

05 - 12 April 2025

# Sharks of the Maldives: introduction to field-based research and monitoring techniques

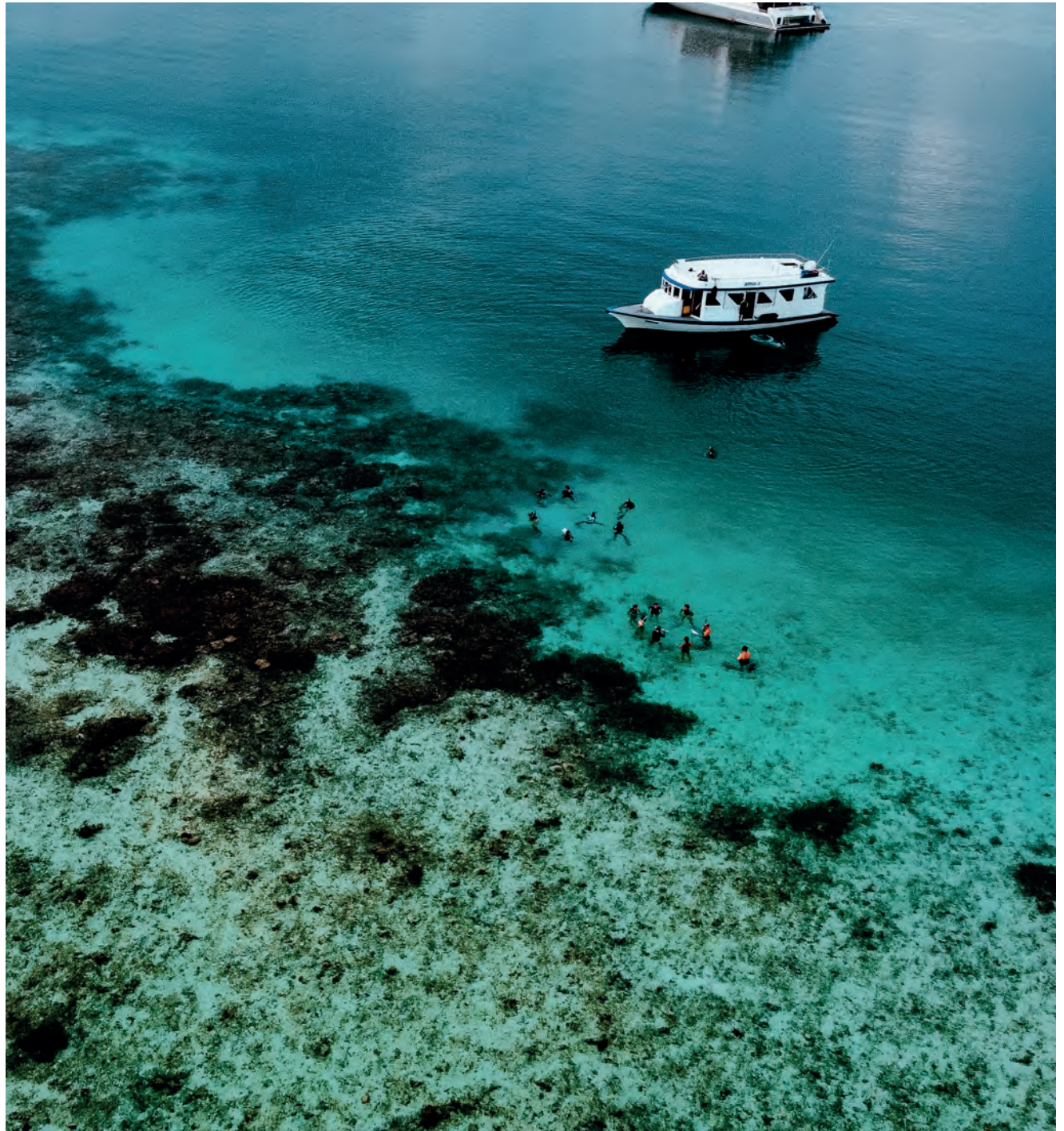
"A scientific diving cruise in the Central Atolls  
of the Maldives" 2<sup>nd</sup> Edition

