

Fish surveys

Long term volunteers can take part in the fish surveys. These surveys are the most complex research we do with volunteers. You have to learn a lot, but in return you will receive a lot of knowledge. Since it is not possible to look at all the fish species, we have made a selection of about 75 indicator fish species. These species have been selected because they play an important role in the ecosystem. The list contains species that are influenced by anthropogenic threats like overfishing and aquarium species, species with completely different diets ranging from predator to plankton eaters, species from different functional groups, species with varying home range (from less than 100m to several km), and preference for clear water etc. They all have one thing in common: they live (part of their life) on the reef.

If you have ever done a Reef Check survey, you will recognize the survey method. We use the same method, but collect much more additional data because Reef Check only gives an indication of human impact on the reefs.

Becoming part of the fish survey team

It takes a lot of time and effort from both you and your teachers to become a member of the survey team. For this reason only volunteers who are here for 8 weeks or longer can participate in the fish survey. After two weeks of training you will be able to participate in the surveys for at least 4 weeks. It also depends on how many fish observers we have at the moment your joining MCP. If we already have a team that is big enough, your help is much more needed on the invertebrate and substrate team.

First you will have to learn the different fish families. This will take 4 dives (2 days). Your teacher (staff member, intern, experienced volunteer) will teach you the families. You start on land with a Powerpoint presentation, followed by teaching under water. During afternoons you can practice with the Anki card deck for fish at family level. This is a game which remembers which fish you don't know yet and a fun way to practice your knowledge. Go to common drive on the MCP computer or one of the laptops or download Anki on your own laptop or smartphone.

When you feel comfortable enough with the fish at the family level, it's time to learn the indicator fish species. It's not easy to learn 75 different fish species, so it will take a while. You'll start with learning the fish that are easy to recognize and/ or are quite common first, like the different Butterflyfish and Angelfish. You will need at least a week, but probably 1.5 week of practising, both on land and in the water. Each afternoon will be dedicated to memorizing the indicator species. You can use the Powerpoint, but there is also an Anki practice deck for fish at species level available. Your teacher will add few new species to the list each day.

In the morning, a member of the survey team will teach you the different fish under water. All the names are written on a slate that you will bring with you. The teacher will point out the fish in the water and then on your slate. After a few dives your teacher will point at a fish in the water and you will identify them on the slate.

After you know about 75% of the species, you'll be making your own fish slate for the surveys. A member of staff will tell you when you can start. Part of your dives will be dedicated to learning the survey technique, reeling out a transect and practising a survey. After you know the fish species and have practised a transect, you will learn to estimate the length of fish under water. You will have to become a good estimator of fish length because during a survey we note all the fish species that we see on our transect, but also include length of most individual fish. After about 16-20 dives, if both you and your teacher think you might be ready for surveys, you will be put to the test.

Test 1 is above water. You need to be able to recognize 40 different species and get a 90% or higher score. Test 2 and 3 are under water. Test 2 consists of a staff member pointing at different fish and you showing him/ her on the slate which species they are. You only pass with a 90% score or higher. The last test is a mock survey. Both you and the dedicated staff member will practice a survey. You will both survey the same site of the transect and your survey will be compared to your teacher's. If the accuracy rate is sufficient you will become the newest member of the survey team. However, if the accuracy rate is determined to be below the standard, you may be asked to do a few additional dives to work on your skills, at which point you will be retested. 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. 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 frog kicking and/or keeping your foot 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.

Fish survey

TOOLS:

- 100 m reel
- Fish slate
- Spare weight (1 piece of 2 pounds)

DURING ALL ACTIVITIES, MAKE SURE YOU DON'T DAMAGE THE REEF OR OTHER MARINE LIFE!

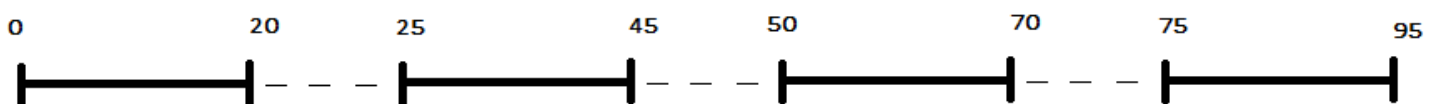
PART 1 REELING OUT + SURFACE WAIT:

- Before you go into the water, take a compass heading of your entry and exit point;
- Make sure you know you know more or less the location of the transect before you go in the water. Each start and end point is marked with a float. Each site has two transect lines, between 4-6 metres and between 9-11 metres. Some of the transects are permanently marked with rope, while others are only marked with zip ties attached to the substrate;

- Find the start of the transect and secure the tip of the reel at the starting point with a clip;
- Start the reeling out in the right direction (differs per dive site) and along the way you will find zip ties attached to hard corals or rock. Put the line down along the zip ties. If you don't find the zip ties, check your dive computer if you are still on the same depth as the starting point. As long as you stay on the same depth in the right direction you are supposed to find zip-ties along the way that confirm that you are following the transect;
- Reel out until your transect line is between 95-100 meters. You should be seeing a float that marks the end of the transect. Secure the reel by weighing it down and put it behind/ under a rock;
- Swim back to the starting point, while keeping a distance of at least 4 meters from the transect line. Keep in mind that if the second fish team is reeling out the other transect, you can't swim too close to their transect either. If you just reeled out the 5 meter transect, swim back at the shallow side of the transect. With reeling out the 10 meter transect, swim back at the deep side of the transect, but don't follow the bottom otherwise you use too much air. Keep a depth of 5-10 meter;
- Wait at the surface near the starting point until 15 minutes have passed and always keep an eye on the transect line. It is very easy to lose the start of the transect because the surface current moves you away from the transect. If you have avoided the transect line during the swim back, you can deduct it from the 15 minute surface wait. Avoiding the transect line for 15 minutes is to reduce the influence of the presence of the divers in the research area and gives the fish the chance to settle again.
- Put up a SMB just before you start, so the teams on land know when you start the fish survey.

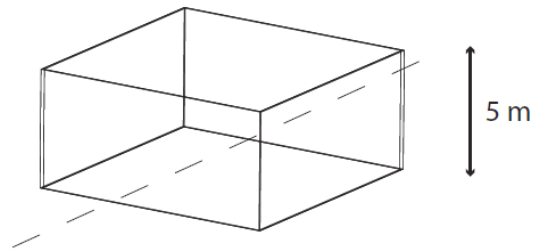
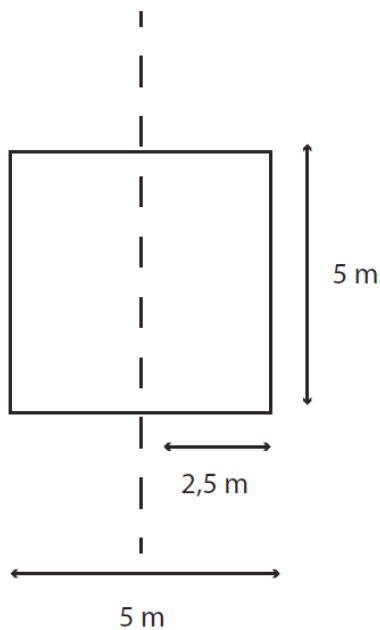
PART 2 THE SURVEY:

- Make sure both observers have enough air left for the whole survey;
- The transect line exist of four 20 meter transects with a gap of 5 metres between each transect, adding up to 95 meters in total;

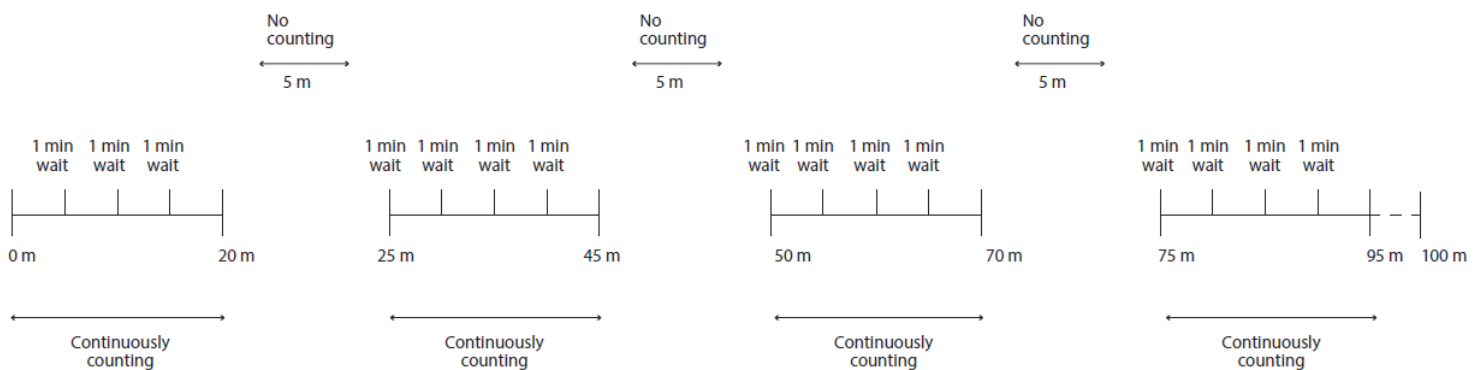


- One observer swims slowly at the right side of the line and one observer at the left side of the line;
- During the survey the observers swim through an imaginary square tunnel of 5 metres width and 5 metres high. The fish species will only be tallied in this square. So each observer will survey 2.5 metres from the reel to the left/right (depends on which side you are) and 5

metres high;



- All fish in your imaginary square will be tallied. It is easy to overestimate the 2.5m width of the transect. If you're not sure whether a fish is in or outside the square, position your body perpendicular to the transect with outstretched arm and fins, so you have a better idea of the distance.
- In between the transects NO FISH WILL BE TALLIED. If you see a fish at 10m distance and your almost at the end of your transect, try to visualize whether the fish is on a transect or in a gap between two transects;
- Both observers swim slowly at the same level along the transect line on their own side. Every 5 metres the observers stop for 1 minute so fish can settle along the transect line. Make sure you swim at the same speed;



- Besides tallying all the indicator species and estimating their length, the families of the Butterflyfish, Angelfish, Surgeonfish, Sweetlips, Snappers, Rabbitfish, Groupers and Parrotfish are also tallied.
- You are counting individual fish. If the same fish keeps swimming in front of you or you think the same fish is returning, don't count the fish again;
- If a fish swims from one half of the transect to the other half of the transect, make sure you communicate with each other who is tallying the fish. It makes most sense if the person makes the tally on the half of the transect where the fish occurred first;

PART 3 REELING IN:

- You only need to reel in if there is no invertebrate or substrate team;
- If needed, remove the weight from the reel and add it to your weight belt;
- One team member reels in and the other one swims at a small distance in front of the other observer to make sure the line isn't entangled between corals or other materials;
- MAKE SURE THE REEL IS NICE AND TIGHTLY REELED IN, WITHOUT TWISTS!;
- Carefully remove the clip from the start point and swim with the SMB to the shore or if the current is too strong swim to the surface and deflate the SMB. Don't forget your safety stop if you did the 10m transect.

A few things to keep in mind:

- Make sure to check your air regularly. Let your buddy know after each 20m 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 10-12m transect, make sure to do a safety stop. If you are down to 40 bar and you are not finished, abort the rest of the survey. Don't start rushing to finish it, because you will be overlooking fish and could endanger yourself by getting to low on air. Do a safety stop and surface. We would rather do the survey again and collect reliable data.
- 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.

Data entry

Once you have finished your diving, you will enter your data in the database. 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.

Use of the data

MCP is interested in the health of the coral reef. Changes on the reef occur slowly and often take several years. Because the 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 if an anthropogenic (human) threat or natural disaster takes place. Hopefully it doesn't happen, but if a typhoon occurs we can show data about the recovery of the reef and compare it to its previous state. We can also monitor the influences of human impact and report our findings to the authorities, such as when oil is dumped into a river that empties into the ocean next to a dive site etc.

Part of the data we collect we submit to Reef Check, an organization that has a worldwide monitoring program. They publish a yearly report on the status of the global reef health to which MCP contributes as well.

The data we collect is also used for updating the Coastal Resource Management plan of Zamboanguita. The municipality would like to have data about the Marine Protected Areas (MPA's) within the municipality (Basak, Lutoban Pier, Lutoban South and Dalakit). The same goes for the municipality of Siaton (Andulay). There is already a discussion going on for quite a few years whether Kookoo's Nest can become an MPA. MCP would like to assist and collecting long term monitoring data is a first step in convincing people this is an important area for conservation.

We are also able to keep an eye on increasing or decreasing fishing pressure of different areas and can warn the authorities if the fish abundance or fish diversity changes.

Other organizations are also interested in the data like BFAR (Bureau of Fisheries Management and Agricultural Resources) and NGO's.