SUBSTRATE SURVEY MANUAL

MCP'S MONITORING

Through a volunteer-based scientific diving program, Marine Conservation Philippines is focused on collecting and analysing biophysical data on locally-managed MPAs effectiveness & resilience and offer support to local and regional management units. MPA effectiveness is defined using the legal scope of their establishment and the goal to enhance food security for the communities. MCP therefore uses commercial productivity of the ecosystem as a primary indicator of effectiveness, followed by substrate lifeforms composition and resilience considered as indirect indicators, being essential for maintaining a source of food security over the long-term.

Commercial fish & invertebrates diversity, abundance and fluctuations as well as **substrate lifeforms composition & resilience** in the MPAs are being monitored on a **seasonal basis**. The monitoring method used employs the use of 30m transects in a **stratified random sampling** strategy that recognises **three depth ranges** (3-7, 9-13, 15-19). By **observing each depth range and treating the results as an ecologically-representative set**, it is possible to generate an accurate model of the entire reef structure and community, determine its relative health, and track changes in the ecosystem over time.

HOW DOES IT WORKS ? You training for surveys

To be able to carry out the surveys correctly, it is important that you learn to identify and find the different indicator species that we monitor. You will also have to learn and practice the methodology used for surveys. To do so, you will go through a phase of in-water and out-of-water training with an experienced teacher *(staff member, intern or trained volunteer).* To ease training and data collection, MCP separates monitoring per speciality allowing to focus on relevant knowledge and skills to survey one group of indicators and focus on either substrate, commercial fish or invertebrates.

§ **Introduction week :** (1 week and 6 dives *) The first week is made to slowly refresh your diving skills, your awareness of basic marine ecology and introduce our work in MCP. It includes:*

- **Bootcamp (** *1 presentation, 2 dives) to refresh dive skills*
- **Introduction to coral reef monitoring** *(1 presentation and 1 dive) to refresh on marine ecology and get an introduction to MCP's monitoring program and scientific skills you will need underwater.*
- **Introduction to mangroves and seagrass ecosystems** *(2 presentations followed by a Mangrove tour and snorkeling in the seagrass with introduction and identification of key invertebrates)*

- **Introduction to Substrate monitoring** *(1 presentation and 1 dive lead by experienced volunteers who will teach you the basics of Hard and Soft coral identification and help you distinguish healthy and unhealthy organisms)*

§ **Specialty training:** *after a first week all together, volunteers will take part of specialized training for a monitoring speciality. For Substrate monitoring, this training takes an average of 2.5 more weeks. It includes:*

- **Identification training:** (3 presentations, 6 dives minimum, average 1 week) Three days on average to introduce you to the different type of substrate we monitor, their different growth forms and their health. Each day, you will start with a presentation in the morning, followed by 2 identification dives and a quiz in the afternoon. During an identification dive, your teacher will bring a slate with the names of the different type of substrates you were presented in the morning. In the beginning, the teacher will point at live specimens and show you on the slate which it is. You will soon become more knowledgeable and be challenged to identify them yourself. To assist your training it is highly encouraged that you use part of your afternoons for studying. Your teacher will introduce you to different training tools to help you study independently (Power point presentations, anki-decks, flashcards). **Study them !** The quicker you learn the substrates types and their growth forms, the more fun your dives will become and the sooner you will begin surveys! At the end of this first phase of training, you will be asked to go through an Identification Test (dry). Passing rate is 90%. Once you passed it, you will go through an underwater test composed of 50 random substrates to identify correctly (90% rate). When you are ready, you will begin to do transect practices.

- **Substrate Transect Practice :** (2 dives /day, average 1 week,1 underwater test) You will learn to do surveys by conducting transect practices and identifying substrates and their growth forms every 25cm on a transect line of 30m and give the appropriate sign to your buddy / teacher who will be recording the data. You will practice both roles. Once you and your teacher feel that you are prepared you will be tested. You must complete and pass a mock survey test with a designated staff member. You will be assessed on your ability to identify and sign the substrates and their growth forms using the correct methodology.

** It is very important in Scientific Research that the data collection process is conducted systemically showing little differences between each volunteer. This is something that MCP takes seriously; thus, please don't feel offended if you are asked to practice a bit longer. As a volunteer, presumably learning substrates for the first time, it can take a few dives to learn the different categories. Everyone learns at different rates and you will be given as much time and support as needed to reach the level required to collect reliable data.

On top of that, your dive skills also need to be sufficient to ensure both the safety of the reef and yourself. If it turns out that you have a

lot of trouble with swimming upside down, frog kicking and/or keeping your feet up at all times, we'll ask you to do some extra buoyancy practice or join another boot camp. We want to prevent harming the coral while doing research as much as possible. If someone were to accidentally kick a piece of coral and it breaks off, it could take 2-10 years to regrow, depending on the species of coral. This is another aspect that MCP takes very seriously, so again, please don't be offended if we ask you to take a little more time to work on your dive skills; we are committed to working with you to make you a better diver. At the end of the day it will make diving for you easier and more enjoyable.

Your survey material

- 30 meter reel
- Two personal substrate slates per team
- 2 Pencil and at least 1 spare pencil per team
- An eraser in the car
- Substrate book

The surveys methodology :

- The surveys takes place **in a buddy pair** along a **30m transect line** over **continuous reef** within a depth range that will be given to you (3-7, 9-13 or 15-19 meter deep).
- After you are given a dive briefing, you will be asked to lay out your reel in a random location of the reef within the depth range you were given. You will also have to follow a compass heading (given) while laying out the transect. It is very important that you perform your survey over continuous reef and that you make sure that you are at least 15 meters away from any other survey reels.
- To perform a survey, you follow the transect line and together with your buddy look at every 25cm on the line. One will be identifying and signaling to the other diver who will be in charge of recording the data on the slate. Roles will change. This buddy system allows better safety while diving, and a "back up brain" if confused at a substrate type during your survey.
- Depending on your air consumption and the depth you will be at, you will be able to perform more than one survey in one dive. You can finish a survey on the second dive if you are not done with it, but a 30m survey will always be completed on the same day, it cannot be divided into two days.
- Depending on the depth of the transect and the dive location, the type and health of substrates you will encounter will be different and therefore your dive time can differ as well. As a rule of thumb, take at least 15 minutes for a 30m transect.

A few things to keep in mind

- Make sure to check your air regularly. Let your buddy know after each 30m transect how much air you have left. You might have the feeling your overdoing it a bit in checking your air, but we notice that a lot of volunteers forget to check their air while they are doing research. Just like any dive, stay close to your buddy so you can respond quickly should an emergency occur.
- When assigned to the deeper transects, make sure to do a safety stop. If you are down to 60 bar and you are not finished, abort the rest of the survey. **Don't start rushing to finish it,** because you will be overlooking substrate and could endanger yourself by getting to low on air. Do a safety stop and surface.
- If a person has an emergency/is not feeling well, abort the survey. Surface together as a buddy team and ask help from another team if necessary. If it turns out to be a minor problem and you both have enough air, you can continue the survey.
- **SAFETY COMES FIRST!**

Data entry

Once you have finished your diving, you will enter your data in the database. Your teacher or an experienced volunteer will explain to you how that works. Make sure you enter your data accurately. If you make any mistakes, it is almost impossible to correct them later, as you will need to erase the data on your slate for the next survey. After you have entered the data, go over it again and compare the data from the data sheet with your slate. Please enter the data the same afternoon and don't wait until the next day, as it is easy to forget and this often results in lost data.

What do we do with the data?

MCP is interested the effectiveness of Marine Protected Areas in preserving healthy ecosystems and commercial organisms in the region. Changes on the reef occur slowly and often take several years. Since our monitoring is long term, we will be able to monitor the health of the reef over several years and notice any incline or decline in health. The long term monitoring program is especially useful in the case of anthropogenic (human) threats or natural disaster disturbing the reefs. In the region, this can most commonly be the impacts of overfishing, pollution, climate change and storms or typhoons.

Our data from the monitoring of commercial fish, invertebrates and substrate is analyzed all together every season. We share it regularly with local governments units to support their coastal resources management strategies and actions.

Other organizations such as BFAR (Bureau of Fisheries Management and Agricultural Resources), DENR (Department of Environmental and Natural

Resources), and other NGO's are also interested in the data. This is also sometimes the case of independent researchers who contact us or join us for a period of time in that purpose.