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

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## INTRODUCTION

Shark populations are facing increasing threats in coastal and open ocean regions worldwide, primarily due to overfishing, bycatch, climate change, and habitat loss, all contributing to biodiversity decline. This results in significant decrease in shark numbers and the degradation of their ecosystems, not only endangering several species but also posing serious risks to the economic stability and food security of many regions, particularly small island nations. In fact, several studies have shown that healthier shark populations often correlate with higher fish biomass and biodiversity within marine habitats. An estimated 100 million sharks are killed each year, and if this level of extraction continues, it will not only deplete shark populations but also disrupt the entire ocean ecosystem through a top-down negative effect. In this global context, the need for trained scientists together with citizen scientists capable of collecting and analyzing data and developing effective conservation strategies, has become crucial to safeguarding elasmobranchs populations.

Only few “hope spots” remain around the world. One of the most important and diverse is the Republic of Maldives, which has become one of the most required destinations for diving and swimming with sharks, thanks to its forward-thinking conservation policies, including the total shark fishing ban implemented in 2010.

During this workshop, you will work alongside marine scientists on a scientific expedition in the Maldives, where you will learn, dive and train in scientific monitoring techniques. The goal of this expedition is to introduce you to both theoretical knowledge and the practical skills necessary for conducting, assisting and supporting research projects focused on shark population surveys and data collection.

The skills acquired in the field of shark biology

and ecology can therefore be applied not only to ecosystem protection and conservation but also to fisheries management, tourism, and academic research.

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 dive survey and photogrammetry techniques to monitor sharks.
- Understand techniques to monitor the movements of individuals.
- Be able to use statistical software such as R and its analysis environment
- 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 diversity.
- Address medical and hyperbaric issues arising from potential accidents during an expedition.

# ORGANIZATION OF THE WORKSHOP

The 7-day workshop will take place from **April 5th to 12th 2025** on 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](http://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](http://www.marhe.unimib.it)), and in collaboration with **Shark Research Mexico** ([www.sharkresearchmexico.com](http://www.sharkresearchmexico.com))

The program includes daily theoretical lessons, practical sessions on shark data collection and analysis, hands-on activities, and intense fieldwork through scuba diving in different reefs located around the Maldivian archipelago. All days will have a minimal of two dives scheduled per day with the option of additional dives when possible. Participants will be assisted underwater by the staff of White Wave and MaRHE Center.

The workshop will be conducted in **English language and all lessons will be provided to participants once the workshop is over.**

**Dr. Darren Andrew Whitehead**, an expert shark researcher with over 15 years' experience working with sharks around the world, will lead the majority of the lessons and shark-based activities. Darren specializes in shark behaviour, health and tracking of sharks as well as the human impact on sharks through tourism and fisheries impact. He is the founder and director of Shark Research Mexico (SRM), a non-profit organization dedicated to the research and conservation of sharks and rays in the Gulf of California. Darren holds both a Master's and a PhD degree in marine biology focused on sharks and has published many peer-reviewed articles on topics ranging from shark habitat suitability to toxicology, reproduction, growth and behaviours, and, since 2010, has been working solely on shark, focusing on species like whale sharks, mako sharks, blue sharks, hammerheads, 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 of 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.

The workshop will be coordinated by researchers from the University of Milano-Bicocca and MaRHE Center, who have extensive experience in tropical marine ecosystems and experts in the coral reef ecosystem of the Maldives from different points of view. In particular, **Dr. Simone Montano** and **Dr. Davide Seveso**, marine biologists, working as Assistant Professors at the University of Milano-Bicocca, Dept. of Earth and Environmental Science (DISAT), and MaRHE Center in Magoodhoo (Faafu, Maldives), where they organize and carry 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 Milano-Bicocca, Dept. of Earth and Environmental Science (DISAT), and at the MaRHE Center. His primary research focus is on shark aggregations, ecology, distribution, and ecotoxicology in the Maldives archipelago. **Jacopo Gobbato**, marine biologist, currently PhD student at the University of Milano-Bicocca, Dept. of Earth and Environmental Science (DISAT), and at the MaRHE Center. His research focuses on biology and ecology of tropical coral reefs, with particular attention to the health of anthozoans in relation to anthropogenic impacts and diseases. He also assists with research on sharks and has a keen interest in their ecology, distribution, and ecotoxicology in Maldivian waters.

# PARTICIPATION REQUIREMENTS

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

The **maximum number** of participants is set at **20. Two scholarships are available exclusively for Maldivian Nationals**. 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.

**Nitrox** is available for **70 euro per week**.

Each diver must fill in upon his/her arrival at the Liveaboard 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't be rented on-site, as well as the **SMB (Surface Marker Buoy)**.



# 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's 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

## **DAY 1 - (Saturday, April 5th):**

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

## **DAY 2 - (Sunday, April 6th):**

- Briefing on dive logistics and safety
- Dive 1 - Check Dive
- Dive 2
- Lesson 1- Shark biology, species identification and behaviour
- Lesson 2 - Introduction to laser photogrammetry
- Briefing on the next day's activities
- Night meeting session

## **DAY 3 - (Monday, April 7th):**

- Dive 3 - Species ID and behaviour
- Practical session - Laser photogrammetry
- Dive 4 - Visual census and photogrammetry
- Lesson 3 - BRUVS explanation, structure purpose, benefits, global research
- Data analysis, introduction to identification software and management of photo libraries
- Briefing on the next day's activities
- Night meeting session

## **DAY 4 - (Tuesday, April 8th):**

- Dive 5 - Laser photogrammetry, species Identification and behaviour
- Practical session - BRUVS construction
- Dive 6 and BRUVS deployment
- Lesson 4 - Terrestrial and aerial drone surveys for sharks
- BRUVS data analysis session
- Briefing on the next day's activities
- Lesson 5: First introduction to R studio

## **DAY 5 - (Wednesday, April 9th):**

- Dive 6 - Hammerhead research
- Practical session - BRUVS deployment, drone surveys
- Dive 7 - Laser photogrammetry, species ID and behaviour
- Lesson 6 - Introduction to first response to potential shark research injuries and dive injuries
- Drone data analysis and BRUVS analysis
- Briefing on the next day's activities

## **DAY 6 - (Thursday, April 10th):**

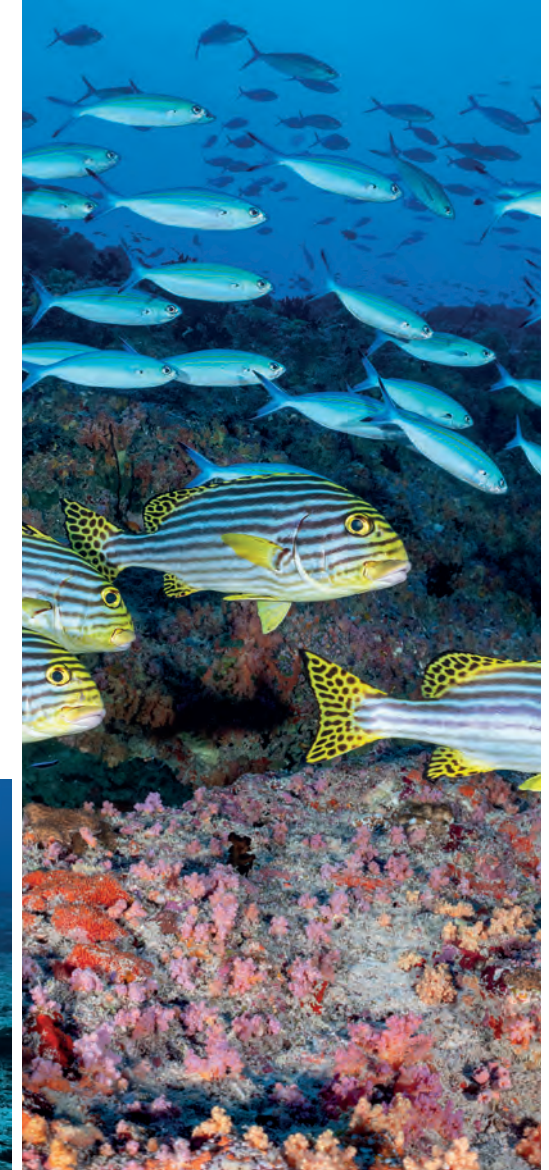
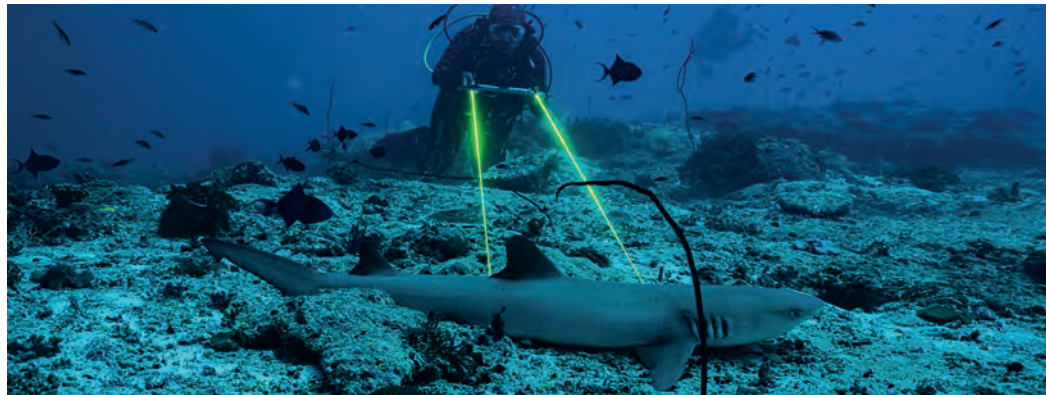
- Dive 9
- Lesson 7 - Introduction to satellite tagging techniques and genetical analysis
- Dive 10
- Seminar on R data analysis with practical examples on shark ecology and Data visualization
- Briefing on the next day's activities
- Night meeting session

## **DAY 7 - (Friday, April 11th):**

- Dive 11- Hulhumale urban sharks
- Presentation of group projects
- Conclusion of the course and free time
- Visit to the capital Malé

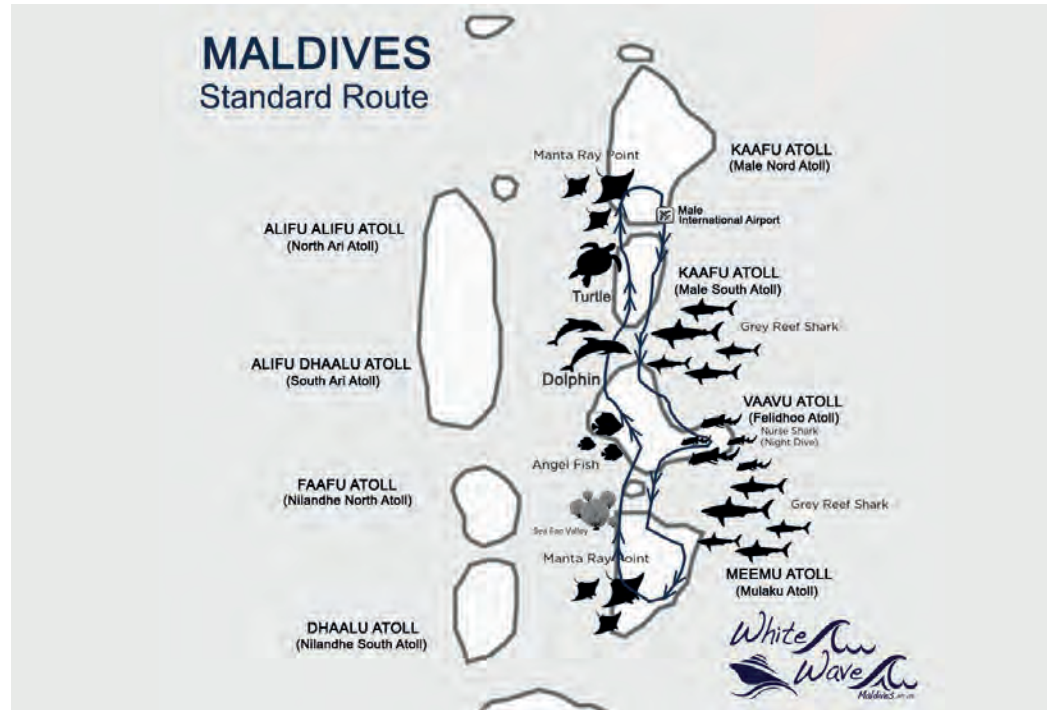
## **DAY 8 - (Saturday, April 12th):**

- Preparation and departure from Malé International Airport



**IMPORTANT NOTES:**

- The **program is indicative**, as it is subject to modifications due to logistical needs or weather and sea conditions. In case of extreme marine conditions, diving activities could be replaced by snorkeling activities.
- 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 shark, grey reef sharks, nurse sharks, and others). However, encounters with these species are not guaranteed.
- Some of the dives could be performed in the 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. For this reason, it is compulsory for each participant to bring the SMB (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.
- If anyone needs to rent scuba gear let them know in advance.
- It is strongly recommended to bring a personal laptop for work and analysis. Specific instructions on software to be installed on personal laptops to ease data analysis and exploration will be provided in detail in due time.





# PRACTICAL INFORMATION

## ACCOMMODATION

The accommodation is provided by the Liveaboard Island Safari 2, in multiple rooms (up to 4 beds). Each room has a private bathroom, air conditioning and a fan. 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 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. For each dive, you will be accompanied by 5 to 6 dive guides, ensuring your safety and comfort, even in more challenging conditions.

## DOCUMENTS

To enter the Maldives it is necessary to have a passport with at least 6 months of validity from your departure from the Maldives. 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 AND EQUIPMENT

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

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

- Mask and fins (either with or without booties)
- Wetsuit (3mm) or shorty wetsuit (water is warm, avoid 5 mm or thicker wetsuits)
- Diving computer (it is mandatory to have your own)
- BCD and regulators
- SMB
- Diving flashlight and underwater camera or Go Pro (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.**

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

## CURRENCY

The Maldivian currency is the Maldivian Rufiyaa (MVR). Euros and dollars are accepted in any bank and exchange offices. 1 Euro € = about 18 Maldivian Rufiyaa (MVR); 1 USD \$ = about 15.42 MVR; It is possible to exchange money at the airport.



## COMMUNICATION

On board the Liveaboard there is a limited free WI-FI service that can be used for educational purposes during the morning and for communicating at home in the evening. However, it is possible to purchase at the airport or in Malé city a local SIM with data traffic, if you want to be always connected. Internet top-ups can be purchased online. It is now available an e-sim card on the Maldivian Ooredoo website, however compatibility with mobile phones must be verified beforehand as not all the brands and models support e-sim cards.



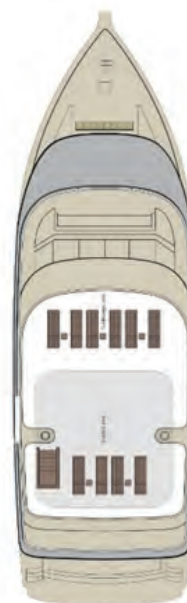
Level 2



Level 3



Level 1



Level 4

### TECHNICAL SPECIFICATIONS M/Y ISLAND SAFARI 2

<b>Year of construction:</b>	2007.
<b>Boat type and hull:</b>	Three-deck wooden motor yacht of Maldivian construction.
<b>Length:</b>	32 meters.
<b>Width:</b>	10 meters.
<b>Decks:</b>	3.
<b>Electrical power:</b>	220/240 volts - 2 silenced generators, 30KV each.
<b>Engine:</b>	480 HP Yanmar.
<b>Cruising speed:</b>	11 knots.
<b>Desalinators:</b>	6000 liters of fresh water per day.
<b>Cabins:</b>	The 9 passenger cabins are all spacious and well-structured to accommodate any needs, families, and friends. They are equipped with a private bathroom with hot and cold shower, and autonomous air conditioning control and are divided as follows: <ul style="list-style-type: none"> <li>• 2 junior suite cabins with double beds</li> <li>• 4 double/twin cabins</li> <li>• 3 triple cabins</li> </ul>
<b>Passenger capacity:</b>	18 pax / 21 max.
<b>Crew:</b>	12 persons and 5 instructors and Divemasters.
<b>Diving crew:</b>	4/5 people.
<b>Restaurant:</b>	International cuisine.
<b>Buffet-style:</b>	Breakfast, Lunch, Dinner + Maldivian-themed evening.
<b>Served bar:</b>	Wide selection of cocktails, wine, liquor, fruit juices, and soft drinks.
<b>Bar lounge:</b>	(1st deck) with TV, DVD player, Hi-Fi system, library.
<b>Telecommunications:</b>	Paid Wi-Fi internet 20\$ per week subject to changes depending on local prices variations. CB radio, GPS, cell phone, and safety devices required by local reg-ulations.
<b>Tender:</b>	5-meter dinghy with a Honda 40 HP outboard motor.
<b>Diving Center:</b>	A well-organized and equipped international diving center. Equipment rental is available onboard if needed.
<b>Support boat:</b>	"Diving Dhoni" with a 4-cylinder engine.
<b>Underwater locator radio:</b>	"Lost diver" safety device.
<b>Compressors:</b>	3 compressors.
<b>Nitrox:</b>	Available for an additional fee.
<b>Cylinders:</b>	12-liter steel tanks with INT/DIN mono valve - 5 cylinders: 15-liter steel tanks with INT/DIN mono valve - 1 cylinder: 18-liter steel tank with INT/DIN mono valve
<b>First Aid:</b>	3 oxygen cylinders of 50 liters each and a complete kit

# FEE & REGISTRATION

## FEE

The registration fee for the workshop "Introduction to Field-based shark research and monitoring techniques" is

**1.800,00 €**

**\*\*Each scholarship for Maldivian citizens covers 1300€ per participant**

The above amount **INCLUDES:**

- Transfer on the boat from/to Malé airport
- Food and lodging onboard the M/Y Island Safari 2: full board treatment and accommodation in multiple rooms.
- Transportation by Liveaboard captain 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 free
- 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 (Malé International Airport)

Per person per week to be **paid directly on the boat by cash or bank transfer (no cards).**

- Mandatory service fee on board **100 USD** per person per week to be paid directly on the boat. The fee requested should be in USD; payment in a different currency is subject to a commission of 5 €
- Tax on tourist goods and services and green tax **200.00 €**
- Possible rental of diving equipment (weights and weight belts are included)
- Passport issuing or renewal costs, if any
- Anything else not specified above

## 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/XQ5dLKisHyYDSiqJ6>

After completing the online questionnaire through the Google form, please send an email to [workshop.marhe@unimib.it](mailto:workshop.marhe@unimib.it) specifying in the subject: "Name Surname - Shark work-shop 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\_SW24.
- Your **CV**

**Important: you will have to wait for our confirmation before purchasing your flight.**

Since a selection of the participants will be performed based on applicants' experience and interests, we will give you the green light to purchase flights and proceed with the fee payment. Any errors you make (wrong flight dates or other) cannot be refunded. The maximum number of participants is set to 20 people.

**THE REGISTRATION DEADLINE IS FIXED FOR 19 January 2025**

## FLIGHT TICKETS

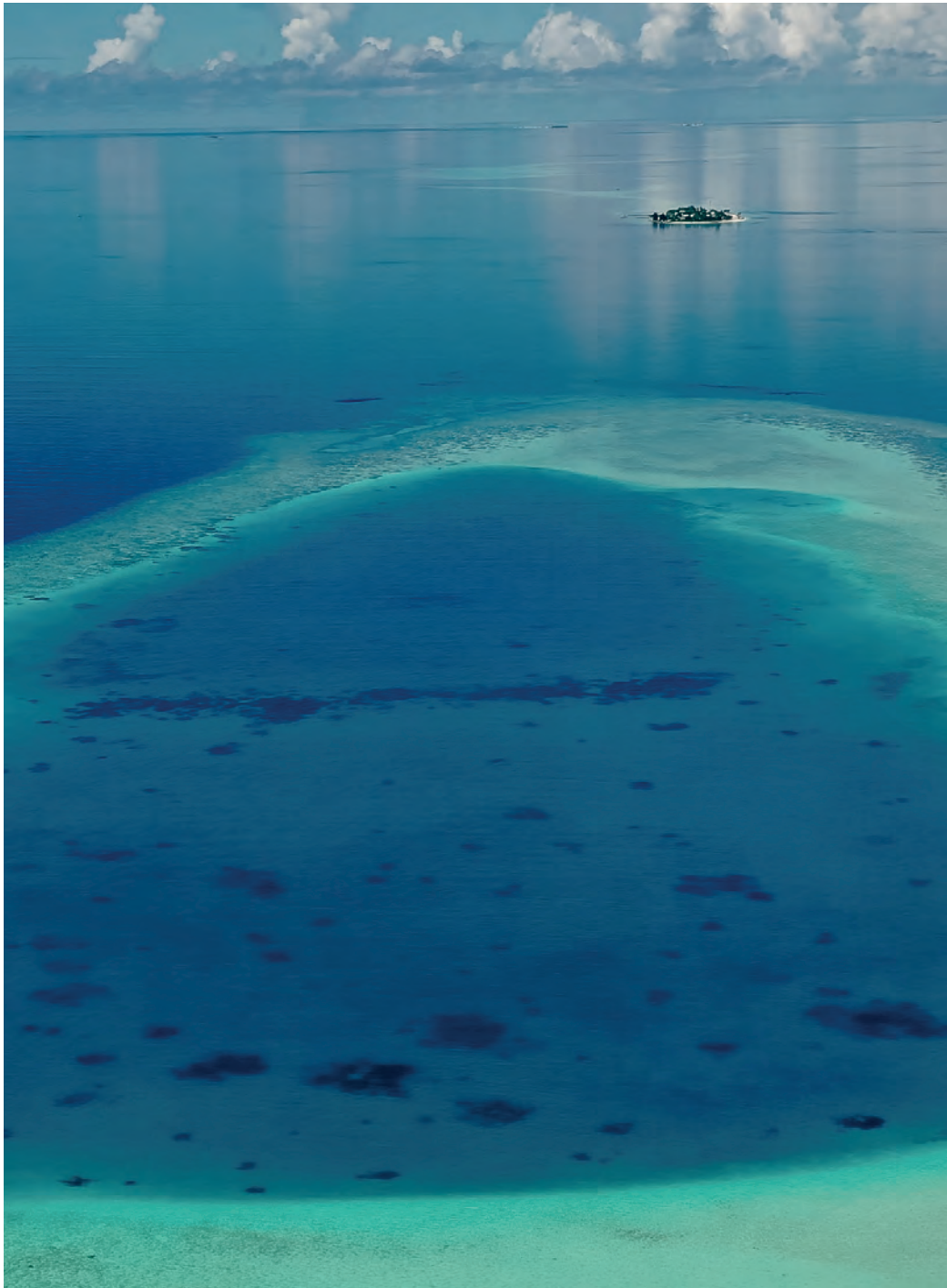
You will be responsible for purchasing the flight. The choice of the airline is yours; the important thing is to be at the airport in Malé, Maldives, on the day and at the time established (we will share with you the necessary information once registered). Pay attention while purchasing the flight tickets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

Furthermore, it will be necessary to send us by mail ([workshop.marhe@unimib.it](mailto:workshop.marhe@unimib.it)) a copy of the air ticket to be able to proceed, if necessary, with the entry visa request, which we will take care of.

## CANCELLATION POLICY

Following the payment of the fee, reimbursements for cancellations will be subject to 10% admin fee. In case of cancellation from the workshop after 15 February 2025, no refund will be possible.





## Appendix 1 MEDICAL STATEMENT

Please carefully read the medical statement which you will need to fill only once on the boat. Should you reply YES to any of the questions, you are required to present a medical certificate following a Physical Examination by your doctor. 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.

- |  |   |
|--|---|
| <input type="checkbox"/> Could you be pregnant, or are you attempting to become pregnant?  | <input type="checkbox"/> Dysentery requiring medical intervention?                                  |
| <input type="checkbox"/> Are you presently taking prescription medications? (with the exception of birth control or anti-malarial)   | <input type="checkbox"/> Any dive accidents or decompression sickness?                              |
| <input type="checkbox"/> Are you over 45 years of age and can answer YES to one or more of the following?  | <input type="checkbox"/> Inability to perform moderate exercise?                                    |
| <ul style="list-style-type: none"> <li>• Currently smoke a pipe, cigars or cigarettes</li> <li>• Have a high cholesterol level</li> <li>• Have a family history of heart attack or stroke</li> <li>• Are currently receiving medical care</li> <li>• High blood pressure</li> <li>• Diabetes mellitus, even if controlled by diet alone</li> </ul> | <input type="checkbox"/> Head injury with loss of consciousness in the past 5 years?                |
| <b>Have you ever had or do you currently have...</b>   | <input type="checkbox"/> Recurrent back problems?   |
| <input type="checkbox"/> Asthma, or wheezing with breathing, or wheezing with exercise?  | <input type="checkbox"/> Back or spinal surgery?  |
| <input type="checkbox"/> Frequent or severe attacks of hayfever or allergy?  | <input type="checkbox"/> Diabetes?  |
| <input type="checkbox"/> Frequent colds, sinusitis or bronchitis?  | <input type="checkbox"/> Back, arm or leg problems following surgery, injury or fracture?           |
| <input type="checkbox"/> Any form of lung disease?   | <input type="checkbox"/> High blood pressure or take medicine to control blood pressure?            |
| <input type="checkbox"/> Pneumothorax (collapsed lung)?  | <input type="checkbox"/> Heart disease and/or attack?   |
| <input type="checkbox"/> Other chest disease or chest surgery?   | <input type="checkbox"/> Angina, heart surgery or blood vessel surgery?                             |
| <input type="checkbox"/> Behavioral health, mental or psychological problems (Panic attack, fear of closed or open spaces)?  | <input type="checkbox"/> Sinus surgery?   |
| <input type="checkbox"/> Epilepsy, seizures, convulsions or take medications to prevent them?  | <input type="checkbox"/> Ear disease or surgery, hearing loss or problems with balance?             |
| <input type="checkbox"/> Recurring complicated migraine headaches or take medication to prevent them?  | <input type="checkbox"/> Recurrent ear problems?  |
| <input type="checkbox"/> Blackouts or fainting (full/partial loss of consciousness)?   | <input type="checkbox"/> Bleeding or other blood disorders?   |
| <input type="checkbox"/> Frequent or severe suffering from motion sickness ?   | <input type="checkbox"/> Hernia?  |
|  | <input type="checkbox"/> Ulcers or ulcer surgery ?  |
|  | <input type="checkbox"/> A colostomy or ileostomy?  |
|  | <input type="checkbox"/> 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: