 5-meter dinghy with a Honda 40 HP outboard motor.

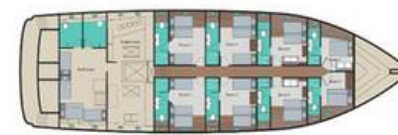
Diving Center: A well-organized and equipped international diving center. Equipment rental is available onboard if needed.

Support boat: 15-meter "Diving Dhoni" with a 4-cylinder engine.

Underwater locator radio: "Lost diver" safety device.

Compressors: 3 compressors.

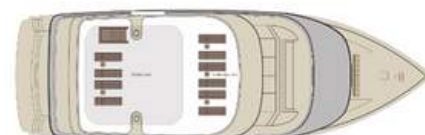
First Aid: 3 oxygen cylinders of 50 liters each and a complete kit



Level 1



Level 2



Level 4



Level 3

DOCUMENTS

Travelling to the Maldives requires a passport, with at least 1 month of validity from your departure from the Maldives and at least 1 empty page to allow the application of the stamp. If you don't have a passport, we invite you to request it promptly since the waiting time may be long. If it is necessary to speed up the release times, Italian students only can request, after registering for the workshop, a letter from MaRHE Center to be handed to the police headquarters. Please let us know if you need this. **A dive insurance (DAN or similar) is mandatory.**

CLOTHING

The air temperature is around 28-29°C. The weather is always pleasant, even during the rainy months. Please note that most of the day will be occupied by field activities and lectures, it is, therefore, advisable to wear comfortable sportive clothes.

EQUIPMENT

For **field activities and diving** it is necessary to have your own equipment and in particular:

- Mask and fins (either with or without booties)
- Wetsuit (3mm) or lycra wetsuit/shirt (water is warm, avoid 5mm or thicker wetsuits)

- Diving computer (it is mandatory to bring your own)
- BCD and regulators
- SMB
- Diving flashlight and underwater camera or GoPro (optional but strongly recommended).

It is possible to rent, for a fee and based on availability, diving equipment (BCD, fins and regulators) on the boat. The dive computer is not available, but mandatory.

However, we strongly recommend that you bring your own equipment which you are used to dive with and thus more confident. Please inform us in advance in case you need to rent anything.

CURRENCY

The Maldivian currency is the Maldivian Rufiyaa (MVR). Euros and dollars are accepted in any bank and exchange offices. 1 Euro = about 16 Rufiyaa; 1 US \$ = about 15 Rufiyaa;

It is possible to exchange money at the airport. We recommend bringing small denominations (€10 or €20), as these banknotes are easily accepted also in local islands.

REGISTRATION & FEES

REGISTRATION

To proceed with the registration, you are asked to fill in the Google form which you can find at the following link:

<https://forms.gle/xzkMzsTih5ZTk5iC9>

After completing the online questionnaire through the Google form, please send an email to workshop.marhe@unimib.it specifying in the subject: "Name Surname - Shark workshop registration" and attaching:

- A good quality **color scan of your passport as .jpg file** (first 2 pages containing personal data), naming the file with Surname_Name_SW23;
- Your **CV**

Since a selection of the participants will be performed based on applicants' experience and interests, **please wait for our green light before purchasing the flights.** Any errors you make (wrong flight dates or other) cannot be refunded. The maximum number of participants is set to 18 people.

**THE REGISTRATION DEADLINE IS FIXED FOR
1st NOVEMBER 2023**



FEES

The registration fee for the workshop “Sharks of the Maldives: Introduction to Field-based shark research and monitoring techniques” is

€ 1,500.00

The above amount **includes:**

- Transfer between Male airport and the boat
- Food and lodging onboard the M/Y Island Safari 2: full board treatment and accommodation in multiple rooms.
- Transportation to all dive sites and atolls
- Lectures, practical and field activities (2 or 3 dives per day) included in the workshop program
- Water and american coffee
- Beach towel and bath/shower towel
- Daily snorkeling activity
- Excursions on deserted islands and fishing villages
- Assistance by White Waves and MaRHE Center staff

The above amount **does not include:**

- Flight to/for Maldives (Male International Airport)
- Mandatory service fee of **80 USD** per person to be paid directly to the boat manager. The fee should be paid in USD; payment in a different currency is subject to a commission of € 5.

- Tax on tourist goods and services and green tax: **€ 150.00** per person to be paid directly to the boat manager.
- Possible rental of diving equipment (weights and belts are included)
- Passport issuing or renewal costs, if any
- Anything else not specified above
- Wi-fi connection (available on board for **20 USD** per person to be paid directly to the boat manager).

CANCELLATION

Following the payment of the fee, reimbursement for any cancellation will be subject to 10% admin fee.

FLIGHT TICKETS

You will be responsible for purchasing the flight. The choice of the airline is yours, the important is to be at Male (Maldives) airport on the day and at the time established (we will share with you the necessary information once registered). Pay attention while purchasing the flight tickets as your mistakes (incorrect flight dates or other) cannot be reimbursed.

Please wait for our go ahead before purchasing the flight tickets.



COME ONBOARD!

APPENDIX 1: MEDICAL STATEMENT

Please **carefully read** the medical statement which you will need to fill in only once in the Maldives. **Should you reply YES** to any of the questions, you are required to

present a medical certificate following a Physical Examination by your physician. This must be obtained **before travelling to the Maldives**.

The purpose of this Medical Questionnaire is to find out if you should be examined by your doctor before participating in recreational diving. A positive response to a question does not necessarily disqualify you from diving. A positive response means that there is a preexisting condition that may affect your safety while diving and you must seek the advice of your physician prior to engaging in dive activities. Please answer the following questions on your past or present medical history with a **YES** or **NO**. If you are not sure, answer **YES**. If any of these items apply to you, we must request that you consult with a physician prior to participating in scuba diving. Your instructor will supply you with an RSTC Medical Statement and Guidelines for Recreational Scuba Diver's Physical Examination to take to your physician.

____ Could you be pregnant, or are you attempting to become pregnant?

____ Are you presently taking prescription medications? (with the exception of birth control or anti-malarial)

____ Are you over 45 years of age and can answer YES to one or more of the following?

- Currently smoke a pipe, cigars or cigarettes
- Have a high cholesterol level
- Have a family history of heart attack or stroke
- Are currently receiving medical care
- High blood pressure
- Diabetes mellitus, even if controlled by diet alone

Have you ever had or do you currently have...

____ Asthma, or wheezing with breathing, or wheezing with exercise?

____ Frequent or severe attacks of hayfever or allergy?

____ Frequent colds, sinusitis or bronchitis?

____ Any form of lung disease?

____ Pneumothorax (collapsed lung)?

____ Other chest disease or chest surgery?

____ Behavioral health, mental or psychological problems (Panic attack, fear of closed or open spaces)?

____ Epilepsy, seizures, convulsions or take medications to prevent them?

____ Recurring complicated migraine headaches or take medication to prevent them?

____ Blackouts or fainting (full/partial loss of consciousness)?

____ Frequent or severe suffering from motion sickness ?

____ Dysentery requiring medical intervention?

____ Any dive accidents or decompression sickness?

____ Inability to perform moderate exercise?

____ Head injury with loss of consciousness in the past 5 years?

____ Recurrent back problems?

____ Back or spinal surgery?

____ Diabetes?

____ Back, arm or leg problems following surgery, injury or fracture?

____ High blood pressure or take medicine to control blood pressure?

____ Heart disease and/or attack?

____ Angina, heart surgery or blood vessel surgery?

____ Sinus surgery?

____ Ear disease or surgery, hearing loss or problems with balance?

____ Recurrent ear problems?

____ Bleeding or other blood disorders?

____ Hernia?

____ Ulcers or ulcer surgery ?

____ A colostomy or ileostomy?

____ Recreational drug use or treatment for, or alcoholism in the past 5 years?

The information I have provided about my medical history is accurate to the best of my knowledge. I agree to accept responsibility for omissions regarding my failure to disclose any existing or past health condition.

Date:

Signature: